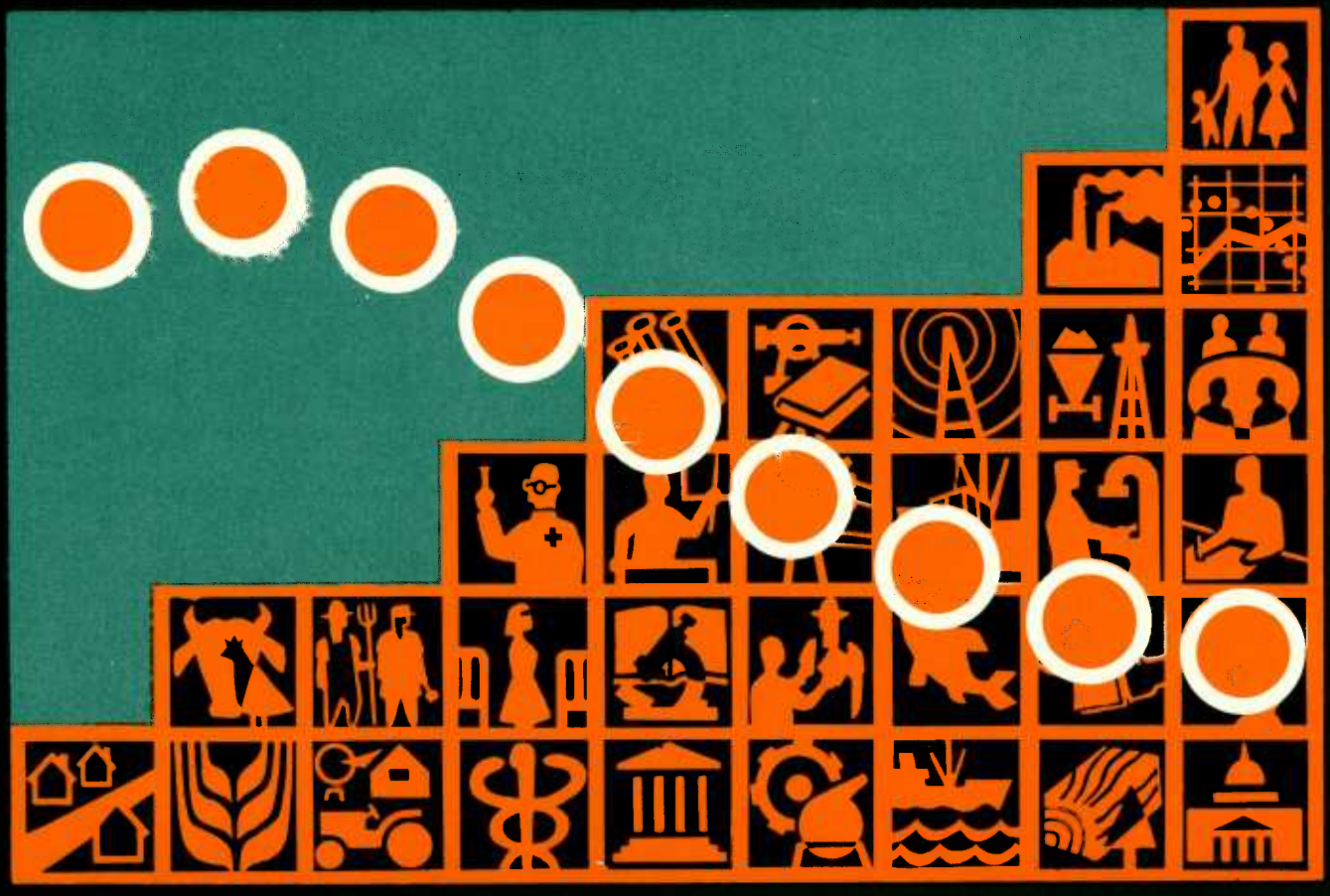
WORLD POPULATION TRENDS AND POLICIES

1981 Monitoring Report

VOLUME I

Population Trends



UNITED NATIONS

DEMOGRAPHIC PUBLICATIONS OF THE UNITED NATIONS

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Department of International Economic and Social Affairs
Population Studies, No. 79

WORLD POPULATION TRENDS AND POLICIES

1981 Monitoring Report

VOLUME I

Population Trends

UNITED NATIONS
New York, 1982

NOTE

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In some tables, the designations "developed" and "developing" economies are intended for statistical convenience and do not necessarily express a judgement about the stage reached by a particular country or area in the development process.

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PREFACE

The World Population Plan of Action, adopted by the United Nations World Population Conference at Bucharest in 1974, recommended that monitoring of population trends and policies "should be undertaken continuously as a specialized activity of the United Nations and reviewed biennially by the appropriate bodies of the United Nations system, beginning in 1977".[1] The present report is the third in a series of reports on this activity. The report of the first round was prepared in 1977[2] and the report of the second round was prepared in 1979.[3]

Prior to the report on the first round of monitoring, the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat had carried out numerous assessments of population trends. Mention should be made, for instance, of *The World Population Situation in 1970*,[4] *Population Bulletin of the United Nations, No. 7—1963, with special reference to conditions and trends of fertility in the world*,[5] *Levels and Trends of Fertility throughout the World, 1950–2000*,[6] *The Situation and Recent Trends of Mortality in the World*,[7] *Growth of the World's Urban and Rural Population, 1920–2000*;[8] and three consecutive reports on *World Population Prospects as Assessed in 1963, 1968* and *1973*.[9] Recent assessments can be found in *World Population Trends and Prospects by Country, 1950–2000: Summary of the 1978 Assessment*,[10] *Selected Demographic Indicators by Country, 1950–2000: Demographic Estimates and Projections as Assessed in 1978*[11] *and World Population Prospects as Assessed in 1980*.[12]

The outline of this report on the monitoring of population trends was based on the discussion at the twentieth session of the Population Commission.[13] In addition to a general survey of the world population situation, special topics dealing with the relationships between population and development were included, emphasizing such important areas as the association between fertility, mortality and socio-economic variables, the developmental aspects of mortality differentials, the causes and consequences of internal migration in developing countries; the determinants of labour force participation, with special emphasis on the demographic characteristics of working women; the demographic impact on consumption patterns, the population-supporting capacity of agricultural land, and the disparities associated with socio-demographic development.

The report on monitoring of population policies (volume II) was prepared by the Population Division on the basis of official government sources, including the "Fourth Population Inquiry among Governments in 1978: review and appraisal of the World Population Plan of Action", statements made by Governments and national development plans.

The Population Commission at its twenty-first session, held from 26 January to 4 February 1981, reviewed a draft of this report and expressed the view that the monitoring of trends and policies provided an essential service to countries as well as to the international community.[14] The Commission recommended that the report be published and made available to Governments and institutions interested in population studies.

Acknowledgement is due to the United Nations Fund for Population Activities whose grant (GLO/78/P09) made the printing of this publication possible.

[1] *Report of the United Nations World Population Conference, 1974, Bucharest, 19–30 August 1974* (United Nations publication, Sales No. E.75.XIII.3), part one, chap. I, para. 107.

[2] United Nations publications, Sales Nos. E.78.XIII.3 and 4.

[3] United Nations publications, Sales Nos. E.79.XIII.4 and 5.

[4] United Nations publication, Sales No. E.71.XIII.4.

[5] United Nations publication, Sales No. 64.XIII.2.

[6] United Nations publication, Sales No. E.77.XIII.2.

[7] United Nations publication, Sales No. 62.XIII.2.

[8] United Nations publication, Sales No. E.69.XIII.3.

[9] United Nations publications, Sales Nos. 66.XIII.2, E.72.XIII.4 and E.76.XIII.4.

[10] United Nations publication, non-sales (ST/ESA/SER.R/33).

[11] United Nations publication, non-sales (ST/ESA/SER.R/38).

[12] United Nations publication, Sales No. E.81.XIII.8.

[13] See *Official Records of the Economic and Social Council, 1979, Supplement No. 2* (E/1979/22).

[14] See *Official Records of the Economic and Social Council, 1981, Supplement No. 3* (E/1981/13).

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Explanatory notes

The following symbols have been used in the tables throughout the report:

Three dots (. . .) indicate that data are not available or are not separately reported.

A hyphen (-) indicates that the item is not applicable.

A dash (—) indicates that the amount is nil or negligible.

A minus sign (−) indicates a deficit or decrease, except as indicated.

A full stop (.) is used to indicate decimals.

A slash (/) indicates a crop year or financial year, e.g., 1970/71.

Use of a hyphen (-) between dates representing years, e.g. 1971-1973, signifies the full period involved, including the beginning and end years.

Details and percentages in tables do not necessarily add to totals, because of rounding.

Reference to "dollars" ($) indicates United States dollars, unless otherwise stated.

Reference to "billion" indicates a thousand million.

INTRODUCTION: OVERVIEW OF RECENT POPULATION TRENDS AND POLICIES

As the twentieth century draws to a close, the evidence continues to mount that a movement towards fertility decline is under way in the developing countries[1] and the trend of moderation in the rate of growth of the world population is sustained. Recently revised estimates by the United Nations Secretariat indicate that the annual rate of growth of the world population may decline to 1.5 per cent by the end of the century, from 1.7 currently and 2.0 per cent 15 years ago. To be sure, the decline is small and its significance lies mainly in its persistence and anticipated acceleration. Otherwise, substantial population increase, mainly in many of the developing countries, will persist and will continue to be among the major factors influencing the present and future of humanity.

The decline in the birth rate in developing countries, from 41 per 1,000 during the period 1960–1965 to 32 per 1,000 at this time, was largely brought about by declines in China and some other countries of East Asia and in several countries of South Asia and Latin America. However, no decline is yet apparent in Africa and in other countries of South Asia. The developed countries, on the other hand, continue to experience a decline in fertility.

Declining fertility in the developing countries has caused a corresponding decline in the proportion of children and young people (aged 0–14 years), from 42 per cent in 1970 to the current level of 39 per cent. The old-age component in developing countries, though relatively small, is growing rapidly.

Mortality regained world attention in the 1970s as a serious demographic problem amidst signs of a slackening in the rate of decline. In particular, mortality remains high in most sub-Saharan countries of Africa; and life expectancy there will probably fall short of the targets set for 1985 by the World Population Plan of Action.

The imbalance between urban population growth and the availability of essential services and employment is also causing serious problems, particularly in the developing countries. The continued flow of migrants from rural to urban areas is parallelled by movements of workers from poorer to richer countries. A new pattern of international migration is the flow of migrants to the oil-exporting countries of Western South Asia. Another recent trend of international migration is the increasing number of refugees. Of the 8.0 million refugees, 6.4 million were found in developing countries.

The trends in population growth, fertility, mortality, age structure, urbanization and international migration, along with a number of studies on the interrelationships between population and various aspects of socio-economic development, are introduced in this overview. A more detailed treatment of these subjects is set forth in the main body of the report.

POPULATION TRENDS

World and regional population growth

Although the demographic conditions in the developed countries are becoming more and more homogeneous, there is a large degree of heterogeneity among the developing countries. Thus, due to different demographic circumstances, the major developing areas of the world have different levels and trends of their growth rates. Africa, with very high levels of fertility and generally high but declining mortality, has the highest annual rate of growth in the quinquennium 1975–1980, namely, 2.9 per cent; and the recent trend in this rate has been increasing, mainly as a result of the mortality decline. Africa is followed by Latin America, where, because the fertility decline has been relatively rapid, the average annual rate of growth during the past five years was 2.5. East Asia has been experiencing a rapid decline in its rate of growth, which was estimated at 1.4 per cent during the period 1975–1980, due largely to the rapid fertility decline in China. In South Asia, there has only been a small decline in the rate of growth, which was about 2.4 per cent per annum until recently and which now stands at 2.2. The highest growth rate observed during the past quinquennium in a developed region was 1.2 per cent in Australia and New Zealand, and the lowest growth rates were 0.05 in Western Europe and 0.10 in Northern Europe. Both Northern America and the Union of Soviet Socialist Republics had growth rates of 0.9 per cent per annum.

The United Nations demographic projections anticipate a growth rate of 1.7 per cent per annum for the world in the 1980s, 0.6 in the more developed regions and 2.1 in the less developed regions. Africa is the only major area where an increasing growth rate is projected, in anticipation of continued though slow mortality decline and an even slower fertility decline. Annual growth rates of 3.0 per cent or higher are consequently expected in Western and Eastern Africa during the remaining two decades of

[1] For convenience, the largest groupings used below for dealing with trends are the categories of "less developed regions" and "more developed regions" as established by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat, on the basis of socio-economic and demographic criteria. The former category includes all countries of Africa, Latin America, East Asia (excluding Japan), South Asia and Oceania (excluding Australia and New Zealand). The latter category includes all countries of Northern America and Europe, the Union of Soviet Socialist Republics and the countries just cited as being outside the "less developed" classification. Within these two broadest groupings, there are eight "major areas" subdivided into 24 geographical regions, which are used at numerous points in the text and tables.

the twentieth century. Although the average rate for the developing countries as a whole is expected to be 2.0, rates between 1 and 2 per cent are anticipated in the Caribbean, Temperate South America and China. All developed regions are expected to maintain rates below 1 per cent, possibly excluding Australia and New Zealand.

Decelerating rates of growth during the 1990s are projected throughout the 24 geographical regions into which the world is divided in the United Nations projections. In the last decade of the century, 3 per cent growth rates are expected to disappear; and China and Temperate South America are expected to have rates near 1 per cent. The lowest rates of growth are anticipated in Europe, where each of the four regions is expected to have growth rates well below 0.5 per cent.

Projections beyond the year 2000 naturally involve more uncertain assumptions. Assuming moderately declining fertility trends in all the current high-fertility countries and a modest increase in fertility among those with low fertility, the medium variant projects a total population of approximately 6.8 billion in the developing countries in the year 2025, with a rate of growth of 1.1 or about half the current rate. On the other hand, a total population of about 1.4 billion is projected for the developed countries; and their growth rate is estimated at 0.2 per cent or virtually nil. Hence, the world population is projected to increase to almost 8.2 billion in 2025, thus doubling its 1975 size within 50 years (the low and high variant estimates are 7.2 billion and 9.1 billion), with a rate of growth at that time of about 1 per cent (0.6 and 1.3 according to the low and high variants, respectively).

Therefore, by the end of the first quarter of the twenty-first century, it is projected that almost 83 per cent of the world population will be living in the currently developing countries, compared with 74 per cent at this time. The projections to the year 2025 anticipate a trebling of the population of Africa, an increase of 150 per cent in Latin America, a doubling of the population of South Asia and an increase of slightly below 50 per cent in China, by which time the annual rate of growth in China will have dropped to 0.4 per cent, compared with 1.9 in Africa, 1.6 in Latin America as a whole and 1.0 in South Asia.

Fertility

The picture provided by recently available estimates of fertility levels and trends in Asia is one of continuing decline. This trend is, of course, substantially influenced by China, where estimates indicate that the birth rate had reached a level of 18 per 1,000 in the late 1970s and a further decline is expected. Hong Kong and Singapore also had low levels nearly equivalent to those of the developed countries, namely, 17.5 and 17.0, respectively, per 1,000 in 1978, nearly half their levels in the early 1960s. Levels below 30 per 1,000 have also been attained in the Republic of Korea and Sri Lanka, and there is evidence of considerable fertility decline in Indonesia. However, the traditionally high levels of fertility are still dominant in most of Middle South Asia, as well as in the Arab countries of Western South Asia.

There is little evidence of any decline in Africa; birth rates of 45 per 1,000 and over still prevail, particularly in Eastern and Western Africa. Some countries of Middle Africa show lower levels, which are thought to be due to health and nutrition rather than to deliberate fertility control. The scanty data on trends suggest that birth rates may have increased in some countries, possibly as a result of improving health, decreasing prevalence of venereal disease and other fecundity-impairing ailments, and shortening periods of breast-feeding.

Compared with Africa and Asia, Latin America had lower and better documented fertility levels. Excluding the Dominican Republic, Haiti and the Windward Islands, the Caribbean region had birth rates below 30 per 1,000, among the lowest in the less developed regions; and the three countries in Temperate South America — Argentina, Chile and Uruguay — had rates below 25. Elsewhere in Latin America, impressive declines in the crude birth rate to levels below or near 30 are indicated in Costa Rica and Panama in Middle America, and in Colombia in Tropical South America. There is also evidence of some decline in the larger countries of those two regions, such as Brazil, Mexico and Venezuela. However, very high levels still exist in the remaining countries in the two regions, with no indication of a decline.

The extent of the fertility decline in the developed countries can be realized from the observation that, excluding Iceland and Ireland, all countries of Northern and Western Europe, as well as those of Northern America, have maintained fertility levels close to or below replacement since early in the 1970s.

This group of countries has more recently been joined by Italy, close to replacement, indicating a continuous convergence of levels. The general trend in the Western developed countries is still downward, although in recent years the decline has been mostly small or nil. The decline in these countries has been brought about more by reducing births of third and higher order than by curtailing those of lower order. Slight increases in fertility have been observed recently in a few developed countries, but it is too early to know whether the change is indicative of a genuine trend.

In the Eastern European countries, fertility slowly increased during the late 1960s and the first half of the 1970s. That increase was largely brought about by pronatalist policies which ranged from family allowances to restriction of abortion. The trend appears to have terminated and it is only in the German Democratic Republic that the total fertility rate rose after 1975. Despite these differences in fertility trends between the centrally planned economies of Eastern Europe and the Western market economies, and the fact that fertility levels are generally higher among the former group, it should be realized that levels in most centrally planned economies are not far from replacement.

Considerable efforts have been made to understand the determinants of fertility levels. Methodological difficulties and lack of detailed information, particularly in developing countries, have limited knowledge mainly to such socio-economic correlates as education, occupation

and type of place of residence, each of which is a complex indicator composed of social and economic elements as well as others reflecting values and attitudes. Within the developed countries, recent information, including the results of the World Fertility Survey, seems to indicate that fertility is less related to social, economic or cultural conditions than ever before. Differences between urban and rural areas, subregions within countries, income groups and religious groups have been considerably narrowed.

Some recent information on the correlates of fertility in developing countries is provided for 15 of those countries by the World Fertility Survey. Inter-country comparisons, which generally indicate a negative relationship between fertility level and socio-economic status, are facilitated and rendered more accurate by the standardized procedures followed in the survey. In the case of education, data from the Latin countries of America included, when analysed by marriage cohorts, show an inverse relationship between education and the number of children ever born in each cohort. In the countries of Asia included in the survey, a general negative relationship also existed, except in Indonesia, where parity increased with education.

Similarly, a lower urban than rural parity differential is also generally shown by the results, although the extent of the difference varies substantially. Uncertainty as to whether the divergences from this pattern are due to such factors as improvement in health and nutrition in rural areas or to differences in stability of marriage demonstrates the need for a deeper analysis than that provided by the urban rural dichotomy.

Some information concerning fertility and labour force participation of women is also provided by the World Fertility Survey. In six out of seven countries, it was found that among women with 10–19 years of marriage, those who had ever worked since marriage had somewhat lower parity than those who had not. The differentials between women who had worked before marriage only and those who had never worked were small. The survey results also confirm that women in white-collar and professional occupations tend to have smaller families than those in blue-collar and service occupations, while agricultural workers generally have the highest fertility level. It has also been found that the relationship between fertility and wife's occupation was similar to the relationship between fertility and the occupation of the husband.

A main factor in the fertility decline observed in many developing countries is the use of contraceptives, information about which was also provided by the World Fertility Survey. The results from 20 developing countries[2] were available at the time of writing. Although these countries cannot be regarded as representative of all developing countries, the group includes populations of different cultural and economic backgrounds. The results show a high level of awareness of contraception in most of the countries surveyed; in all the 20 countries except Nepal, at least three quarters of ever-married women of reproductive ages had heard of a modern method. Needless to say, knowledge does not imply practice; and in each of the nine countries for which the information is available, the percentage of those who knew of a family planning outlet was lower than the percentage who knew of a modern method. Thus, in many countries, substantial numbers of women, often a large majority, do not know where to obtain family planning services. The results also show that rural women and women with little education are usually less likely than others to know of where get these services.

Results of the World Fertility Survey indicate that a relatively high degree of contraceptive use exists in Latin America. The proportion of currently married women of reproductive ages who had ever used contraceptives ranged from 47 per cent in Mexico to 84 per cent in Costa Rica. The range was much wider and the level lower among the countries of Asia and Oceania, from 4 per cent in Nepal to 69 in Fiji. In Latin America, the proportion of those who were currently using ranged from 30 in Mexico to 64 percent in Costa Rica; and in Asia and Oceania, it ranged from 2 in Nepal to 41 in Fiji. Somewhat comparable figures for the developed countries indicate that between two thirds and three fourths of currently married women are using contraceptives. Available data also indicate that in some of these countries, the proportion of users has doubled in fewer than 10 years. By contrast, little or no recent change can be seen in other countries.

With only a few exceptions, most family planning in the developing countries is carried out through the use of modern contraceptives. The World Fertility Survey results indicate that the pill is an important contraceptive method in most developing countries and in many it is the most frequently used. Thus, in 15 out of the 20 countries surveyed, the pill accounted for 20 per cent or more of contraceptive use; and in Indonesia, the proportion exceeded 50 per cent. Female sterilization is also popular in some of these countries. The intra-uterine device (IUD) and condom are also important in many countries but, in general, have fewer users; and except in the Philippines, use of these methods has not increased in relative terms over time.

In all countries, the level of contraceptive use increases with family size up to three children. In general, there is little further increase beyond that point; and sometimes there is even a decline. It should be realized, however, that this observation may well be influenced by a cohort effect arising from differences between elder and younger women in their attitudes towards family planning.

The need for family planning services is demonstrated by the observation that in 16 of the 19 countries for which data are available, at least 40 per cent of the women who wanted no more children were not using any contraceptives; and in all but one country over one fourth of such women were non-users.

[2] The developing countries for which results were available are distributed as follows:
Africa: Kenya, 1977;
Latin America: Colombia, 1976; Costa Rica, 1976; Dominican Republic, 1975; Guyana, 1975; Jamaica, 1975/76; Mexico, 1977; Panama, 1976; and Peru, 1977;
East Asia: Republic of Korea, 1974;
South Asia: Bangladesh, 1976; Indonesia, 1976; Jordan, 1976; Malaysia, 1974; Nepal, 1976; Pakistan, 1975; the Philippines, 1978; Sri Lanka, 1975; and Thailand, 1975;
Oceania: Fiji, 1974.

It is also important to take note that in the developing countries where the use of contraception is fairly widespread, its aim is not solely termination of childbearing, as it is also used for birth-spacing. It was found, for instance, that the correlation between the proportion who were using among those who wanted more children and the proportion among those who wanted no more children exceeded 0.8.

Among the socio-economic factors that could be distinguished from the survey, namely, the woman's and the husband's education, rural/urban residence and the wife's occupation, the wife's education had the most significant relation to her contraceptive use. With few exceptions, there were very large intracountry differences among educational classes in the extent of contraceptive use. This was true for both husband's and wife's education, but the differentials were usually larger in the case of the wife's education. Although contraceptive use clearly increases with education, the data also imply that family planning has an impact even among illiterate persons.

Differentials by urban/rural residence also were significant. However, for all countries except Indonesia, differentials related to education remained large, though somewhat smaller, after the effect of place of residence was controlled. The analysis also shows that although contraceptive use was rather strongly correlated with the wife's occupation, in some countries there was no significant effect of occupation once the influence of her education was controlled, while in others the effect remained evident though reduced.

Nuptiality

Increasing attention is being paid by demographers to nuptiality, both as a major factor influencing fertility and as a component of family demography. In the developing countries, where effective practice of fertility regulation is not yet common and non-marital fertility is quite limited, age at marriage is a significant factor influencing reproduction. However, it is necessary to discuss developing and developed countries separately because of the vast difference between the two groups.

Throughout Asia, marriage is virtually universal; in no country for which data are available does the proportion never married aged 45–49 years exceed 7 per cent; and in most areas the proportion is under 4 per cent. The data show clearly that female age at marriage in East Asia and Eastern South Asia is more advanced than elsewhere in this major area. The singulate mean age at marriage, as calculated from data representing the period 1970–1975, was from 20 to 24 years; the only documented exception is Indonesia (1971), where the Mean was 19.3. The means were lower in most of Middle South Asia and in Western South Asia, but impressively high in Sri Lanka, where the mean age in 1971 was 23.5 years. With only a few exceptions the singulate mean age at marriage is increasing in Asia. The pattern is the same in the case of males, with the mean age at marriage generally higher by from three to five years. A case worth mentioning again in this context is Sri Lanka, where the male singulate mean age at marriage had already reached 28 years in 1971, which is higher than in most developed countries.

The prevalence of marriage in the large countries of South Asia is evident from the results of the World Fertility Survey, which show that the percentage of women aged 20–24 at the time of the survey who were still single was as low as 5 in Bangladesh (1976) and as high as 61 in Sri Lanka (1975). The question on age at first marriage asked in the survey provides a similar picture. The increase in age at marriage is shown clearly by a comparison between these data and the corresponding mean ages at first marriage among younger women aged 25–29 at the time of the survey.

Nuptiality data and analysis in Latin America are influenced by conceptual and reporting errors arising from the existence of a variety of forms of sexual unions. Compared with other developed regions, census data in this major area show much higher percentages of females in age group 45–49 reported as "never-married", in a range from 7 in Mexico (1970) to 32–33 in Guadeloupe and Martinique (1967). Census data also show a relatively high singulate age at marriage; none was less than 19 years among the females in the early part of the 1970s and most were equal to 22 or 23 years. Male averages were higher, generally by three or four years. It is to be noted, however, that cohabitation and reproduction may be taking place earlier in other types of unions.

The rarity of early legal marriages in Latin America compared with the situation in the large countries of South Asia is also confirmed by data of the World Fertility Survey. In none of the countries surveyed was the mean age at first marriage as low as those prevalent in South Asia. This was true for women aged 40–44 and for women aged 25–29 who were married before age 25. These data do not show any consistent change in age at marriage from the older to the younger cohort, an observation that may be influenced by changes in the incidence of other forms of unions which precede legal marriage. The possibility of reporting error in this respect should not be excluded.

In all of the countries of Latin America for which information on marriage dissolution is available from the World Fertility Survey, a much higher percentage of first marriages were dissolved than was the case in Asia (except for Indonesia). In the few countries for which data are available, more than three quarters of first-marriage dissolutions are due to separation. This situation is due to fairly low levels of mortality and divorce and to the high incidence of consensual unions among these marriages.

In the countries of Africa for which fairly recent census tabulations on marital status by age are available, there are, in general very low incidences of celibacy. This situation is found both south of the Sahara and in Northern Africa, with never-married females aged 45–49 years frequently amounting to 2 per cent or less. Around 1970, many of these countries showed singulate mean ages at marriage in the range of 18–20 years among females, with males marrying several years later. There is also evidence of an advancement in the age at marriage in Morocco and Tunisia.

During the 1970s, the annual number of legally contracted marriages per 1,000 population steadily declined

in most of the Western developed countries. A notable exception is the United States of America, where the slightly higher rates recorded in the late 1960s persisted. These crude marriage rates were fairly stable in Eastern Europe, except for a slightly increasing trend in the German Democratic Republic and Romania. It is to be noted, however, that these trends may have been influenced by changes in population composition or by high and rising remarriage rates which may have concealed a decline in first-marriage rates. In most Western countries for which post 1970-data are available, first-marriage rates (per 1,000 persons aged 15 and over) declined during the 1970s, although data for the German Democratic Republic and Hungary show an increase in this rate.

With some significant exceptions, female age at first marriage is higher in developed countries than in developing countries. Around 1970, the singulate mean age at marriage varied from about 21 years in most Eastern European countries to 25.7 in Sweden, with most countries closer to the lower limit of this range. Censuses taken around 1970 and in later years show that in 13 Western developed countries the proportion of women aged 20–24 who were never married ranged between one half and three quarters; and, with only a very few exceptions, the proportion in all of those countries exceeded 40 per cent. On the other hand, considerably lower proportions (24–37 per cent) were recorded in Eastern European countries, the only exception being Poland (47 per cent).

For almost all the developed countries for which post-1970 data are available, there are clear indications of a postponement of formal marriages and a reversal of a long-standing declining trend in the age of marriage. Thus, the female median age at first marriage has been increasing consistently, and the censuses taken after 1970 show an increasing trend in the proportion of never-married females in age group 20–24.

Important changes in attitudes towards formal marriage have been taking place in Western societies in recent years. The general pattern is that women are marrying at a later age; but legal marriage is being preceded by a period of cohabitation or consensual marriage, even beginning at ages below those of entry into legal marriage only a few years ago. In several countries, the practice of cohabitation raises the age at marriage by an estimated period of two years. The causes of these changes, though still under scrutiny, include changes in the role and status of women in the society, easy access to a variety of efficient methods of birth control (which eliminates or substantially reduces the risk of having unwanted children within these consensual unions) and greatly increased acceptance not only of cohabitation but of childbearing outside legal marriage and hence a reduced necessity for marriage.

Mortality[3]

The slow-down of mortality decline that was observed in the late 1960s in developing countries with reliable data, primarily countries of Latin America, has raised concern about the feasibility of closing the gap between the developed and the developing countries in the near future and meeting international targets in this regard. The World Population Plan of Action has as one of its goals the attainment of a life expectancy of 74 years for the world as a whole by the end of the century. On the basis of the United Nations estimates and projections, it now appears that this goal cannot be attained, particularly in Africa and in most of Asia. Although life expectancy in the developed countries is expected to be above this level, the projections indicate that by the end of the century the developing countries as a whole may reach a life expectancy of 63 or 64 years—only a year or two above the level of 62 years which the Plan stipulated for the world in 1985.

It was commonly thought in the 1960s that socio-economic progress was not essential for bringing about mortality decline in developing countries and that substantial and rapid progress could be made through the introduction of modern public health measures. Since then, however, it has been realized that both development and public health factors are involved. Likewise, it appears that both levels of living and the availability of public health measures and medical facilities are responsible for differences in mortality between urban and rural areas, and between population classes within such areas. Marked differentials are usually observed according to educational and occupational status, but these variables are interrelated with levels of living and better knowledge of sanitary and personal health measures. Unfortunately, lack of information has been a main obstacle to research directed towards quantitative assessment of the impact of the numerous intricately related factors involved.

In a recent study of mortality trends since 1950 in 23 developing countries for which reasonably reliable data are available (14 in Latin America, 6 in Asia and 3 in Africa), it was observed that in early all of these countries infant mortality has been steadily declining and is, in general, declining more rapidly now than before. Nevertheless, in about half of these countries there was a temporary slow-down in the rate of decline around the period 1965–1970; and in three cases, all in Latin America, there was an increase. Similarly, where data were available, declines in adult mortality were generally observed; and in each of the seven countries in which available data allowed observation of a trend, a temporary slow-down in the rate of decline during the late 1960s or early 1970s was observed. That temporary setback has been followed by a faster decline in more recent years. It is possible, therefore, that a slowing of the pace of mortality decline was not uncommon during the late 1960s. However, the countries studied have already attained low levels of mortality and are generally more developed than other developing countries. Whether their trend of mortality decline is representative of the developing countries in general or whether their own state and pace of development has caused the more rapid mortality decline that is currently taking place remains an open question.

[3] This section also refers to "Mortality differentials", chap. XI in part two of the report.

On the whole, it appears that mortality levels in sub-Saharan Africa are still the highest in the world, with levels of life expectancy at birth well below 50 years, and that this area has made the least progress in lowering mortality during recent years. Exceptions are the small islands of Comoros, Mauritius and Réunion, where impressive gains have been made. Mortality levels can be determined with greater certainty for Northern Africa, where estimates of life expectancy, except for the Sudan, are between 55 and 60 years. Most of the countries of South Asia are in the range of 50–60 years. On the other hand, recent estimates of life expectancy in China exceed 65 years, and numerous small countries in Asia have managed to bring mortality down to or near the levels prevalent in developed countries.

Among the developing countries, mortality conditions are best documented in Latin America, where the majority of the countries enjoy a life expectancy above 60 years. In several of these countries, the level is close to that prevalent in the more developed regions; and such large countries as Brazil and Mexico are not far from that level.

Infant and child mortality levels remain the most critical in the developing countries. In so far as can be ascertained from available data, infant mortality rates for virtually all of sub-Saharan Africa, are in the range of 150–200 deaths per 1,000 live births; and in Northern Africa, the rates usually exceed 100. In the large countries of South Asia, the rates appear to remain well above 120. In Latin America, the rates are, in general, considerably below 100. The significance of these levels can be appreciated by comparing them with those of developed countries, which are now mostly in the 7–15 range, and with those of Hong Kong and Singapore, which have already reached the 12–13 level. Although figures on child mortality (1–4 years of age) are difficult to find in several regions, available estimates range between 4 and 40 per 1,000, while in the developed countries these rates are 1 per 1,000 or less.

As in the case of fertility, mortality differences are observed, and are usually found to be much more pronounced than in developed countries, where population is stratified by such conventional socio-economic factors as place of residence and education. Unlike the developed countries where urban/rural differences have tended to disappear, rural communities in the developing countries have a much higher mortality than urban areas, with the difference reaching 50 per cent or more of the urban level. Such a difference clearly reflects, in part, better sanitation and access to medical service, in urban areas.

There is extensive evidence indicating that maternal education plays a major role in influencing infant and child mortality, presumably reflecting personal health behaviour, care and access to and use of medical facilities. It was found in Latin America, for instance, that the probability of death between birth and age 2 years declined almost linearly with the increase in the level of the mother's education. Children of illiterate women had a risk 3.5 times that of children whose mothers had 10 or more years of education. It was also found that the influence of the mother's education was still pronounced even after taking into account the effect of the place of residence.

Although the decline of mortality in the more developed regions was quite slow in the 1960s, it gained momentum in the 1970s. Around the middle of that decade, several countries in Northern and Western Europe had already achieved a life expectancy at birth of 78 years among females and an infant mortality rate of 10 per 1,000 or less. In the early 1970s, the life expectancy of females in the developed regions ranged from 70 to 78 years, and for males, from 64 to 72 years.

As for over-all sex differences in mortality, the greater life expectancy among females is well established, exceeding that of males by over six years, on the average, and by 10 years in the USSR (1971–1972).

The gain in life expectancy in the developed countries during the third quarter of this century was about seven years (six among males and eight among females) or about 0.3 year per annum, on the average, an accomplishment that has to be assessed in the light of the fact that the main causes of death are no longer those which can be addressed through public health measures. It is well known that significant progress can be made in combating only endogenous diseases which mainly afflict persons aged 50 and over. The total elimination of mortality under age 50 would add only two or three years to life expectancy among females and four or five years among males.

In the developed countries, circulatory diseases are the main cause of death among males over the age of 35 or 40 years, followed by cancer among males over age 40. Among females aged 25–60 years, the leading cause of death is cancer, while circulatory diseases are the main cause of death among those over 60 years of age. Mortality from the infectious diseases has been virtually eliminated, with such diseases responsible for only 1 per cent of all deaths. During the 1970s, the trend in a majority of countries was towards a decline in mortality from circulatory diseases for both sexes, but with a much more pronounced decline among females. An increase was observed in the incidence of lung cancer among males over age 45, as well as among young females.

Inter-country differences in mortality have been narrowing for a long time. While around 1950 the range of difference in life expectancy among the developed countries was about 19 years, this range was only eight or nine years around 1975. The same cannot be said, however, about intracountry differences. The upper social classes are benefiting more from the progress achieved in reducing mortality, due in large part to changes in life-style, including nutrition and exercise.

Population structure

Declining fertility in the developing countries has caused a corresponding decline in the proportion of the child and young population aged 0–14 years, from about 42 per cent in 1970 to an estimated 39 per cent currently. In fact, the annual rate of growth of this group, which was 2.5 per cent in the 1960s, declined to 1.6 in the 1970s. Due to the expected continuation of fertility decline, this

proportion is estimated to be slightly over 33 per cent by the year 2000, according to the medium-variant projection. Although the latter percentage constitutes a substantial decline from the 1970 level of 42 per cent it would still be far from the 23 per cent that currently exists in the developed countries.

Judging from current and anticipated fertility and mortality trends, the aging of population, which has been a demographic problem for many years in the developed countries, may become a problem in China and other developing countries experiencing rapid fertility decline. For the developing countries as a whole, the population aged 65 years and over, now only 4 per cent of their total population, was increasing at a rate of 2.7 per cent in the 1970s (compared with 2.3 in the developed countries); and this rate will continue to increase, leading to a substantial increase in the proportion of the population aged 65 and over. That proportion is expected to be about 25 per cent by the year 2000. However, the old-age component, with its social and health problems, is not expected to be a significant factor in the developing countries in which fertility is not declining rapidly.

It should be emphasized that the demographic situation in China has had a substantial impact on the abovementioned measures for the developing countries. In the rest of the developing countries, age groups 0–14 and 65 and over would be 36.3 and 40 per cent of the total population, respectively, at the end of the century. With respect to the developed countries, the proportion of the total population aged 0–14 years declined during the past two decades until it reached the current level of 23 per cent. In the next two decades, the population in this age group is projected to grow at a rate not exceeding 0.3 per cent per annum and to constitute 21 per cent of the population of these countries in the year 2000. On the other hand, the aging process is expected to continue in these countries, with the percentage aged 65 and over increasing from the current level of 11.6 to 13.0 at the turn of the century.

Recent demographic trends are also reflected in the continuously increasing median age of populations in the developed countries, rising from about 28 years in 1950 to over 31 currently and to an estimated 36 years in the year 2000. In the developing countries, the median age declined from 21 to 19 years between 1950 and 1970, and then reversed its direction, reaching 20 years currently. It is projected to be 24 years at the end of the century. Thus, the gap in median age between the developing and developed countries has been continuously increasing, from 7 years in 1950 to over 11 in 1980; it is projected to be about 12 in 2000. As may be expected, current differences in median age among countries are quite substantial, with medians ranging from 16 years in some countries of Western Africa to 36 or 37 in some European countries.

Dependency ratios, namely, those relating either the child population (0–14) or the old-age population (65 and over) to the population in the ages or economic activity (15–64), obviously reflect these trends. In the developing countries, the number of children per 100 adults in the ages of economic activity was 77 in 1970, compared with only 42 in the developed countries. The trend in this child dependency ratio has been declining recently, reflecting mainly declining fertility in both developing and developed countries. The ratio is estimated at 69 in 1980 in the developing countries and is expected to reach 54 in the year 2000, while in the developed countries, the ratio is expected to decline very slowly from 35 (half the value in developing countries) to 32 at the end of the century. On the other hand, old-age dependency as a population problem in the developed countries has been intensifying for several decades. The number of aged per 100 adults of working age, which was 12 in 1950, is about 17 now and is expected to reach 20 in the year 2000. In the developing countries as a whole, the ratio, which was stable and equal to about 7, is expected to show a modest increase to 8 by the end of the century.

International migration

A major change in the pattern of international migration during the past decade was the emergence and expansion of flows of migrants to the resource-rich developing countries, particularly those of Western South Asia. At the same time, the large-scale flows into Northern and Western Europe were substantially reduced; and the south-to-north flow, which was the predominant pattern of international migration in the 1960s and the early part of the 1970s, continued between Latin America and Northern America.

The decade and a half ending in 1975 witnessed flows, mainly of males, going from poorer to richer countries in search of employment. During that time, the traditional countries of immigration in Northern America and Oceania continued to receive large flows.

A very important factor influencing the global pattern of international migration in these years was the pace of economic growth and a rising demand for labour in Northern and Western Europe. In addition to providing increased opportunities for employment for resident citizens, hence reducing their propensity to emigrate, this growth attracted increasing numbers of migrants from outside Europe. In the 1960s, the net migration balance for Europe as a whole was nearly zero, although gross flows were substantial. During the first half of the 1970s, Europe as a whole had a net inflow of just over 900,000.

Within Europe, the leading countries of immigration were France and the Federal Republic of Germany; however, almost all of the other countries of Northern and Western Europe experienced relatively large net inflows.

A very substantial proportion of the migrants to Northern and Western Europe came from Southern Europe. In all, there was a net outflow of about 5 million during the 1960s and early 1970s; Turkey also became a major supplier of labour to Western Europe. The demographic impact of the outflow was especially heavy for Portugal, whose total population experienced an absolute decline in the 1960s and early 1970s.

After being a region of net immigration, Latin America has, since around 1960, become a region of substantial net emigration, due to a reduced inflow from Southern

Europe and an increased emigration to the United States of America. There was also a substantial flow from the English-speaking countries of the Caribbean to Canada and the United Kingdom of Great Britain and Northern Ireland. Immigration into Canada from Latin America, mostly from the Caribbean, rose steeply during the late 1960s and the early 1970s. Within Latin America, Argentina and Venezuela began to attract larger numbers from neighbouring countries.

In Africa too, labour migration grew in importance. The countries along the coast of Western Africa have traditionally attracted migrant workers from the land-locked countries to their north. In Southern Africa, employment of migrant labour is a highly organized practice. However, in recent years South Africa has followed a policy intended to reduce its dependence on immigrant labour. By 1977, the number had declined to 360,000.

Since 1970, a large stock of migrant workers has been building up in the resource-rich Arab countries. Although data for these countries are markedly uneven in quality, it appears that in 1970 more than 1 million foreigners, most of whom were drawn from other Arab countries, were employed; and the number had risen to nearly 2 million by 1975. These flows have had a significant demographic impact because, apart from Saudi Arabia, the national populations are small in comparison with the number of immigrants.

Although economic stringency in Europe and the other industrial countries brought an end to the expansion of the stocks of migrant workers in those countries, flows into the petroleum-exporting countries of Western South Asia and other regions continued to increase in importance, and their number doubled between 1970 and 1975. Large proportions of the migrant workers have continued to come from other countries within the region, but there is also a growing dependence on workers recruited from East and South Asia. All available evidence indicates that the growth has continued until the present, although possibly at a somewhat diminished rate.

The large flows of migrants are also generating large new flows of remittances. For example, Pakistan reported a net inflow of about $1,300 million. Moreover, the remittance flows have been growing very rapidly. In several countries, the flows approximately doubled from 1975 to 1976 and then doubled again from 1976 to 1977 (at current prices).

While the stocks of immigrants in the European countries continue to be substantial, changes since the mid-1970s reflect less the effects of entry of new migrant workers and more the results of family reunification and natural increase. To a considerable degree, the second half of the 1970s can be characterized as a period of relative stabilization in international migration for Europe, following the preceding decade and a half when stocks and flows were building up steadily. During the second half of the 1970s, outflows of the leading countries of net immigration tended to decline from levels attained around 1975 and by the late 1970s were generally comparatively close to the inflows.

Temporary labour migration has given rise to some controversy at the international level. It has economic benefits for sending countries in terms of substantial remittances and, in many instances, reduction of unemployment. It alleviates labour shortages in the receiving countries. On the other hand, this migration has entailed the loss of needed skilled workers in some key occupations in countries of origin. Furthermore, European countries have encountered problems arising from friction between foreign and national labour, and problems in returning foreign workers to the countries of origin upon termination of temporary employment. In some small countries with relatively large stocks of migrant workers, for example, some countries in Western South Asia, there is concern about the political impact of foreigners who have remained for long periods without being assimilated. Along with the movement of workers with comparatively limited skills from developing to developed countries, there was the small but significant flow of highly trained persons, the so-called "brain drain", estimated to be between 300,000 and 400,000 between 1960 and 1975.

Another important and apparently increasing international flow is that of undocumented or illegal migrants. Such flows are naturally difficult to estimate, but they are known to have reached substantial numbers in Venezuela, the United States of America, the countries of Europe and some countries of Western South Asia. Control of this type of migration has become a policy issue of serious concern to the countries involved.

Outbreaks of repatriation flows and refugee movements continued during the past decade. The United Nations High Commissioner for Refugees and the United Nations Relief and Works Agency reported that as of early 1980, there were about 10.5 million refugees and displaced persons. In Eastern South Asia, over 1 million persons fled their country from 1978 onward. The size and suddenness of the flows have imposed severe strains on receiving countries. In Africa, there are estimated to be over 3 million refugees, the largest numbers of whom are found in countries south of the Sahara.

Urbanization

A recent revision of the United Nations estimates and projections of urban and rural populations gave very similar results to those provided in the second round of monitoring. In summary, urbanization is expanding rapidly in the developing countries, due to rapid natural increase, internal migration and territorial redefinition, and is leading to the emergence of human agglomerations of unprecedented magnitude. By the end of this century, it is projected that slightly over half the world population will be living in urban areas, slightly over half the urban population will be living in cities having half a million or more inhabitants and more than two fifths of the urban population will be in cities of 4 million or more inhabitants.

Having grown at a rate of almost 4 per cent per annum since 1960, the urban population of the developing countries is already in excess of 1 billion, or a little over 30

per cent of the total population of these countries. Thus, during the three decades beginning in 1950, the urban sector of these countries increased 3.6 times and the degree of urbanization almost doubled. The projections anticipate a gradual decline in this rate of urban growth, to 3.5 per cent at the end of the century. The trend implies a doubling of the urban population in the remaining two decades and an increase in the degree of urbanization to 44 per cent.

In the developed countries, on the other hand, the annual rate of urban growth has declined, from 2.4 in 1950 to 1.4 per cent currently; and it is expected to decline to slightly under 1 per cent in the year 2000. Accordingly, their urban population, now estimated at 800 million, is expected to increase by about 25 per cent to 1 billion at the turn of the century. These countries, which are now about 70 per cent urban, would thus become 80 per cent urban in 2000, raising the degree of urbanization in the world as a whole from about 40 per cent to slightly over 50 per cent in that year.

Despite the very high rate of urban growth in the developing countries, their rural populations are still increasing at substantial rates, currently averaging about 1.4 per cent per annum. The anticipated decline in natural increase, combined with rural-urban migration, could bring this rate down to 0.6 by the end of the next two decades. However, during this period the rural population would increase by 500 million or 22 per cent. This increase would take place while the rural population of the developed countries was declining at an average rate of 1.1 or 1.2 per cent during the same two decades, thus experiencing a net decline of 20 per cent over the period. The less developed regions show considerable heterogeneity in this respect. Rural growth in East Asia is expected to terminate by the end of the present decade. In Latin America, which is already 63 per cent urban, the rural population is expected to continue increasing at a rate of about 0.75, which is considerably lower than the corresponding rate in Africa and South Asia.

Urbanization, particularly in the developing countries, is oriented to large cities and the prospects indicate a continuation of this trend. As recently as 1970, there were 24 cities of 4 million inhabitants or more. This number has since increased to 38 and is expected to exceed 80 within the next two decades. This phenomenon is taking place mainly in the developing countries, which had only 12 such cities in 1970, have 23 currently and are expected to have over 60 in 2000. If the projections are approximately right, a full quarter of the urban population of the developing countries would then be living in cities of 4 million and more. (The corresponding proportion is now 18 per cent in the developed countries.)

Cities of between 1 million and 4 million persons, though increasing substantially in numbers, show very little increase in their share of the urban population, both in the developing and in the developed countries; and their share of the world urban population, estimated at 18 per cent in 1970, would probably become 20 per cent in 2000. Similarly, little change is observed in the proportion living in cities of between 500,000 and 1 million persons. It is thus at the expense of towns with population below half a million that large-scale urbanization is materializing in both the developing and the developed countries. The share of these towns in the urban population of the world has declined from 58 per cent in 1970 to 54 currently and is expected to decline to 49 in 2000.

Another phenomenon of modern urbanization is the emergence of the very large city, or mega-city, a large agglomeration that may contain a number of urban centres, each with its own administrative boundaries. In 1950, there were two such agglomerations, with 10 million inhabitants each—metropolitan New York and London. Currently, there are 10 mega-cities, of which the largest is metropolitan New York, with about 20 million inhabitants. Six of the mega-cities are in the developing countries (compared with none in 1950). The projections indicate that there could be 25 mega-cities by the end of the century, most of which would be in the developing countries and several of which may exceed 20 million inhabitants. However, physical, economic and technological constraints may impose limitations on the future sizes of these agglomerations.

Urban concentrations in the developing world already pose increasingly serious problems. In the majority of countries, the situation is producing a geographical distribution of the population that is far from optimal for the full utilization of resources and the full integration of the population in economic, social and political affairs; and there are strong indications that in the future the geographical distribution of the population will pose an even greater challenge that Governments will have to face.

POPULATION AND DEVELOPMENT[4]

Relationship between fertility, mortality and socio-economic variables in developing countries

Planners have given increasing consideration to ways in which socio-economic policy variables can influence levels of fertility and mortality. Conceptual analysis suggests that these variables are linked by an intricate network of extremely complex interrelationships. In part because of this complexity and in part because of inadequate data, it has not been possible fully to sort out the direct and indirect demographic effects of alternative socio-economic policies.

Full-scale national studies have been impeded by the absence of the necessary observations for many developing countries. As a preliminary step, a study was undertaken by the Population Division of the United Nations Secretariat, which examined the relationship between fertility, mortality and selected socio-economic variables using simple regression analysis. Although 85 developing countries were considered, the requisite data on all variables were available for only 21 countries.

Although selected on the basis of data availability, the 21 countries are to some degree geographically representative. However, they are considerably more developed

[4] For discussion of "Mortality differentials", chap. XI in part two of the report, see section on "Population trends".

than the majority of developing countries. Though the results of this study may not apply to developing countries in general, they do point to some promising areas for future investigation.

Linear regression models were estimated for indicators of fertility and mortality using as arguments seven socio-economic variables, selected on the basis of a preliminary correlation analysis. The independent variables included two educational indicators, two indicators of the status of women, the gross domestic product per capita, the share of income going to the poorer 40 per cent of the population and the proportion of the population that is urban.

When all seven independent variables were included in the model, 79 per cent of the variance in the crude birth rate and 71 per cent of the variance in the gross reproduction rate were explained. Due to the high intercorrelation among the explanatory variables, it was possible to find six groups of three independent variables which explained more than 70 per cent of the variance; and no single variable was essential for explaining a high proportion of the variance, except the share of income going to the poorer 40 per cent of the population.

Only one indicator of mortality, life expectancy at birth, was considered. When all seven independent variables were included, 86 per cent of the variance in life expectancy was explained. However, neither gross domestic product per capita nor the share of income going to the poorer 40 per cent played a significant role in the mortality equations.

Although the results of this study are merely indicative, when comparable data for the majority of developing countries become available, it should be useful to investigate whether gross domestic product per capita and the distribution of income are more significant as determinants of fertility than as determinants of mortality. If this should prove to be the case, it would then be useful to try to identify the specific causal links that explain the phenomenon.

Health, population and development

It has become increasingly evident that health is not only a desirable goal in itself but a means and indeed an indispensable component of social and economic development. Conversely, the attainment of health targets depends upon economic and social progress, the achievement of greater equity, improvements in the environment, the availability of an adequate food-supply and the implementation of appropriate population policies.

The world health situation leaves much to be desired. About 800 million people in the developing countries have incomes too low to ensure basic nutrition and have little access to essential health services. There has also been a significant increase or resurgence of certain communicable diseases in these countries, while in a number of industrialized countries rapid increases in health costs have called into question the relationship between health care and health indices. In the developing countries, the search for alternative approaches has led to the view that primary health care is the most important means whereby the health sector can improve the health status of the population.

Among the most important interactions between health and development are those where population growth and change are intermediate variables. For example, the age distribution of the population is due to past trends in fertility and mortality, which are in turn linked to trends in health status. Conversely, a changing age distribution can bring about a radical change in the demand for health services.

Family planning is one of the important operational elements in programmes to reduce rates of population growth. These programmes can also favourably influence health by reducing unwanted pregnancies, reducing the total number of children born to a mother, changing the time in a mother's life when births occur and achieving an optimal interval between pregnancies. Conversely, family health programmes can contribute to the success of family planning programmes because a sharp decrease in early childhood mortality rates is often considered a prerequisite of a decline in fertility rates.

It has become increasingly clear that activities in all development sectors are essential to the improvement of health. In this regard, life expectancy at birth is an extremely useful measure of the level of health of a population when viewed from the broader perspective of socio-economic development strategy. Currently, there is a gap in life expectancy at birth between the developed and developing countries on the order of from 15 to 18 years. Provided that satisfactory progress is made in those social, economic and political areas which influence mortality, this gap should be cut in half by the end of this century.

Causes and consequences of internal migration in developing countries

Rural-urban migration has long been considered an essential component of the modernization process. Many theories of the development process focus on the need to shift labour from the lower-productivity agricultural sectors to higher-productivity industrial sectors, on the basis of the argument that urbanization is a necessary complement to the process of industrialization. However, the view is now widely held that current rates of rural-urban migration are excessive.

In general, the reasons for migrating can be traced to differences between rural and urban levels of living. The low level of per capita income in rural areas can be attributed to rapid population growth, an unequal distribution of land ownership and the structure of capital and labour markets. Often, national policies tend to widen the gap in socio-economic conditions between rural and urban areas. In particular, policies of plant location, import substitution, public investment, minimum wages and the differential provision of health, education and recreational facilities favour urban areas.

All of these factors provide an insight into the available policy options if Governments wish to moderate the flow but it is necessary to explore the consequences of rural-

urban migration in order to decide whether it would be appropriate to interfere with this process.

The consequences of the movement to the cities can be viewed from three perspectives: that of the migrant; that of the rural areas; that of the urban areas. Of these perspectives, the effects on the migrants are most certain. In general, they are beneficial. Migrants usually find employment, improve their level of living and even earn a surplus which they can then remit to their families in the areas of origin.

The consequences of out-migration from the viewpoint of the rural areas are more ambiguous. To be sure, they benefit to some degree from remittances and there is an increase in the land-to-labour ratio. Furthermore, rural areas may benefit from an increase in the price of agricultural commodities in relation to industrial output. However, the increase in agricultural wages due to migration may result in a shift towards capital-intensive agricultural techniques, which may cause a further concentration in the distribution of agricultural income and land-holdings.

Empirical studies on the effect of migration on rural areas are inconclusive. It is not clear whether remittances are used productively. Studies indicate that though internal migration may reduce the differential between rural and urban incomes, it may widen the disparities within the rural sector. The evidence currently available does not support the contention that rural-urban migration increases the demand for agricultural output in relation to industrial output, thus improving the rural terms of trade. No analytical studies are available to confirm the hypothesis that migration encourages the introduction of labour-saving technology in agriculture. On the whole, it can be said that the question whether rural-urban migration is beneficial or harmful to rural development has yet to be resolved.

In developing countries, the rapid movement of persons from rural areas has had both economic and demographic consequences. Of the two, the economic effects are the more difficult to disentangle.

It has been widely hypothesized that urbanization has outpaced industrialization in much of the developing regions and therefore migration is a major cause of urban unemployment. However, empirical studies indicate that recent migrants have lower rates of unemployment than do other urban residents. Furthermore, there is reason to believe that migrants may raise the over-all level of urban employment.

Migrants from rural areas may lower urban wage rates, thus leading to an expansion of employment. This expansion may encourage industrial investment, particularly in labour-intensive technology. By localizing the labour force, urbanization may result in greater specialization and other economies of large-scale production. Ultimately, the net impact of migration on urban areas will depend upon the characteristics of the migrants themselves. If the migrants are in the prime working ages and bring with them useful skills, the areas of destination will benefit.

The demographic effects of migration on urban areas are more definite. Although migrants tend to have higher fertility than the general urban populace, their fertility is lower than comparable persons who remain in the rural areas. For that reason, increasing migration and urbanization are likely to reduce the fertility level in the country as a whole.

Given the documented benefit of rural-urban movement to the migrants themselves, given the ambiguity with respect to the over-all economic impact as concerns rural and urban areas in general and given the role played by urbanization in moderating rates of fertility, it would seem that the value of policies designed to curb migration remains open to question.

Determinants of labour force participation

The size of the labour force is a reflection of the size and age/sex composition of the population and the proportions of the various groups who are economically active. Thus, an understanding of levels and trends in the size of the labour force requires an identification of the principal socio-economic and demographic determinants of activity patterns.

In low-income agrarian countries, most people contribute to subsistence from an early age; and as a result, the extent of participation of the child labour force has generally been understated. Although child labour persists in many guises in many parts of the world, economic growth and the associated shift to higher levels of school enrolment and the formalization of work relationships have led to a decline in those labour force participation rates.

Most males over the age of 14 years participate in the labour force except for those in school, those who have retired and some who have become discouraged from seeking employment. This participation rate, though high, tends to decline logistically with economic growth and industrialization.

Although most men spend their adult years in the labour force, the situation is more complex in regard to women. In low-income countries, four patterns emerge: participation rates may be low in both urban areas and rural areas; they may be high in both areas; they may be high in rural areas and low in urban areas; or they may be low in rural areas and high in urban areas. Some observers have also detected a U-shaped pattern with respect to industrialization, with labour force participation of women declining at first and then rising as industrialization progresses. There are also a variety of age profiles of female labour force participation.

Among the socio-economic determinants of female activity rates is the industrial/occupational structure. The shift of wage labour in agriculture has tended to squeeze women out of farming; on the other hand, mechanization has opened up opportunities for women in a wide variety of industries and occupations. Another major determinant of women's economic activity is the level of aggregate demand, because in periods of declining employment, women tend to be pushed to the margin of the work force.

In many low-income countries, women have been forced to enter the labour force to meet family income requirements. Within higher-income families the need for additional income is reduced; and in both developed and developing countries, there is a tendency for women whose husbands have relatively high incomes to have a low propensity to participate in the labour force. On the other hand, if wages improve for women or if income-earning opportunities emerge, their labour force participation will be greatly enhanced.

The causal process is not very clear, but empirical studies tend to indicate a positive relationship between indices of education and the probability of labour force participation. In some of these studies, however, the effect is non-linear or has only been observed beyond some threshold level of schooling. Furthermore, high levels of unemployment and persistent discrimination will greatly reduce the positive effect.

In addition to economic factors, such demographic factors as fertility and migration play a very important role in the labour force participation of women. It has long been hypothesized that there is a strong inverse relationship between fertility and female activity rates. This hypothesis has strongly influenced policy prescriptions and has recently received further empirical support from comparative analyses of data from the World Fertility Survey. Studies indicate that this relationship is influenced by three factors: the size of the societal norm for family size; the abundance of child labour; and the availability of alternative child-care arrangements. When the societal norm is large, young women will typically be excluded from most "career" jobs and even from job training. When child labour is restricted, greater female labour force participation is allowed and the child-care constraint on female economic activity will vary inversely with the availability and cost of child-care arrangements. In general, the linkage between fertility and labour force participation is most consistent in the developed countries.

Although evidence is sparse, studies indicate that the more educated women tended to have a higher participation rate than the less educated women for each level of fertility and that an increase in family size had a proportionally greater effect on participation at higher levels of schooling.

Migration affects labour force participation in a variety of ways. The out-migration of men from rural areas tends to increase female participation in agriculture and the migration of women will affect their own participation. Because most adult migration is for economic reasons, all migrants, including females, tend to have higher participation rates than non-migrants. Furthermore, population mobility can be expected to reallocate labour from areas where there are relatively few labour force opportunities to areas where more labour is required.

Demographic aspects of changes in consumption levels and patterns

The relative magnitudes of expenditures devoted to food and non-food items are major determinants of the sectoral pattern of employment, the structure of prices and the distribution of income. For this reason, the estimation of future consumption patterns is a major element in the development planning process. Normally, these estimates are derived from Engel elasticities which relate the consumption of particular commodities to total income or total expenditures. However, Engel analysis in its simplest form neglects the influence of important demographic factors and therefore may yield incorrect results.

A study undertaken by the Population Division of the United Nations Secretariat refined a methodology that may be applied to assess the impact of demographic factors on the pattern of consumption. It involves the integration of micro-analytical consumption functions into a macro-economic framework.

In the first phase of this study, household[5] consumption functions were estimated from household survey data of Pakistan (1971/72) and the Philippines (1971). For each country, separate functions were estimated for rural and urban areas and for food and non-food items. In each case, the level of household consumption expenditures on a given commodity was made a function of total household expenditure and the number of household members, disaggregated by age. The size and sign of numerical coefficients were as expected. In both the rural and the urban areas, the proportion of each additional increment of total expenditure going to food items was substantially less than that going to non-food items.

The proportion of additional expenditures going to specific commodities also varied between rural and urban areas. The proportion going to non-food items was more than 10 per cent greater in urban than in rural areas. This proportion is also to be expected, given the higher level of expenditure per household in urban areas.

In both rural and urban areas, increases in family size were associated with a shift in expenditures from non-food to food items. Because total household expenditures are larger in urban areas, the shift due to an increase in family size was larger in those areas. The shift was most pronounced if the additional family member was an adult.

Increments of aggregate consumption expenditures can be decomposed into four additive independent elements, which may be referred to as effects due to changes in: (*a*) the number of households; (*b*) average household size; (*c*) rural-urban migration; and (*d*) expenditure per household. To demonstrate this technique, simulations of aggregate consumption expenditures covering a five-year period were prepared for Pakistan and the Philippines.

The micro coefficients of the household consumption functions that had been computed in the first part of the analysis were substituted for the macro coefficients in a model of aggregate consumption, along with hypothetical values for the changes in expenditures per household, the number of households, household size and the rate of rural-urban migration.

[5] The household was used as the unit of analysis in one case and the family was used as the unit of analysis in the other. For purposes of exposition, the term "household" is used in describing both studies.

On the basis of these simulations, it was projected that over a five-year period total consumption would increase by the equivalent of $1,113 million in Pakistan and by the equivalent of $1,322 million in the Philippines. Of these totals, nothing was attributed to changes in average household size. In both countries, 62 per cent was attributed to the change in the number of households. In Pakistan, 2 per cent was attributed to rural-urban migration and 36 per cent to the change in expenditure per household. In the Philippines, 9 per cent was attributed to rural-urban migration and 29 per cent to the increase in expenditure per household.

Thus, in the absence of changes in the number of households, the location of households and the expenditure per household, changes in household size would have had no effect on total consumption expenditures. Were household size, rural-urban location and expenditure per household to remain constant and the number of households to increase at the assumed rate, then total expenditures would increase in both countries by an amount equal to 62 per cent of the total increase in consumption expenditures.

If household size, the number of households and the expenditure per household in both rural and urban areas were held constant, a shift in the distribution of households from rural to urban areas would result in a small increase in consumer expenditures for food and a somewhat larger increase in the case of non-food expenditures. Lastly, if all demographic variables were assumed to be constant and per capita income were to increase as hypothesized, the result would be an increase in consumption expenditure equal to 36 per cent of the total increase in the case of Pakistan and 29 per cent of the total increase in the case of the Philippines.

Although changes in total expenditures per household were associated with less than 40 per cent of the increment in total consumption expenditure, it would be incorrect to conclude that demographic variables are more important than economic variables in determining levels and patterns of household comsumption. This decomposition assumes that household size, the number of households, their geographical location and the expenditure per household can be treated as independent factors. In reality, they are mutually interacting factors. In order to form a complete view of the consequences of demographic change on consumption, these interrelationships between the economic and demographic determinants would also have to be assessed. However, this exercise demonstrates that population factors are important in explaining shifts in the composition of consumption expenditures and that in future planners should give greater weight to the consequences of demographic change in projecting future consumption levels and patterns.

Demographic characteristics of women's work patterns and rates

An important relationship exists between a woman's current work status and some of her demographic characteristics, including age, current marital status and the age of her youngest living child. In addition, local economic and employment conditions have an independent effect on the relationship between work and fertility.

The World Fertility Survey provides data on women's work histories for three countries of Latin America (Colombia, Panama and Peru) and for seven countries of Asia (Bangladesh, Indonesia, Jordan, Pakistan, Republic of Korea, Sri Lanka and Thailand). Despite wide variations in work rates across countries and certain definitional difficulties, three patterns emerge from these data. The first is displayed in the countries of Latin America, where a substantial proportion of women had worked at some time before or after marriage and the timing of work is flexible. The second is displayed by the Muslim countries of Bangladesh, Jordan and Pakistan, where relatively few women were recorded as working in any circumstances. In Jordan, there appears to be more flexibility in the timing of work for the relatively few women who work, whereas in Bangladesh and Pakistan, working women, who are few in number, appear to work consistently and are therefore likely to be quite unusual in many respects in relation to the average woman. In the rest of the countries of Asia represented, work experience was found to be reasonably high; and there was less flexibility, although the Republic of Korea and Sri Lanka appear to represent a somewhat intermediate group.

In most countries, current work rates are seen to rise with age, though more sharply in some countries than others. However, in the three Muslim countries (Bangladesh, Jordan and Pakistan), few women work at any age. In general, the data suggest that current work rates are related to the age of the youngest living child in that current work rates were higher for women whose youngest child was older. In addition, however, the distribution of women's employment in terms of occupation, industry and location of work is an important determinant of the shape of the age/work relationship. Although there are some notable exceptions, it is usually the case that working away from home, working in non-agriculture and working as a non-family employee are associated with fewer children ever born because in such cases work and child-rearing are more difficult to reconcile.

Potential population-supporting capacities of land: Africa

Despite major advances in agricultural technology, hunger continues to affect at least 500 million people. Projections indicate that almost 50 per cent more food must be grown in the year 2000 to maintain current inadequate nutritional levels and additional supplies would be needed to conquer famine and malnutrition. However, the ability of land to produce food is limited by soil and climatic conditions, as well as the nature of the crops and the technology employed. Accordingly, there are critical levels of population that can be fed from any specific land area. Once the upper level of technology has been reached, any attempts to increase food production in excess of these critical levels can only result in degradation of the land, hunger and eventual reduction in population.

The Food and Agriculture Organization of the United Nations and the United Nations Fund for Population Activities, in collaboration with the International Institute for Applied Systems Analysis, have initiated a project to quantify the limits of the food-producing capacity of lands. The present study describes the methodology used and presents results for Africa.

Basic to this assessment is a social and climatic inventory. First deductions are made for land required for non-agricultural use, for irrigation and for fallow periods. Then major climate/crop temperature requirement rules are applied to ascertain which crops can be grown, after which the calorie and protein production from different crops is calculated. Once the maximum production potential for each zone is ascertained, country-specific data on calorie and protein requirements per capita are used to determine the population-supporting capacity according to the level of input envisaged. These data are compared with current population size to identify critical zones where potential sustained production is insufficient to meet the food needs of populations already living in those areas. Country population projections for the year 2000 are also compared with potential population densities to determine where future populations are likely to face critical situations with regard to food.

Generations of traditional subsistence cultivation have, to a large extent, determined the dietary preferences of populations. Accordingly, account has been taken of the mixture of crops currently grown and the relative proportions of their areas under cultivation. For the low level of input analysis, the pattern of crops currently grown is rigidly maintained even though those crops may be inferior in terms of calorie and protein productivity. At the intermediate level of input, the same pattern is applied only to currently cultivated areas. The analysis at high levels of input assumes that all cultivable land is devoted to crops giving the highest calorie and protein production. Optimization of calorie and protein production is reiterative for each zone until both the calorie-protein constraint and that of the applicable current crop mix are met. Accordingly, the analysis does not assume a transfer of produce from one zone to another.

The potential population-supporting capacities for each zone are totalled at the country level to arrive at country potentials, which are then compared with current population data and the United Nations medium-variant population projection for the year 2000. This procedure permits the identification of countries where land resources are insufficient to supply the food needs of current or projected populations.

Computations have been made for each zone of each developing country in Africa. They show that the continent as a whole has sufficient rain-fed cultivable land for self-sufficiency. Given only a low level of input, the combined potential productivity from all 51 countries could feed 50 per cent more people than are projected for the year 2000. At an intermediate input level of technology, the land could provide for more than five times the estimated population.

However, this result would require a massive movement of food or population between and within countries because there are extreme differences in land resources at the zone and country levels. It is estimated that the rain-fed land resources of 12 countries of Africa will be insufficient to provide for the food needs of their populations in 2000. In areas where the situation is not critical at the high level of input, additional production needs can be met by changing the crop mix and raising the input level. The economics of this and of major land improvements, however, require careful investigation.

Economic disparities associated with socio-demographic development

In both the developed and the developing countries, gross domestic product per capita continues to grow, implying that production is increasing more rapidly than population. However, rates of progress have been unequal, with the result that disparities in levels of living have widened. In general, population continues to grow most rapidly in those countries which have the lowest levels of product per capita, with the unfortunate result that the degree of inequality between countries has been magnified.

The progress of 116 countries, constituting more than 97 per cent of the world population in 1975, was studied in relation to socio-demographic change. It was found that the 82 developing countries, with 72 per cent of the total population, accounted for only 20 per cent of total production. The gross domestic product per capita in those countries was equal to $270, measured in 1970 prices. In marked contrast, the 34 developed countries, with 28 per cent of total population, accounted for 80 per cent of total gross domestic product.

Although gross domestic product per capita is an imperfect measure of welfare, it is distributed in a way that closely parallels other measures. For example, in 1975, the commercial energy consumption per capita in developed countries was more than 10 times that in developing countries. Differentials in gross domestic product per capita also correspond to differentials in education and health indicators. Thus, in 1975, combined primary-school and secondary-school enrolment equalled 89 per cent of the eligible population in developed market economies and 90 per cent in the centrally planned economies of Eastern Europe and the Soviet Union. The corresponding figure for the developing countries was 57 per cent. Conversely, there were more than 10 times as many persons per physician and per nurse in the developing countries than in the developed countries.

When broad aggregates are considered, there appears to be a consistent association between gross domestic product per capita and important demographic indicators. In 1975, the developed countries, which had the highest level of gross domestic product per capita, had the lowest rate of natural increase, the lowest total fertility rate and the highest life expectancy at birth. The developing countries, which had the lowest gross domestic product per capita, had the highest rate of natural increase, the highest total fertility rate and the lowest life expectancy at birth.

Significant differences also are found among the developing countries; among the most striking are the differences between the 12 developing countries that are petroleum exporters and the other 70 countries that are not. In 1975, the gross domestic product per capita of the former group was almost 80 per cent greater than that of the latter. The demographic characteristics of the petroleum-exporting countries also differed markedly from the other developing countries at similar levels of gross domestic product per capita. The petroleum-exporting countries, on the average, had higher fertility, a higher rate of natural increase, a lower life expectancy at birth and a smaller proportion of their population of working age (15–64) than did the other developing countries.

Important regional differences also exist among the developing countries. In 1975, gross domestic product per capita and commercial energy consumption per capita in Latin America were more than twice that of the developing countries as a whole. On the other hand, the proportion of eligible persons enrolled in primary and secondary schools in East Asia was more than twice that of all developing countries. Both Latin America and East Asia had less than one third the number of persons per physician and per nurse than did the developing countries as whole.

Demographic characteristics likewise vary among regions. The contrast between the developing countries of Africa and those of East Asia was most marked. In 1975, the rate of natural increase and the total fertility rate in the former countries was almost twice that of the latter. And, as would be expected, life expectancy at birth and the proportion of the population of working age were much lower in Africa than in East Asia.

When the 104 non-petroleum-exporting countries are cross-classified into one of seven levels of gross domestic product per capita and one of seven levels of total fertility rate, the distribution of countries demonstrates a clear over-all inverse relationship between the two variables. With but three exceptions—China, Mauritius and Sri Lanka—all countries with a gross domestic product per capita below $350 had a total fertility rate above 5.0 per woman. Similarly, with but three exceptions—Ireland, Israel and Puerto Rico—all countries with a level above $1,400 had a total fertility rate below 2.5. Although no such uniformity was found when countries in the range from $350 to $1,399 were considered, the over-all pattern tends to support the claim that conditions associated with very low income levels inhibit such processes as development, which would moderate high population growth rates by reducing fertility.

A similar matrix linking gross domestic product per capita with life expectancy at birth demonstrates that life expectancy is positively related to that measure. With but two exceptions, countries with a gross domestic product per capita in excess of $1,400 had life expectancies at birth exceeding 70 years; and with just one exception, Sri Lanka, countries with a level below $200 had life expectancies under 55 years. In the intervening range, the modal level of life expectancy varied directly with gross domestic product per capita.

During the period 1960–1975, there was no narrowing of the gap in gross domestic product per capita between the developing and the developed market economies. On the contrary, it increased from $1,846 in 1960 to $2,998 in 1975. In the developing economies, the growth rate of the gross domestic product was 1.4 percentage points higher than that in the developed market economies, but 1.0 percentage point below that of the centrally planned economies. Population in the developing countries increased at a rate that was more than twice that of the developed market and centrally planned economies. Consequently, the rate of growth of gross domestic product per capita was only 3.2 per cent in the developing countries, compared with 3.3 per cent in the developed market economies and 5.5 per cent in the centrally planned economies.

Although the rate of growth of gross domestic product per capita in developing countries was only slightly less than that of the developed market economies, the annual increment in that measure for the developed market economies exceeded the corresponding increment in the developing countries by a factor of 12. During that same period, the rate of natural increase in the developed market economies declined annually by 0.28 person per 1,000; the corresponding decrease in the developing countries was 0.06 person per 1,000.

In the period 1960–1975, the average annual rate of growth of gross domestic product per capita was 6.6 per cent in the petroleum-exporting countries, compared with 2.7 per cent for the other developing countries, despite the fact that the rate of natural increase in the former group was 20 per cent higher than that in the latter.

There were also marked regional differences in patterns of socio-economic change between 1960 and 1975. However, they were not related in a uniform way to regional changes in demographic variables. For example, the annual increment in gross domestic product per capita in Latin America was almost three times that of all developing countries. Yet, the annual decline in the total fertility rate in East Asia was more than six times that of the developing countries as a whole.

The findings of this study demonstrate that demographic factors alone cannot adequately explain observed disparities in levels of gross domestic product per capita and other socio-economic indicators as they existed in 1975 or as they changed between 1960 and 1975. However, an unmistakable pattern emerged in which gross domestic product per capita was inversely associated with fertility and directly associated with life expectancy at birth.

Excluding the petroleum-exporting developing countries, the findings of this analysis generally tend to substantiate the view that low gross domestic product per capita and associated socio-economic conditions tend to perpetuate high fertility and rapid population growth; and, conversely, rapid population growth inhibits the rapid growth of gross domestic product per capita. Therefore, the economic disparities between countries might have been narrowed between 1960 and 1975 had population growth rates in the developing countries been more moderate.

POPULATION POLICIES

In 1980, most Governments considered the different problems that arose from the evolution of their population situations to be critical factors for the success of their national development plans. Governments recognized that population problems were not limited to population growth but included such concerns as the uneven distribution of the population within the national territory. They also realized that fertility problems were not limited to the global aspects and the effect on population growth but included such individual aspects as those which related to a person's welfare and human rights. Furthermore, national recognition of the importance of population and of its close relationship with economic and social development has been accompanied by a growing awareness of the possible international consequences of national population policies.

The following analysis of Governments' perceptions, policies and measures in relation to population is based entirely on official government sources, including replies to the most recent population inquiry conducted by the United Nations, entitled "Fourth Population Inquiry among Governments in 1978: review and appraisal of the World Population Plan of Action", statements made by Governments on different occasions and national development plans.

Natural increase and population growth

In 1980, most Governments considered that the changes in their rates of natural increase were among the most important determining factors in the formulation of their development policies, an opinion held by both developed and developing countries. At the world level, 35 countries out of a total of 165, which represented 12 per cent of the world population, perceived an increased rate of growth as desirable; 75 others, with 29 per cent of the world population, expressed satisfaction with their rate of natural increase; while 55, with 59 per cent of the world population, desired a decreased rate of growth.

Among the developed countries, 11 out of 39 desired a higher rate of population growth, while the remaining 28 countries were reportedly satisfied with their rates of growth. In the developing countries, on the other hand, the situation was almost entirely reversed: 24 out of 26 countries desired an increased rate of growth; 47 were reported satisfied; and 55 (which represented 79 per cent of the total population in the developing countries) desired reduced rates of population growth. If the perception of the rate of natural increase is classified by population size rather than by number of Governments, the distribution becomes markedly asymmetrical, owing to the considerable demographic weight of the large countries of Asia, all of which desired a reduced growth rate.

In the developed countries, the achievement of a net reproduction rate of less than unity and the increasing size of the old-age population played an important, though not necessarily decisive, role in the formulation of Governments' perceptions of the rate of population growth. Indeed, none of those countries desired a lower rate of natural increase; but among those countries which were satisfied with their rates of natural increase and those which considered it too low, the observed variations did not occur in a different demographic context but rather as a result of divergent estimates of the social and economic consequences of the same demographic trends.

Between 1978 and 1980, no radical change in the Governments' perceptions was observed. In fact, there was a reinforcement of previous perceptions. At the same time, in many countries of Western Europe, a debate as to whether to change the official positions with respect to the trends of population growth developed among the general public and in governmental circles.

In the developing countries, the maintenance of a high net reproduction rate and the increase in the already high dependency ratio, accompanied by a simultaneous increase of the economically active population, led many Governments to express dissatisfaction with the levels and trends of their rates of natural increase. Most developing countries with populations of more than 50 million considered their rates of natural increase too high. With some notable exceptions, the developing countries that were satisfied with their rates of growth or that perceived them as too low were, in general, the smaller countries where the level of mortality was still very high.

In the region served by the Economic and Social Commission for Asia and the Pacific (ESCAP), the dissatisfaction with current rates of natural increase was the greatest: 16 out of 30 countries, which represented 90 per cent of the regional population, desired a reduced rate of growth. The developing countries that were generally more satisfied with their rates of growth were found in the regions served by the Economic Commission for Africa (ECA) and the Economic Commission for Western Asia (ECWA). The proportion of countries that desired a higher rate of growth was greater in the latter region.

Governmental intervention with respect to the rate of natural increase is seldom undertaken in an isolated manner. The general practice is to combine various interventions. Modern population policies are generally multidimensional in character. It is therefore necessary for Governments to formulate and combine the most effective set of interventions. This analysis is limited to the combinations of options most frequently utilized today in reference to the categories of perception and the rates of natural increase.

When the rate of natural increase was perceived as satisfactory, there was less pressure to modify fertility for demographic reasons and emphasis was placed on fertility policy measures directed towards the improvement of individual well-being. In that situation, spatial distribution interventions also played an important, although non-essential, role. The same finding was true for international migration and changes in the socio-economic structure. On the other hand, when the rate of natural increase was perceived as being too high, emphasis was usually placed on the reduction of fertility in combination with interventions relating to spatial distribution. The reorganization of socio-economic structures in accordance with the national development strategy also received a relatively high priority.

Lastly, in cases where the rate of natural increase was considered to be too low, one of the following situations was likely to pertain: either both fertility and mortality rates might have been too high or else both might have been too low. In the first case, typified by countries at the early stages of the demographic transition, priority was accorded to a reduction in mortality in association with efforts towards a spatial redistribution of the population. Fertility interventions, as well as international migration, generally received a lower priority, while efforts for socio-economic restructuring received a higher priority. In the second case, typified by countries in the final phase of their demographic transition, emphasis was placed on fertility increase with an explicit demographic objective in combination with an objective to enhance well-being. In a few cases, mortality intervention was considered to have an important role, particularly if resort to international migration was limited. It is necessary constantly to adapt socio-economic structures in accordance with internal and external economic pressures so that interventions in this area are carried out in the most systematic way possible.

Mortality and morbidity

The reduction of mortality and the improvement of the health status of the population were universal development objectives, though Governments differed as to the strategies used to attain them and the demographic role assigned to those strategies. Governments for which mortality and morbidity policies also served demographic objectives were few in number and, in general, were among those Governments which considered their rate of natural increase to be too low. Thus, the reduction of mortality constituted a way to maximize the demographic effect of existing fertility and therefore to influence the rate of natural increase.

Intervention to reduce mortality and thus to improve health status had high priority among all Governments. In a previous report,[6] it had been indicated that mortality followed spatial distribution in the hierarchy of problems raised by changes in the population situation. The situation remained the same in 1980. Out of a total of 165 countries, 107 Governments considered the current level of life expectancy to be unacceptable. In fact, no Government perceived its existing levels of mortality as totally satisfactory. However, some Governments conceded that their current level was acceptable given prevailing circumstances and taking into account the diverse constraints which restricted the reduction of mortality.

The acceptability of mortality levels generally increased with the length of life expectancy at birth. For instance, nearly all of the 50 countries that had a life expectancy at birth of less than 50 years considered that the level was unacceptable, while only seven out of 42 countries that had attained a life expectancy of more than 70 years considered the level to be unacceptable. Among the 39 developed countries, nine considered the level unacceptable and 30 considered it acceptable. In the 126 developing countries, the frequency of "unacceptable" responses was much higher: only 28 countries considered the level acceptable, whereas 98 considered it unacceptable.

In the developed countries, efforts were being increasingly directed towards the reduction of the differentiating factors that still existed between the diverse categories of the population, in particular, those which were exposed to specific risks owing to living conditions, occupational hazards and place of residence. Special attention was also being given to the factors associated with adult male mortality and the gap between male and female mortality at the older ages.

In the 1970s, concern had been expressed in regard to a slowing of the decrease in the mortality rate of developing countries. In 1980, that concern still persisted, although the analysis of the currently available data provided more nuances in the assessment of the situation. In any case, based on the United Nations mortality projections, it appeared unlikely that the objective proposed by the World Population Plan of Action (to achieve at the world level a life expectancy at birth of 62 years) would be attained by 1980.

The distribution of deaths by age and cause in developing countries reflected the importance of the proportion of deaths in age group 0–4 years and the predominance in all age groups of deaths due to exogenous causes. Some of those deaths could easily be averted through utilization of inexpensive cures and through an improvement in the conditions of living. Since the International Conference on Primary Health Care, held at Alma-Ata, USSR, from 6 to 12 September 1978, a new orientation had come about, which gave priority to primary health care, especially for high-risk groups, such as infants, women of childbearing ages, rural populations and the underprivileged in urban areas. Although the importance of certain types of medical care was widely recognized, priority had been given to efforts concerning environmental sanitation and the non-medical determinants of health.

Fertility

The perceptions that Governments expressed with regard to fertility may be examined from the point of view of their effect on the global level and the trends of the rate of natural increase, and from the point of view of their effect on the well-being of families and individuals. Of course, a direct relationship exists between the two points of view: the progressive polarization of individual behaviour around certain norms of reproduction can lead Governments to consider global fertility levels unsatisfactory.

At the world level, 22 countries considered their fertility rate to be too low, 59 considered it too high and 84 expressed satisfaction with their current rate. In the developed countries, 8 out of 39 considered their level of fertility too low; the remaining 31 countries considered it satisfactory. In developing countries, the distribution was

[6] *World Population Trends and Policies: 1979 Monitoring Report*, vol. II. *Population Policies* (United Nations publication, Sales No. E.79.XIII.5).

almost reversed: 14 countries out of 126 considered their fertility level to be too low; 53 were satisfied; and 59 considered it too high. An "unsatisfactory" perception did not necessarily imply that Governments had decided to intervene or that they had already intervened. At the world level, 17 of the 22 countries that considered their fertility to be too low had intervened to regulate the rate, and 38 out of the 59 countries that considered their rates too high had indicated intervention. The category of satisfied countries (84) was heterogeneous; some were satisfied because their intervention had been successful and others simply because the spontaneous trends were considered satisfactory. Among the group of countries that expressed satisfaction, 31 had adopted measures for the maintenance of fertility at the currently satisfactory level.

In the developed countries, the types of fertility intervention may be grouped into three broad categories: legal measures directed towards permitting couples to exercise in a more or less free manner their reproductive choices; economic measures directed towards the compensation of families for the expenses associated with having children or bringing about desired fertility behaviour through a progressive system of benefits; and measures directed towards reduction of the conflicts between work and maternity.

Legal measures concerning access to contraception had evolved considerably. A majority of the developed countries, whether pro-natalist or anti-natalist, were currently committed to very liberal legislation; only a few maintained a restrictive attitude. National legislation had recently undergone a liberalization; only three countries still restricted access to modern methods of contraception. Of 39 developed countries, 13 permitted abortion on demand, 16 permitted it for socio-economic reasons and 28 for broad medical reasons. Nevertheless, certain restrictions had been imposed in some countries where abortion formerly had been available on request. On the other hand, other developed countries had liberalized their legislation on abortion. Legislation concerning sterilization was often more difficult to interpret because of the ambiguity of its range of application. Taking into account that restriction, it appears that 16 countries permitted sterilization on demand, two permitted it for socio-economic reasons and two for medical reasons.

The second method of intervention included the taking of responsibility by the State for a share of the expenses incurred in child support. Most modern States had a system of compensation for family expenses (such as a reduction in taxes) and/or family allowances, thus pursuing the often indistinguishable objectives of social justice and fertility increase. In the few pro-natalist countries of Western and Eastern Europe, the second objective had been clearly underlined and strongly accentuated in the past few years by the placement of emphasis on having a third child.

The third method of intervention involved a combination of measures directed towards the resolution of the conflict between maternity and work. With the help of the Governments in the countries of Eastern Europe, the reconciliation between the roles of mother and working woman had created the conditions necessary for a resumption of natality. Some Eastern European countries had instituted legal arrangements or measures that allowed mothers to meet their educational responsibilities (through the creation of crèches etc.) and to improve their professional qualifications (through study leave etc.). Foremost among those measures was a paid leave for rearing children.

Among 126 developing countries, 59 Governments perceived their fertility rates as too high. Of those countries, the largest proportion (in terms of countries and in terms of population) are in the ESCAP region and the smallest in the ECWA region. In the policy area, 38 Governments of developing countries had adopted specific policies to reduce fertility; and, once again, the largest proportion with anti-natalist interventions was found in the ESCAP region.

The major directions taken by anti-natalist policies in 1980 consisted of a coherent collection of measures directed towards improvement of the supply of family planning services and development of an over-all demand for them through the encouragement of parents to have fewer children (and thus to have recourse to family planning services). Concerning supply, not only legal measures but technical measures were taken. In reference to demand, policy interventions included economic incentives or disincentives, information and education measures, legal measures and, lastly, actions of a general nature on the socio-economic determinants of fertility behaviour.

Various measures had been taken by Governments for the legalization and facilitation of access to modern methods of contraception, abortion and sterilization. Only nine out of 126 developing countries still restricted access to modern methods of contraception; on the other hand, 81 supported direct access to these methods. Nevertheless, if all the countries that had an anti-natalist policy directly supported access to modern methods of contraception, it was also true that even more countries that did not have anti-natalist policies or that had pro-natalist policies indirectly authorized or supported access to those methods, but in that case with the objective of promoting individual well-being. Whatever the situation might be, the general direction was towards liberalization.

In numerous anti-natalist countries, abortion was very strictly regulated, whereas it was permitted on demand in some anti-natalist countries. In developing countries for which information is available, 5 countries permitted abortion on demand, 9 for socio-economic reasons and 46 on broad medical grounds. The other countries had a very restrictive approach in that abortion was considered legal only when the life of the mother was in danger or in specific juridical or eugenic cases.

The situation with respect to sterilization was more complex. In many countries, clear legislation had been formulated, but in others the law was still uncertain. Of the 101 developing countries for which information is available, 27 countries permitted sterilization on demand; 4 for socio-economic reasons; 7 for reasons linked exclusively to family planning; 21 for medical reasons;

and the remaining 52 on limited grounds only. The ambiguities of the judicial status of sterilization in many countries had not prevented its emergence as a form of contraception, even after the set-back observed in 1976 following the state of emergency in India. It had been estimated that in 1977, 80 million sterilizations had been performed throughout the world (as compared with 20 million in 1960), with 64 million in the developing countries. The distribution by broad regions was as follows: ECA, 0.5 million; Economic Commission for Latin America (ECLA), 3 million; ESCAP, 60.5 million; and ECWA, negligible. In the region served by the Economic Commission for Europe (ECE), 16 million sterilizations had been performed.

Over the previous few years, different measures had been undertaken to improve the diffusion and supply of family planning services. First, the trend towards the integration of those programmes with health services, which began with services for maternal and child protection, had progressed considerably. The final statement of the International Conference on Primary Health Care had reinforced that already well-established trend. In addition, new approaches had recently been attempted to integrate family planning services into activities other than health programmes, such as integrated rural development. Another way to improve the supply of, and to some extent the demand for, contraceptive services consisted of making the programmes community-based, in which emphasis was placed on such units as the village, the neighbourhood or the factory. The growing utilization of paramedical personnel also constituted an area of priority action to increase the diffusion of family planning services. Lastly, in that context, one can mention the "demedicalization" of contraception, that is, the sale of contraceptive products through other channels, whether traditional or modern.

The use of economic incentives or disincentives that tended to influence the demand for family planning services appeared to have greatly increased in recent years. They were directed towards individuals and to an increasing degree were community-based. Economic incentives were more frequent than disincentives, owing to the low level of development of many of the concerned countries.

Besides incentive measures, certain Governments had also taken disincentive measures. Singapore, for example, is well known to be a leading country in this area. Recent developments in other countries of Asia had confirmed the efficacy of those measures when applied in the socio-economic context specific to the stage of development of the country.

In order to have a short-term and a long-term impact on the motivation of couples for smaller families, Governments had supported campaigns that utilized traditional and modern methods of communication.

Among the legal measures that had had a significant effect on fertility were changes in the age at marriage, particularly in regard to women. Among some developing countries that had anti-natalist policies, the minimum age at marriage had recently been increased. Currently, that was the only measure imposed at the national level which was coercive in the legal sense of the word.

Lastly, considerable interest had been shown since the World Population Conference at Bucharest in 1974, in reference to the eventual effects of intervention based on the socio-economic determinants of fertility, such as education, health, employment, income distribution, status of women and land reform. Nevertheless, development plans adopted since that time by countries that had anti-natalist policies indicated that efforts in those areas had largely been made for non-demographic reasons.

In general, it was the use of economic incentives and disincentives (mainly in Asia) and the improvements of methods of supply of family planning services (in all the anti-natalist countries) that appeared to be the main features of recent anti-natalist policies. The proliferation of economic incentives raised financial problems and there was a great temptation to resort to some sort of pressure, first as a complement to and then as a substitute for those expensive incentives.

Spatial distribution and internal migration

Among the demographic processes considered by Governments to be most frequently associated with problems of development, spatial distribution of the population came first. At the world level, only 19 countries out of 165 considered the geographical distribution of their population to be acceptable; of the remaining 146 countries, 79 considered it unacceptable to a large extent and 67 considered it unacceptable to a lesser extent.

In line with the history, economy or ideology of each country, important differences existed in the modalities of government intervention in regard to spatial distribution. For instance, in Eastern Europe, particularly in the USSR, rapid urbanization had not been accompanied by a mass concentration of the population in large metropolitan areas, as was the case in Western Europe. Among the Governments of industrialized countries, only 3 countries out of 39 considered the geographical distribution of their population unacceptable to a large extent, 22 considered it unacceptable to some extent and only 4 considered it to be acceptable.

Government policies may be classified as those designed to modify the migratory flow and those designed to modify the spatial configuration of human settlements. None of the 39 developed countries wished to accelerate the migratory flow. On the other hand, 22 desired to reduce it, 6 wanted to accelerate it and 11 did not desire to intervene. Concerning the spatial configuration of urban settlements (for example, creation of new towns) or rural settlements (relocation of the population to specific rural zones), 18 countries did not desire specific action, 16 favoured intervention for urban areas only, 5 favoured intervention for urban and rural areas, and none favoured it for rural areas only.

One can distinguish collective or individual measures, whether incentives or disincentives, whether direct or indirect, that were directed towards the influencing of individual or collective migratory behaviour. Among the

collective measures, for instance, were those which favoured the development of industrial infrastructure and others which restricted or did not permit that form of intervention. Among the individual measures of intervention were incentives, including grants for relocation, settlement and job training; or disincentives, such as special taxes or even the restriction of freedom of movement. In general, outside of direct government interventions, such as the creation of social and economic infrastructure or employment in the public sector, incentives or disincentives appeared to be more frequently utilized.

Governments of developing countries were also very conscious of the gravity of the situation in that 110 out of a total of 126 considered the distribution of their population to be unacceptable to a varying degree. The largest proportion of countries that considered the situation unacceptable were in the ECA and the ECLA regions.

In the developing countries, the distribution of preferences was as follows: only 4 countries desired to accelerate the flow; 15 wanted to reverse the flow; 79, or the largest proportion, wished to reduce the flow; and only 28 countries desired no intervention at all. It was apparently in countries of the ESCAP region that stringent policies were the most common (8 out of 33 countries desired a reversal of the migratory flow). At the same time, some countries seemed to have renounced such a policy or to have made their former policies more flexible. In regard to spatial configuration, 54 countries reported no intervention. A majority (60) intervened in both the urban and rural areas, 21 only in urban areas and 30 in rural areas. Once again, most interventions were found in the ESCAP region (24 countries out of 33), followed by ECLA (21 countries out of 30).

The strategies that had been adopted by developing countries to deal with the growth of their urban population most frequently focused on policies directed towards the solution of problems caused by a rapid increase of the population of metropolitan areas. A frequently observed policy was to distribute the flow of migrants between metropolitan agglomerations and other urban centres, rather than to intervene on the volume of migrations itself.

As already noted, the spatial distribution policies of developing countries often had been and remained exclusively focused on limitation of the increase in the populations of metropolitan areas and involved policies that often appeared to have failed. Following those failures, certain countries had reacted by altering their spatial distribution policies: they had given priority to the development of rural areas. Those strategies had consisted in intervention in various aspects of rural development, including agriculture; and in the social, economic and institutional fields. One of the objectives of that strategy had been to retain an important part of the population in the rural areas. In general, the measures taken to implement spatial redistribution policies were expensive; and if their financing came from national sources, they required a transfer of considerable resources from the urban sector to the rural sector and from the better endowed areas to the poorer areas; thus they raised obvious political difficulties. International assistance in that area represented an important but still limited source of financing.

Most Governments of the developing countries considered that the improvement of the spatial distribution of their population was one of the bases of their development policy as well as of their population policy. In effect, an improved spatial distribution would influence the components of the rate of natural increase and, on the other hand, would help to adapt the economic system to population pressures.

The problems encountered in co-ordinating different spatial distribution policies had led a number of developing countries to revise the respective roles assigned to urban and rural development; Governments were ready to assign each type of development a more complementary and less conflicting role.

International migration

A rather limited number of Governments regarded international migration to be demographically significant. The number of countries that considered immigration to be important had reached 47 out of 165 countries; of those, 15 were developed. In the case of emigration, the number had reached 51; 10 were developed countries.

The major countries of immigration were the petroleum-exporting countries of Northern Africa and Western South Asia, the countries of Northern America and Western Europe, some countries of South America and the industrialized countries of Oceania.

Immigration in the petroleum-exporting countries of Western South Asia, formerly more spontaneous or individual, had become increasingly organized. Certain countries had adopted measures that led to better control or restriction of the entrance of immigrants. Other countries had signed bilateral accords with Governments that exported workers with a view to the exercise of a more effective control over the entrance of foreign workers. The system of sponsorship of foreign workers was largely utilized in the region. Through the establishment of a link between the presence of the immigrant and the execution of a particular project, it had contributed to improvement of the control over the immigrants and had made the foreign workers more mobile and thus less susceptible to integration.

The countries of Europe had a policy that emphasized the management of the stock of immigrants resident in a country rather than the migratory flows themselves. On the whole, the policies adopted in recent years by the European countries had had three objectives: to stabilize or reduce the immigrant population by the means of such incentives as grants for departure or by means of such disincentives as restrictions on entry, limitation of the number and the length of stay of the resident foreign population; to better integrate the foreign population authorized to stay in the receiving country; and to facilitate the reunion of immigrant families.

The countries that traditionally exported workers from the southern basin of the Mediterranean had long been

affected by the crisis. Some had adopted a deliberate policy of reintegration, which leads one to believe that they no longer considered emigration one of the important ways to solve their employment problems.

As in many other regions of immigration, illegal migration played a significant role in Europe. In Northern America, the previous two years had been marked by the arrival of a large number of refugees from the Caribbean and, to a lesser extent, from Eastern South Asia. The flow of illegal migrants had also been continuing. The Governments of the countries of immigration were increasingly concerned with the need to control different migratory movements more effectively and to revise the principles that underlay current immigration policies.

Latin America considered the intraregional movements of temporary workers important, although very few countries tried to attract permanent immigrants. A large proportion of those temporary immigrants were illegal.

In Africa, the main areas of attraction were in Western and Southern Africa, but it is important to remember that relatively significant migratory movements occurred almost everywhere across borders that were easily penetrated. In Western Africa, the traditional receiving countries were Gabon, the Ivory Coast, Senegal and, to a lesser extent, Ghana.

South Africa has always played an important role as a country of immigration in spite of the vicissitudes of politics. In Africa, as in Latin America, immigration is, in general, of a regional character and often takes the form of illegal migration, which plays a role similar to temporary migration in Europe. Africa is also the major area where one finds the largest number of refugees. The Pan African Conference at Arusha in 1979 had attempted to define the principles of an African policy of sharing the costs resulting from the receiving of refugees.

In spite of the fact that Asia includes the majority of countries of emigration, it also had to receive a considerable flow of refugees in the period under study. That was true in the case of Pakistan, where almost 1 million persons had entered its territory in the previous year. It had also been and was still the case in Malaysia, Thailand and, to a lesser extent, Indonesia. Many countries of Asia currently participated in an emigration movement in the direction of Western South Asia. Some had even adopted quantitative objectives for emigration in their five-year development plans. Other countries of Asia had promulgated legislation to encourage the emigration of unskilled workers but to limit the "brain drain". The emigration situation in the region can be characterized: some countries that had attained an intermediate stage of development tried to associate the emigration of manpower with the exportation of the industrial equipment they produced; another group of countries, at an earlier stage of development, located in Eastern South Asia and in Middle South Asia, concentrated their efforts on the systematic organization of emigration while they tried to control its volume and structure.

Australia was one of the few countries of permanent immigration where the objective was to assure a relatively stable flow of new immigrants while public authorities were allowed to adjust annual admissions according to the needs of the economy. New Zealand, on its side, preoccupied with the possibility of a negative balance of migration, had made its restrictive policies towards immigration a little more flexible.

In the developed countries, where immigration was considered significant, only one country considered it too low, nine considered it to be satisfactory and five thought it was too high. In developing countries, the numbers were, respectively, 5, 11 and 16.

As concerned immigration policies, 51 countries at the world level intervened in one way or another to act upon immigration: 9 to increase it; 17 to maintain it at its existing level; and 25 to reduce it. As could be expected, the largest number of policies to reduce immigration were reported in the ECE region (12 countries out of 39). In the developed countries, the distribution between the different policies was as follows: only one country had a policy intended to increase immigration, 2 wanted to maintain it at the current level and 12 wished to reduce it. In the developing countries, the corresponding figures were, respectively, 8, 15 and 13.

Of 39 developed countries, 10 considered that migration was demographically significant; and among the developing countries, 51 out of 126 considered it to be significant. Whereas a majority of the concerned developed countries (7 out of 10) considered that emigration was too high, more than half of the concerned developing countries (29 out of 51) considered it satisfactory and three countries perceived it as too low.

Emigration policies existed in 10 developed countries out of 39 and in 50 developing countries out of a total of 126. The interventions of one or the other group of countries corresponded indirectly to the perceptions described earlier and the highest frequency of restrictive policies concerning emigration (10 countries out of 30) occurred in the ECLA region.

An examination of the current trends of international migration policies shows that it is not easy to analyse policies relating to international migration by utilizing the traditional distinctions, such as those between temporary migrants, permanent migrants, and legal and illegal migrants. It appears that the problem of defining the different categories of international migrants is essentially political; Governments assign migrants to particular categories depending upon the needs of the moment.

Undoubtedly, public authorities of the receiving countries find themselves confronted with problems without precedent. Never in human history has the gap between the supply and the demand of international migration been so large. There are a variety of reasons for the migratory flows which contribute to creating or accentuating disequilibrium. There are economic reasons (the gap in levels of living between the North and the South, the massive transfer of populations from the traditional sector to the modern sector in the South and

the industrial restructuring occurring in the North), and demographic reasons (the demographic dynamism of the countries of the South being such that, with rare exceptions, migration does not solve the problems created by high rates of natural increase, whereas the volume of migrants is considerable, compared with the capacity of the receiving countries). There are also cultural reasons (attraction to a Western way of life), technical reasons (development of continental and intercontinental means of transportation) and obvious political reasons.

Part One

RECENT DEMOGRAPHIC TRENDS

INTRODUCTION

In the last decades of the twentieth century, it is becoming increasingly evident that there is a trend towards fertility decline in the developing countries and that a moderate growth rate is being sustained for the world population. According to the estimates recently revised by the United Nations Secretariat, the annual rate of growth of the world population may decline to 1.5 per cent by the end of the century, from 1.7 per cent in 1980 and 2.0 per cent 15 years ago. Obviously, the decline is small and it is significant primarily because it has been persistent and is anticipated to accelerate. Furthermore and most important, substantial population increase will persist, mainly in the developing countries, and will continue to be one of the major factors affecting the present and future of humankind.

The developing countries, defined here to include all the countries of Africa, Latin America, Asia (excluding Japan) and Oceania (excluding Australia and New Zealand), currently absorb 70 million additional people annually, or nine tenths of the global increase; and this additional pressure on their resources and on their capacity for development is not expected to decrease significantly in the near future. In fact, the projections indicate that towards the end of the century the annual addition to the population of the developing countries may well increase to 84 million, or 93 per cent of the projected total annual increase in world population. If this trend continues, the population of the less developed regions will increase by almost 50 per cent (1.5 billion or 1.6 billion) between 1980 and the year 2000. This increase will materialize despite the anticipated decline in the overall birth rate for these countries, from 32.3 in 1980 to 25.7 per 1,000 in 2000. However, the projected decline in the death rate, from 11.5 to 8.4 per 1,000, in the same period will partially offset the impact of fertility decline so that the rate of growth will decline from 2.08 per cent to 1.73 per cent.

According to the demographic estimates and projections as assessed by the United Nations Secretariat in 1980, the total estimated population of the world was 4,432 million in 1980. During the past three decades, the world population increased by 1.9 billion, that is, from 2.5 billion to 4.4 billion. The medium-variant projections of world population, as prepared by the United Nations, are 6.1 billion for the year 2000, 7.0 billion for 2010 and 8.2 billion for 2025.

By the end of the first quarter of the twenty-first century, it is projected that 83 per cent of the world population will be living in the currently developing countries, compared with 74 per cent at this time. By 2025, it is anticipated that the population of Africa will have trebled, that of Latin America will have increased by 150 per cent, that of South Asia will have doubled and that of China will have increased slightly less than 50 per cent.

In the developing countries, the decline in the birth rate during the period 1960–1965, from about 41 to its current level of 32 per 1,000, was brought about largely by declines in China and in several countries of Latin America, East Asia and Eastern South Asia. This trend has gained momentum and has spread, but little or no decline is yet apparent in other regions, in particular, those of Africa, and Middle and Western South Asia. Thus, fertility levels among the developing countries are extremely heterogeneous.

A second important feature of the current demographic situation is the continuing fertility decline in the developed countries (those of Northern America and Europe, Japan, Australia, New Zealand and the Union of Soviet Socialist Republics), a trend that has been under way since the end of the post-war "baby boom". The average birth rate in these countries declined from a high of about 22 in the 1950s to 17 in the period 1970–1975 and to less than 16 per 1,000 during the period 1975–1980. In fact, by the mid-1970s, although fertility in the majority of these countries was already below replacement level, the large numbers of young adults who were born during the "baby boom" years of the 1950s were responsible for maintaining a positive balance of births over deaths in most countries. By the period 1975–1980, fertility was above the replacement level in 15 of 33 developed countries. Even among those 15 countries, fertility rates usually were not far above the replacement level. However, very preliminary figures for several countries suggest that a reversal in this long downward trend may have begun. Although the Eastern European countries have recently experienced a variety of fertility trends, including a temporary recovery, their current fertility levels are either below the replacement level or not far above it.

During the remainder of the twentieth century, as the relatively large cohorts of women of reproductive ages are replaced by smaller numbers born in the 1960s and 1970s, the annual balance of births and deaths in many developed countries will become negative unless current low levels of fertility increase. Despite the fact that the rate of growth in the developed countries is projected to decline from the current level of about 0.7 to 0.5 per cent near the turn of the century, the medium-variant projections of the United Nations anticipate that between 1980 and 2000 the total population of these regions will increase by about 140 million.

During the 1970s, the annual number of legally contracted marriages per 1,000 population steadily declined

in most Western developed countries. In almost all the developed countries for which post-1970 data are available, there are clear indications of a postponement of formal marriages and a reversal of the long-standing declining trend in the age of marriage. In part, this situation reflects the important changes in attitudes towards formal marriage that have been taking place in Western societies in recent years. The general pattern is that women are marrying at a later age but legal marriage is being preceded by a period of cohabitation or consensual marriage, beginning at ages even below those which were prevalent for entry into legal marriage only a few years ago. The causes of these changes, which are still being studied, include changes in the role and status of women, easy access to efficient methods of birth control and greatly increased acceptance of cohabitation and childbearing outside legal marriage.

Amidst fears that earlier assessments of levels and trends of mortality in many developing countries may have been too optimistic, mortality regained world attention in the 1970s as a serious demographic problem. Despite the difficulty of obtaining reliable data, all estimates indicate that mortality in Africa south of the Sahara is still very high and that, except for a small number of countries, life expectancy at birth is below 50 years and will probably fall far short of the life expectancy targets for 1985 set by the World Population Plan of Action.[1]

The mortality situation is somewhat better in Northern Africa and South Asia, where life expectancies are generally around 55 years. Furthermore, several countries of East Asia and others, such as Kuwait, have managed to reduce mortality to, or near to, the levels prevalent in developed countries. Most of Latin America also has low or relatively low mortality levels, but a slackening in the rate of decline beginning in the late 1960s has raised concern in some countries. In other countries, however, the pace of mortality decline has resumed. Mortality decline in the developed countries gained momentum in the 1970s; and in several of these countries, female life expectancy has reached 78 years.

On the whole, mortality levels in sub-Saharan Africa appear to remain the highest in the world, with levels of life expectancy at birth well below 50 years. Among the less developed regions, these regions appear to have made the least progress in lowering mortality during recent years. In contrast, most countries of South Asia have life expectancies in the range of 50–60 years and recent estimates of life expectancy in China exceed 65 years. The majority of countries in Latin America also enjoy a life expectancy of more than 60 years.

When national populations are stratified by socio-economic factors, such as place of residence and education, mortality differences appear to be more pronounced in developing than in developed countries. For example, unlike the developed countries, where urban/rural differences have tended to disappear, rural communities in many developing countries have much higher mortality rates than are observed in urban areas, with the difference reaching 50 per cent or more of the urban levels.

Infant mortality remains most critical in Africa and South Asia. Whether in Africa south of the Sahara, where levels in virtually all countries are between 150 and 200 deaths per 1,000 live births; or in Northern Africa and South Asia, where they are usually within the range of 100–150, infant mortality rates are much higher than levels prevalent elsewhere. Low levels of infant mortality, however, are not confined to the developed countries, where they are mostly between 7 and 15 per 1,000; a number of developing countries also have made impressive gains during the past decade and have brought infant mortality rates down to levels below 30. Child mortality (ages 1–4) also remains very high in many less developed regions. Available estimates range up to 40 per 1,000, while in the developed countries these rates are 1 per 1,000 or less.

Although the age structure of the population does not normally change rapidly, declining fertility in the developing countries has caused a corresponding decline in the proportion of children and the young (ages 0–14), from 42 per cent in 1970 to an estimated 39 per cent currently. Although the proportion is still much higher than the 23 per cent observed in the developed countries, the decline is significant and has been brought about largely by the fertility decline in China. The proportion of the population 65 years of age and older in developing countries, though still relatively small, is growing rapidly; and in some countries where fertility is declining rapidly, it will not be long before the social and health problems of this age group will be as important as they now are in the developed countries. This age group already constitutes 11 per cent of the population of these countries and the proportion is expected to increase to 13 per cent in 2000.

Urban population is increasingly becoming a concern to policy-makers, particularly in the developing countries. Since the middle of the twentieth century, the urban population of these countries has increased almost four-fold to about 1 billion; and in 1975, it accounted for a majority of the urban population of the world for the first time in modern history. With a current growth rate of almost 4 per cent, the urban population of developing countries is expected to double over the next two decades and to exceed the urban population of developed countries by a margin of two to one. The growth rate of the urban population of the developed countries, which is currently 1.4 per cent, has been consistently declining. Between now and the year 2000, it is estimated that it will increase by only about 25 per cent. The developed countries are thus expected to be about 80 per cent urban in that year. This high level of urbanization in developed countries, in connection with the rapid urban population growth in developing countries, will lead to a significant milestone in human demographic history in 2000; by then, the world population, which had always been largely rural, will have become predominantly urban.

The substantial urban growth in the developing countries, which would make these countries 44 per cent urban

[1] *Report of the United Nations World Population Conference, 1974, Bucharest, 19–30 August 1974* (United Nations publication, Sales No. E.75.XIII.3), chap. I.

in 2000 compared with only 17 per cent in 1950 and 31 per cent in 1980, has been the result of both urban natural increase and rural-urban migration, with the latter factor playing a somewhat smaller role. Urban growth thus does not imply an alleviation of population pressure in the rural areas. In fact, the population of rural areas is currently increasing at an average rate of 1.4 per cent; and although projections anticipate a rapid decline in this rate, an increase in the rural population of 500 million, or more than one fifth, during the next two decades is implied. During the same period, the rural population of the developed countries is expected to decline by one fifth.

A main feature of current and anticipated urban growth is that it is "large-city" oriented. This trend is particularly obvious in the developing countries, where, during the past decade, the number of cities of more than 4 million inhabitants increased from 12 to 23; this number is expected to exceed 60 in the year 2000. The projections indicate that by the turn of the century a quarter of the urban population of the developing countries will be living in such cities. In both the developed and the developing countries, this type of expansion is at the expense of towns with a population of 500,000 or less. The share of these towns has declined from 58 per cent of the total urban population in 1970 to 54 per cent currently and is expected to continue its decline to slightly under 50 per cent in 2000. Cities with a population of from 500,000 to 4,000,000, though increasing substantially in numbers, are maintaining a relatively stable share of the urban population.

The early 1970s witnessed a continuation of the earlier pattern of international migration, namely, the movement of workers from poorer to richer countries (mainly males in search of employment in areas enjoying economic growth and rising demand for labour). This pattern was characteristic of movements between Latin America and Northern America, within Europe and into Europe from Northern Africa and Asia. In the European countries of immigration, the inward movement of workers has stabilized, though the stocks are still substantial.

After being a region of long-term net immigration, Latin America has, since 1960, become a region of substantial net emigration, owing to a reduced inflow from Southern Europe and increased emigration to the United States of America. Immigration into Canada from Latin America, mostly from the Caribbean region, rose steeply during the late 1960s and early 1970s. Another important and apparently increasing international flow is that of undocumented migrants. Such flows are difficult to estimate; but they are known to have reached substantial numbers in Venezuela, the United States, the countries of Europe and some countries of Western South Asia.

A new pattern of international migration, which has gained momentum during the past decade, is the flow of migrants to the petroleum-exporting countries of Western South Asia and elsewhere in the developing countries. It is estimated that the number of migrant workers employed in the petroleum-exporting Arab countries, coming mainly from other countries in the region, doubled between 1970 and 1975, reaching about 2 million in the latter year. Similarly, there are substantial numbers of migrant workers in some countries of Western Africa who come from land-locked countries to their north. An analogous but declining flow exists in Southern Africa.

During the past decade, outbreaks of repatriation flows and refugee movements have continued. The United Nations High Commissioner for Refugees and the United Nations Relief and Works Agency for Palestine Refugees in the Near East reported that there were about 10.5 million refugees and displaced persons as of early 1980. The size and suddenness of these flows have imposed severe strains on the receiving countries. The largest numbers of such persons are found in Africa.

Chapter I

WORLD AND REGIONAL POPULATION GROWTH*

A. Global trends

According to the United Nations world demographic estimates and projections as assessed in 1980, the total population of the world is estimated to be 4,432 million for 1980, with an annual rate of growth of 1.7 per cent. This rate appears to be in line with the gradual declining trend that began around the middle of the 1960s, when the world population was growing at an estimated rate of 2.0 per cent. In spite of this apparent abatement in the rate of population growth in the 1970s, the size of the annual addition to the existing world total has been increasing steadily to the current level of about 75 million per annum. This increment is the largest observed thus far and the size of annual increments is likely to increase further in the future.

The seemingly contradictory trends between the magnitude of the increase and the percentage rate of change can be explained by the fact that the size of the world population has grown so much. For the same reason, projected annual increments in the size of the global population will continue to increase for the coming 30–40 years even with the anticipated further decline of growth rate assumed in the United Nations medium-variant projections. During the past three decades, from 1950 to 1980, the world population has increased by 1.9 billion, from 2.5 billion to 4.4 billion, while 2.6 billion persons are expected to be added in the coming three decades, bringing the world total to 7 billion by 2010 (see table 1).

The global trend in population growth tends to mask the full implications of this process in regard to critical development issues because of the large differentials in population growth between the more developed and the less developed regions and among the less developed regions themselves. First, the most notable differentials in growth trends may be found between the two groups of regions. The population of the less developed regions of the world today, which, for statistical convenience, are defined here as consisting of the countries of Africa, Latin America, East and South Asia and Oceania, excluding Australia, Japan and New Zealand, comprises three quarters of the world total population and is growing at an estimated average annual rate of 2.1 per cent. In contrast, the annual rate of population increase in the more developed regions, consisting of the countries of Northern America and Europe, the Union of Soviet Socialist Republics and the three countries mentioned

* Prepared by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat.

TABLE 1. POPULATION SIZE AND RATE OF INCREASE FOR THE WORLD, MORE DEVELOPED REGIONS AND LESS DEVELOPED REGIONS, MEDIUM VARIANT, 1950–2025, AS ASSESSED IN 1980

	World		*More developed regions*[a]		*Less developed regions*[b]	
Year	*Population (millions)*	*Rate of increase*[c] *(percentage)*	*Population (millions)*	*Rate of increase*[c] *(percentage)*	*Population (millions)*	*Rate of increase*[c] *(percentage)*
1950	2 525	. . .	832	. . .	1 693	. . .
1955	2 757	1.76	887	1.28	1 870	1.99
1960	3 037	1.94	945	1.27	2 092	2.25
1965	3 354	1.99	1 003	1.19	2 351	2.33
1970	3 695	1.94	1 047	0.87	2 648	2.38
1975	4 067	1.91	1 092	0.84	2 975	2.32
1980	4 432	1.72	1 131	0.71	3 301	2.08
1985	4 826	1.70	1 170	0.68	3 656	2.04
1990	5 242	1.65	1 206	0.61	4 036	1.98
1995	5 677	1.60	1 242	0.58	4 435	1.89
2000	6 119	1.50	1 272	0.48	4 847	1.77
2005	6 558	1.39	1 298	0.40	5 261	1.64
2010	6 988	1.27	1 321	0.35	5 667	1.49
2015	7 407	1.17	1 342	0.31	6 066	1.36
2020	7 813	1.07	1 360	0.27	6 453	1.24
2025	8 195	0.96	1 377	0.24	6 818	1.10

Source: Results of the United Nations demographic estimates and projections as assessed in 1980.

[a] Including the countries of Northern America and Europe, Australia, Japan, New Zealand and the Union of Soviet Socialist Republics.

[b] Including the countries of Africa, Latin America, East and South Asia and Oceania, excluding Australia, Japan and New Zealand.

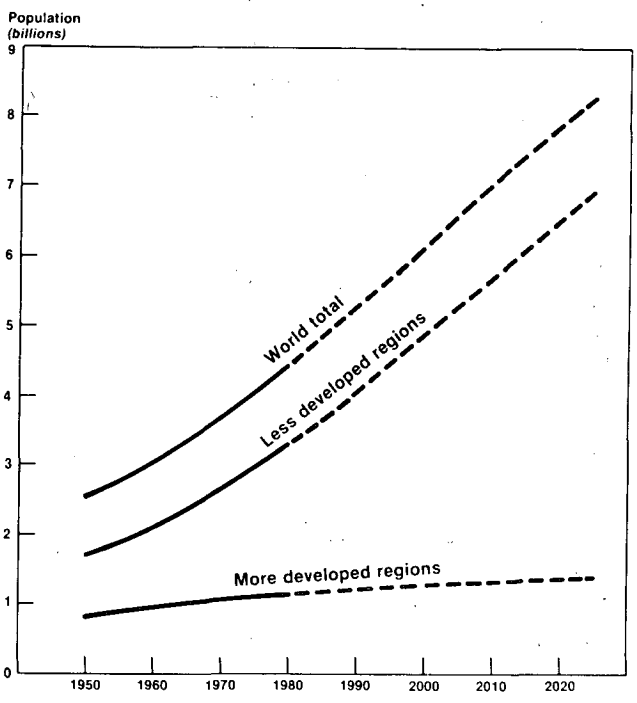
[c] Average annual rate of increase for each five-year period since the preceding date.

above, is 0.7 per cent, on the average, which is one third of the average rate for the less developed regions.

In terms of the size of population, the global population growth in the past 30 years and especially in the 1970s was largely due to population growth in the less developed regions; and their contribution appears likely to expand in the future. From 1970 to 1980, the increase of population in the less developed regions as a whole was 653 million and comprised 89 per cent of the global increase, while the more developed regions as a whole increased their population by 84 million in the same decade. In the 1980s and the 1990s, population growth in the less developed regions is projected to exceed 735 million and 810 million, respectively, while the projected increase in the more developed regions will gradually decline to 75 million and 66 million, respectively. Thus, the share of the global population growth accounted for by the less developed regions, which had been increasing from 78 per cent in the 1950s to 84 per cent in the 1960s, will rise to over 90 per cent in the coming several decades (see figure 1).

Another important feature in the demographic development that took place in the 1970s and is also expected to become more significant in the 1980s is the enlarging growth differentials among the less developed regions themselves. According to the United Nations estimates for the period 1975–1980, the average annual growth rates in the major areas ranged from a high of 2.9 per cent for Africa, followed by 2.5 per cent for Latin America and 2.2 per cent for South Asia, to a low of 1.4 per cent for East Asia. Moreover, there are indications that these growth differentials are widening. From 1960–1965 to 1975–1980, the annual growth rate declined only slightly in South Asia, while it increased in Africa by 0.4 percentage point. In short, the less developed regions today seem to be dividing themselves into a group of countries with persistently high growth rates and groups of countries with growth rates decelerating at varying paces (see table 2).

Figure 1. Past trends and future prospects of population in the world, more developed regions and less developed regions, medium variant, 1950–2025



B. Less developed regions

One of the most prominent features of the recent demographic trends among the less developed regions is the increasing diversity in the rate of population growth. In the 1960s, differences in growth rates among regions were relatively small. Among the major areas, the highest rate was estimated for Latin America at 2.8 per cent during the period 1960–1965, closely followed by a rate of 2.5 per cent per annum for Africa. In Asia as a whole (excluding Japan), population growth was relatively slow in 1960–1965, with an annual rate of 2.2 per cent. This situation changed radically in the 1970s and the gap between the highest and the lowest growth rates widened. In Africa, the growth rate rose to 2.9 per cent during the period 1975–1980, mainly due to a decline in death rates, while East Asia (excluding Japan), due largely to the experience of China, had a dramatic decline in its growth rate from 1.9 per cent in 1960–1965 to 1.4 per cent in 1975–1980. In South Asia and Latin America, the growth rate has declined slightly (see table 2).

Disparities in growth rates are also widening among smaller regions within each major area. In Latin America, three countries—Argentina, Chile and Uruguay, which are grouped together as Temperate South America—experienced a further decline in their growth rate in the 1970s from an already low rate of 1.7 per cent in the period 1960–1965 to 1.3 per cent in 1975–1980. The Caribbean region also had a decrease in its growth rate from 2.3 per cent in 1960–1965 to 1.8 per cent in 1975–1980, while the average growth rate appears to have remained at around 3.1 per cent per annum in Middle America, an area from Mexico to Panama, during the past two decades. The average rate of growth in Tropical South America decreased from 3.0 per cent in the period 1960–1965 to 2.5 per cent in 1975–1980. On the other hand, in Western South Asia, a rate of more than 2.8 per cent per annum was sustained during the 1960s and 1970s, while Eastern and Middle South Asia experienced a moderate decline in the growth rate from 2.4 per cent in 1960–1965 to 2.1 or 2.2 per cent in 1975–1980.

C. More developed regions

The population of the more developed regions of the world, estimated at 1,131 million in 1980, or 26 per cent of the world total, has been growing at a low and declining rate since the 1950s, when the average annual growth rate was about 1.3 per cent. The rate subsequently declined to less than 1.0 per cent in the latter half of the 1960s and 0.7 per cent in the period 1975–1980. Due to the fact that the birth rate is expected to recover slowly, if at all, and the death rate is expected to rise due to the aging of the population, the growth rate is projected to decline continuously, falling below 0.5 per cent by 2000 and 0.2 per cent by 2025. The percentage of the world population

TABLE 2. POPULATION SIZE AND RATE OF INCREASE, BY MAJOR AREA AND REGION, MEDIUM VARIANT, 1960–2025, AS ASSESSED IN 1980

	Population (millions)								*Average annual rate of growth (percentage)*							
	1960	*1970*	*1975*	*1980*	*1985*	*1990*	*2000*	*2025*	*1960-1965*	*1970-1975*	*1975-1980*	*1980-1985*	*1985-1990*	*1990-1995*	*1995-2000*	*2020-2025*
WORLD TOTAL	3 037	3 695	4 066	4 432	4 826	5 242	6 119	8 195	1.99	1.91	1.73	1.70	1.65	1.60	1.50	0.96
MORE DEVELOPED REGIONS	945	1 047	1 092	1 131	1 170	1 206	1 272	1 377	1.19	0.84	0.71	0.68	0.61	0.58	0.48	0.24
LESS DEVELOPED REGIONS	2 092	2 648	2 974	3 301	3 656	4 036	4 847	6 818	2.33	2.32	2.09	2.04	1.98	1.89	1.77	1.10
AFRICA	275	355	407	470	546	635	853	1 542	2.48	2.73	2.90	3.00	3.02	2.99	2.90	1.91
Eastern Africa	77	100	115	134	156	183	250	478	2.63	2.76	2.94	3.09	3.17	3.17	3.12	2.09
Middle Africa	35	42	47	53	61	70	91	162	1.76	2.37	2.52	2.67	2.74	2.75	2.72	1.90
Northern Africa	65	83	94	109	126	144	186	296	2.33	2.58	2.88	2.87	2.77	2.62	2.45	1.47
Southern Africa	20	25	29	33	38	44	58	101	2.43	2.61	2.75	2.87	2.87	2.82	2.71	1.76
Western Africa	79	104	121	141	166	195	267	505	2.77	2.99	3.06	3.18	3.23	3.20	3.13	2.01
LATIN AMERICA	216	283	322	364	410	459	566	865	2.80	2.54	2.45	2.38	2.28	2.15	2.02	1.48
Caribbean	20	25	28	31	34	37	43	62	2.27	2.06	1.84	1.82	1.74	1.71	1.64	1.19
Middle America	49	68	79	93	107	122	156	242	3.23	3.15	2.98	2.88	2.72	2.51	2.31	1.43
Temperate South America	31	36	38	41	44	47	52	62	1.66	1.33	1.33	1.29	1.20	1.09	0.99	0.55
Tropical South America	115	154	176	199	226	254	315	498	3.00	2.61	2.53	2.46	2.36	2.23	2.10	1.66
NORTHERN AMERICA	199	226	236	248	261	274	299	343	1.49	0.86	0.95	1.04	0.95	1.05	0.70	0.42
EAST ASIA	816	991	1 096	1 175	1 250	1 327	1 475	1 712	1.94	1.96	1.38	1.24	1.20	1.09	1.02	0.38
China	682	838	928	995	1 060	1 128	1 257	1 469	2.02	2.02	1.40	1.27	1.24	1.13	1.05	0.39
Japan	94	104	112	117	120	123	129	131	0.99	1.33	0.88	0.62	0.49	0.48	0.49	−0.07
Other East Asia	40	51	57	63	70	76	88	111	2.78	2.21	2.05	1.92	1.76	1.54	1.35	0.69
SOUTH ASIA	877	1 116	1 257	1 404	1 565	1 731	2 075	2 819	2.40	2.36	2.22	2.17	2.02	1.90	1.72	0.95
Eastern South Asia	229	291	326	361	400	440	520	688	2.41	2.27	2.07	2.05	1.91	1.77	1.58	0.88
Middle South Asia	592	752	845	944	1 051	1 160	1 386	1 867	2.36	2.33	2.21	2.14	1.98	1.87	1.70	0.90
Western South Asia	56	74	85	98	114	131	168	264	2.76	2.94	2.84	2.89	2.78	2.63	2.42	1.47
EUROPE	425	459	474	484	492	499	512	522	0.91	0.63	0.40	0.34	0.30	0.27	0.24	0.03
Eastern Europe	97	103	106	110	113	116	121	131	0.68	0.55	0.71	0.61	0.49	0.43	0.43	0.23
Northern Europe	76	80	82	82	82	82	83	81	0.71	0.31	0.10	0.04	0.03	0.05	0.02	−0.10
Southern Europe	118	128	134	139	143	147	154	161	0.87	0.98	0.72	0.61	0.53	0.46	0.40	0.12
Western Europe	135	148	152	153	153	154	155	150	1.23	0.56	0.05	0.04	0.07	0.08	0.05	−0.16
OCEANIA	16	19	21	23	25	26	30	36	2.08	1.85	1.47	1.44	1.36	1.29	1.19	0.61
Australia-New Zealand	13	15	17	18	19	20	22	25	1.99	1.68	1.21	1.15	1.05	0.99	0.93	0.35
Melanesia	2	3	3	4	4	5	6	9	2.31	2.73	2.70	2.72	2.63	2.46	2.18	1.37
Micronesia-Polynesia	1	1	1	1	2	2	2	2	2.84	1.96	1.74	1.66	1.52	1.30	1.10	0.34
USSR	214	242	253	265	278	290	310	355	1.49	0.95	0.93	0.93	0.84	0.70	0.64	0.50

Source: Results of the United Nations estimates and projections as assessed in 1980.

living in the currently more developed regions is thus projected to decline from 26 per cent in 1980 to 21 per cent by 2000 and to 17 per cent by 2025, if the United Nations assumptions on future fertility and mortality rates should hold.

Among the more developed regions, Europe appears to have the lowest rate of population increase. During the period 1975–1980, it grew at an annual rate of 0.4 per cent. As concerns the regions of Europe, Northern and Western Europe have practically reached a state of zero population growth, registering annual growth rates of 0.10 and 0.05 per cent, respectively. In contrast, the populations of Eastern and Southern Europe both grew at an annual rate of 0.7 per cent in the period 1975–1980, owing to moderately high birth rates of 17 and 16 per 1,000, respectively. Outside Europe, the average annual rate of population increase for the period 1975–1980 was about 0.9 per cent for Northern America, Japan and the USSR, and 1.2 per cent for Australia and New Zealand. In all the more developed regions mentioned above, population is projected to grow at a similar, if not lower, rate in the near future.

D. Population projections

The increasing size of the net annual increase in the world population, especially in the less developed regions, has significant implications for the development issues outlined for the 1980s and beyond in the United Nations New International Development Strategy and the New International Economic Order. On the other hand, in the more developed regions, many countries are going to face new challenges which will be caused by very slow, if not negative, population growth accompanied by the further aging of the population.

In order to assist national and international actions and planning for the future, the United Nations demographic projections were revised in 1980 by taking into account all the most recent available data. Results of that exercise show that the world population of 4.4 billion in 1980 will likely increase to 6.1 billion by 2000 and 8.2 billion by 2025. Because demographic projections are computed on the basis of assumptions about uncertain future trends of fertility, mortality and migration rates, the high and the low variants of projections are prepared in addition to the medium variant quoted above. These variants are intended to present plausible but not exhaustive ranges within which future population would likely grow. The low and the high variants, respectively, put the world population at between 5.8 and 6.3 billion for 2000, and between 7.2 and 9.1 billion for 2025 (see table 3).

The significant differences among these projections reflect the volatile state of current and future demographic trends. Depending upon the extent of success in social and economic development efforts, population policies, technological innovations and other factors that should affect demographic rates directly and indirectly, future population could follow quite different paths having quite different social and economic implications. The medium-variant and low-variant projections assume a declining trend in the rate of future population increase, while the high variant envisages practically constant, if not higher, rate of increase through the end of this century. In terms of the size of this increase, however, the medium and the high variants foresee ever-growing net annual additions throughout the current century, which will reach from 90 million to 100 million per annum by 2000, up from a 1975–1980 level of 75 million. Only the low variant predicts a more or less constant absolute annual increase in the coming two decades. For the first quarter of the twenty-first century, projections are more diverse and anticipate that the size of average annual increases will range from 120 million in the high variant to 40 million in the low variant, while the medium variant is put at 80 million per annum.

Due to the gap in the current growth rate between the more developed and the less developed regions, most future population growth is projected to occur in the latter regions. The less developed regions, with an average current growth rate of 2.1 per cent, are projected to continue to grow quite rapidly, at rates of 1.8 per cent during the period 1995–2000 and 1.1 per cent during 2020–2025. The more developed regions, on the other hand, are projected to experience a reduced growth rate

TABLE 3. WORLD POPULATION TRENDS AND PROSPECTS ACCORDING TO THREE VARIANTS OF PROJECTIONS, 1950–2025

	Medium variant		*High variant*		*Low variant*	
Year	*Population (millions)*	*Rate of change[a] (percentage)*	*Population (millions)*	*Rate of change[a] (percentage)*	*Population (millions)*	*Rate of change[a] (percentage)*
1975.....	4 066	1.92	4 066	...	4 066	...
1980.....	4 432	1.73	4 441	1.76	4 220	1.67
1985.....	4 826	1.70	4 866	1.83	4 779	1.56
1990.....	5 242	1.65	5 328	1.81	5 139	1.45
1995.....	5 677	1.60	5 823	1.78	5 496	1.34
2000.....	6 119	1.50	6 337	1.69	5 837	1.20
2005.....	6 558	1.39	6 867	1.61	6 155	1.06
2010.....	6 988	1.27	7 414	1.53	6 446	0.92
2015.....	7 407	1.17	7 978	1.47	6 710	0.80
2020.....	7 813	1.07	8 553	1.39	6 949	0.70
2025.....	8 195	0.96	9 135	1.32	7 168	0.62

Source: Results of the United Nations estimates and projections as assessed in 1980.

[a] Rate of change is the average annual rate of population change during the five-year period since the preceding date and is computed as an exponential rate.

from the current 0.7 to rates of 0.5 per cent per annum for the period 1995–2000 and 0.2 per cent for 2020–2025. Concomitantly, the population residing in the currently less developed regions will increase from 74 per cent of the world population in 1980 to 79 per cent in 2000 and 83 per cent in 2025.

Among the less developed regions, Africa is projected to maintain the highest rate of population increase throughout the projection span: 2.9 per cent at the end of this century; and 1.9 per cent in the period 2020–2025. Here, the population will increase from the current size of 470 million to 853 million, or by 80 per cent by the year 2000; and it will more than treble by 2025, attaining a size of over 1,500 million. Latin America is likely to have a faster pace of decline in growth rate than Africa: the current rate of 2.5 per cent per annum in Latin America is projected to decline to 2.0 per cent by 2000 and to 1.5 per cent by 2025. The population for Latin America is projected to be 566 million in 2000 and 865 million in 2025; these values are greater than the current 364 million by 55 per cent and 138 per cent, respectively.

On the other hand, Asia as a whole had a population of 2,600 million in 1980 and comprised 58 per cent of the world total. That population is projected to grow to 3,600 million in 2000 and to 4,500 million in 2025. The absolute size of the increase, close to 1,000 million in the coming 20 years, appears to be overwhelming but the percentage rates of increase are rather modest. However, East Asia, which includes China, Japan, the Democratic People's Republic of Korea, Hong Kong, Mongolia and the Republic of Korea, has already achieved a modest growth rate of about 1.3 per cent per annum and the rate is projected to decrease to below 1.0 per cent by 2000 and 0.4 per cent by 2025. In contrast, South Asia, which had a population of 1,400 million in 1980, is currently growing quite rapidly at a rate of 2.2 per cent. The rate is projected to decline to 1.6 per cent by 2000 and 0.9 per cent by 2025; nevertheless, the population is likely to double by 2025.

Meantime, population growth in Northern America, Europe and the USSR is projected to remain at or below the current modest rate throughout the projection span. Thus, for the more developed regions as a whole, including Australia, Japan and New Zealand, population is projected to grow from 1,100 million in 1980 to 1,300 million in 2000 and 1,400 million in 2025. Consequently, the distribution of the global population by broad geographical areas will significantly change in favour of Africa, Latin America and South Asia. More specifically, by 2025 these areas will contribute to the world total 19, 11 and 34 per cent, respectively. These shares are larger than their 1980 shares, by 8, 3 and 3 points, respectively. Conversely, East Asia and the rest of the world will contribute a reduced share of the total world population.

Chapter II

RECENT LEVELS AND TRENDS OF FERTILITY*

A. World summary

Levels of fertility continue to vary enormously among countries, with the variations being almost as large within the less developed regions as those between the developing and developed countries. Cross-country comparisons of fertility show substantial variations even within countries at similar levels of development. In general, it can be said that fertility in Africa remains the highest in the world. In Latin America and Asia, over-all fertility levels are lower; and there is also a much greater spread of levels within these two major areas. Among the developed countries, fertility levels are consistently low, with the large majority recording total fertility rates in the mid-1970s well below levels required to sustain population replacement for the future.

Despite increasingly prevalent reports of dramatic fertility declines throughout the developing world,[1] there exists little undisputable evidence to date of such declines among many of the more populous developing countries. Unfortunately, analysis of levels and trends in fertility is hampered by the paucity of fertility data currently available which are based on complete birth registration statistics. In general, the trend in fertility was downward over the course of the 1970s for almost all the developing countries for which comparable data over time are available. In many of the other (often substantially more populous) countries, that trend may also have been the case, but current estimates based on sample surveys and other incomplete methods do not permit precise inter-temporal comparisons. None the less, the picture presented in this report is one of lower estimated fertility levels, most notably for some of the more populated countries of Asia. Whether there have actually been decreases of the magnitude indicated for some countries is uncertain; in some cases, the changes may reflect improved estimation of relatively stable fertility levels.

Excluding the USSR and most of Eastern Europe, there was a declining trend in fertility among the developed countries during the 1970s. Because of divergent trends between Eastern and Western Europe, Eastern Europe is now experiencing, on the average, levels of fertility slightly above those prevailing in Western and Northern Europe as well as those in Northern America.

B. Less developed regions

Africa

Africa continues to represent the last frontier for demographers who monitor levels and trends in fertility around the world. Although within the next two years new estimates of fertility for the late 1970s are anticipated for nine countries of Africa which are currently conducting World Fertility Surveys,[2] those estimates were not available for this report. Only five of the 48 countries of Africa have relatively complete birth registration statistics—three countries in Northern Africa (Algeria, Egypt and Tunisia) and two tiny islands in Eastern Africa (Mauritius and Réunion)—no one of which typifies the demographics of the vast bulk of the African continent.

Table 4 presents the most recent reliable estimates of crude birth rates for each of the countries of Africa, as well as an estimated total fertility rate (when available). These estimates are based on a variety of sources and methods. Only 17 of the 48 countries have estimates based on data from the 1970s, five more than in the last monitoring report.

The picture of fertility levels in Africa remains remarkably unchanged despite more recent estimates for 11 countries. Crude birth rate estimates range from a high of 53 per 1,000 population in the Niger to 25.7 per 1,000 population in Réunion, with only 15 of the countries recording crude birth rate estimates below 45 per 1,000 population. Estimates of the total fertility rate range from a high of 8.1 in Kenya to a low of 3.0 in Mauritius, with only 13 out of 40 countries for which such data are available recording a total fertility rate below 6 per woman.

The regions of Eastern and Western Africa show, on the whole, the highest levels of fertility in the world. From moderate to high fertility is also characteristic of the rest of Africa, with only a few countries recording crude birth rates of 40 or below per 1,000: Egypt, Equatorial Guinea, Gabon, the Gambia, Guinea-Bissau, Mauritius, Réunion and Tunisia. Of these countries, Egypt is the most important in terms of population size. The reasons for the unusually low fertility, in relative terms, estimated for Equatorial Guinea and Gabon in Middle Africa, and the

* Prepared by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat.

[1] See, for example, Amy Ong Tsui and Donald T. Bogue, *Declining World Fertility: Trends, Causes and Implications*, Population Bulletin, vol. 33, No. 4 (Washington, D.C., Population Reference Bureau, Inc., October 1978).

[2] The countries of Africa with surveys completed or in progress as of 30 June 1980 were Egypt, Ghana, the Ivory Coast, Kenya, Lesotho, Morocco, Senegal, the Sudan, Tunisia and the United Republic of Cameroon. "World Fertility Survey, WFS surveys in developing countries: current status", WFS/TECH. 1460, 30 June 1980 (mimeographed).

Gambia and Guinea-Bissau in Western Africa, are still unknown, though it is generally thought that health and nutrition, among other things, have contributed to a comparatively wide prevalence of subfecundity.

Trends since 1970 can be discerned for only a very few countries with relatively good statistics. From tables 5 and 6 it can be seen that fertility was continuing to decline in Mauritius in 1977. A preliminary estimate of the crude birth rate for 1978 shows a substantial increase over 1977 but previous trends in the total fertility rate suggest that this estimate may not represent a real increase in fertility. A provisional birth rate for 1977 in Réunion suggests that fertility is continuing its decline there as well. In Tunisia also, both the crude birth rate and the total fertility rate showed further declines in 1976. On the other hand, provisional crude birth rate figures for Egypt give no evidence of recent fertility declines. Although both Egypt and Tunisia have a substantial government investment in family planning, the programme in Tunisia has been particularly aggressive in recent years.[3]

[3] Dorothy L. Nortman and Ellen Hofstatter, *Population and Family Planning Program*, 9th ed., A Population Council Fact Book (New York, The Population Council, 1978), p. 19.

TABLE 4. ESTIMATES OF FERTILITY MEASURES, COUNTRIES OF AFRICA, LATIN AMERICA AND ASIA, SPECIFIC YEARS

Major area, region and country	*Period*	*Method of estimation*	*Crude birth rate (per 1,000 population)*	*Total fertility rate (per woman)*
AFRICA				
Eastern Africa				
Burundi[a]	1970-1971	B	42	6.0
Comoros	1966	C(4)	47	6.1
Ethiopia[b]	1972	C(4)	51	. . .
Kenya[c]	1977-1978	B	48.7	8.1
Madagascar	1966	C(3)	49	7.1
Malawi[d]	1970-1972	C(4)	50.5	. . .
Mauritius	1978	A	27.2	3.0[e]
Mozambique	1960	C(4)	43	5.5
Réunion	1977	A	25.7[f]	. . .
Rwanda[g]	1970	C(4)	51.0	. . .
Somalia	1965	C(4)	47	6.5
Uganda	1969	C(4)	46	6.1
United Republic of Tanzania[h]	1973	B	47	6.5
Zambia[i]	1969	C(4)	50	7.1
Zimbabwe	1969	C(4)	48	6.7
Middle Africa				
Angola[b]	1972	C(4)	50	. . .
Central African Republic[j]	1959-1960	C(3)	45	5.1
Chad	1963-1964	C(3)	48	5.3
Congo	1960-1961	C(3)	44	5.7
Equatorial Guinea	1965	C(4)	35	5.0
Gabon	1960-1961	C(3)	31	4.1
United Republic of Cameroon[b]	1972	C(3)	39	. . .
Zaire[k]	1975-1976	C(4)	44.6	6.6
Northern Africa				
Algeria	1975	A	47.8	. . .
Egypt	1978	A	37.6	. . .
Libyan Arab Jamahiriya	1964	C(4)	47	6.5
Morocco[l]	1973	B	47.7	7.4
Sudan	1955-1956	C(4)	49	6.9
Tunisia	1976	A	36.4	5.8
Southern Africa[m]				
Botswana	1971	C(4)	44	7.2
Lesotho	1966	C(4)	38	5.0
Namibia	1960	C(4)	45	6.0
Swaziland	1966	C(4)	50	6.5
Western Africa				
Benin	1961	C(3)	50	6.7
Gambia	1963	C(4)	40	5.3
Ghana[n]	1967-1969	C(3)	48	7.0
Guinea	1954-1955	C(3)	48	6.0
Guinea-Bissau	1965	C(4)	40	5.3
Ivory Coast	1957-1958	C(3)	52	6.0
Liberia[o]	1970	B	51	6.5

TABLE 4 (*continued*)

Major area, region and country	*Period*	*Method of estimation*	*Crude birth rate (per 1,000 population)*	*Total fertility rate (per woman)*
AFRICA				
Western Africa (continued)				
Mali	1960-1961	C(3)	50	6.7
Mauritania	1964-1965	C(4)	45	5.9
Niger	1959-1960	C(3)	53	7.0
Nigeria	1963	C(4)	50	6.7
Senegal	1960-1961	C(4)	49	6.5
Sierra Leone	1963	C(4)	45	5.9
Togo	1961	C(3)	50	6.5
Upper Volta[p]	1969	C(3)	49	6.5
LATIN AMERICA				
Caribbean				
Cuba[q]	1970-1975	C	25.8	2.5
Dominican Republic[q]	1970-1975	C	42.0	6.2
Guadeloupe[r]	1975	A	24.8	...
Haiti[q]	1970-1975	C	42.7	5.9
Jamaica[s]	1976	A	29.3	3.7
Martinique[r]	1975	A	20.4	...
Puerto Rico	1978	A	22.8	...
Trinidad and Tobago	1978	A	25.3	...
Middle America				
Costa Rica[t]	1974	A	29	3.9
El Salvador	1977	A	41.7	...
Guatemala[u]	1973	A	41.5	5.7
Honduras[v]	1974	B	48	7.2
Mexico[w]	1977-1978	A	37.0	5.2
Nicaragua[q]	1970-1975	C	48.3	6.5
Panama	1978	A	28.2	...
Temperate South America				
Argentina	1970	A	22.9	...
Chile[x]	1975	A	24	3.0
Uruguay	1976	A	21.2	...
Tropical South America				
Bolivia[q]	1970-1975	C	46.0	6.5
Brazil[q]	1970-1975	C	37.1	5.0
Colombia[y]	1976	B	31.1	4.2
Ecuador[q]	1970-1975	C	42.2	6.4
Guyana[z]	1975	B	...	4.4
Paraguay[q]	1970-1975	C	39.8	6.0
Peru[q]	1970-1975	C	41.0	6.0
Suriname[q,aa]	1970-1975	C	41.6	5.5
Venezuela[q]	1970-1975	C	36.2	4.9
EAST ASIA				
China[bb]	1978	D	18.3	...
Japan	1977	A	15.5	1.8
Other East Asia				
Democratic People's Republic of Korea	1972	C(6)	44.0	...
Hong Kong	1978	A	17.5[f]	...
Mongolia	1972	C(6)	40.0	...
Republic of Korea[cc]	1975	A	26.0	3.6
SOUTH ASIA				
Eastern South Asia				
Burma	1972	C(6)	40.0	...
Democratic Kampuchea[dd]	1957-1962	C(5)	45.9	7.2
East Timor	1970	A	43.0	...
Indonesia[ee]	1976	B	34.0	4.5
Lao People's Democratic Republic	1972	C(6)	42.0	...
Malaysia	1972	C(6)	38.0	...
Peninsular Malaysia	1977	A	30.7[f]	...
Sabah and Sarawak	...	D	...	...

TABLE 4 (*continued*)

Major area, region and country	*Period*	*Method of estimation*	*Crude birth rate (per 1,000 population)*	*Total fertility rate (per woman)*
SOUTH ASIA				
Western South Asia (continued)				
Philippines[ff]	1977	B	...	5.0
Singapore	1978	A	17.0	...
Thailand[gg]	1974-1975	B	37.0	5.1
Viet Nam[hh]	1973	D	42.0	6.7
Middle South Asia				
Afghanistan[ii]	1972-1973	C(6)	50.0-53.0	7.7
Bangladesh[jj]	1971-1975	B	...	6.3
Bhutan	1972	C(6)	47.0	...
India[kk]	1975	B	35.2	...
Iran[ll]	1975-1976	C(4)	42.7	6.7
Nepal[mm]	1974-1975	B	44.0	6.5
Pakistan[nn]	1975-1976	B	40.5	6.3
Sri Lanka[oo]	1974	B	...	3.4
Western South Asia				
Arab countries				
Bahrain[pp]	1971	C(4)	41.2	7.0
Democratic Yemen	1972	C(6)	50.0	...
Iraq[qq]	1965	C(4)	49.5	7.2
Jordan[rr]	1972	B	45.0	7.7
Kuwait[pp]	1969-1971	C(4)	47.0	7.0
Lebanon[ss]	1970	B	34.4	5.5
Oman	1972	C(6)	50.0	...
Saudi Arabia	1972	C(6)	50.0	...
Syrian Arab Republic[tt]	1970	C(4)	47.8	7.5
Yemen[pp]	1972	D	50.0	6.9
Non-Arab countries				
Cyprus	1978	A	19.3	...
Israel	1978	A	25.2[f]	...
Turkey[uu]	1967	B	39.6	...

NOTE: Methods of estimation were as follows:

A. "Complete" birth registration statistics;

B. Birth data from sample survey;

C. Other estimates, including estimates the basis of which cannot be clearly determined from available information;

(1) "Reverse-survival" method;

(2) On number of children reported as having been born to each woman during her lifetime;

(3) On reported births occurring during the 12-month period before a survey or census and the number of children ever born, both by age of mother;

(4) On the analysis of the age composition of the population, supplemented by indications of the rate of natural increase or of an approximate level of mortality;

(5) On number of reported births by age of mother in the year preceding the census, adjusted by graphic technique;

(6) Basis either unknown or cannot be clearly determined for available information;

D. Either no data available or birth registration statistics so deficient as to be useless for identifying trend.

[a] Burundi, Ministère du plan, Département des statistiques, *Enquête démographique 1970–1971*, vol. II, *Démographie-méthodologie-annexes-1974*, pp. 107 and 110.

[b] Jacques Veron, "Niveaux nationaux de la natalité et politiques de limitations des naissances", *Population* (Paris), vol. 31, No. 6 (November–December 1976), p. 1242.

[c] Ministry of Economic Planning and Community Affairs, Central Bureau of Statistics, "Kenya Fertility Survey: major highlights", paper prepared for the World Fertility Survey Regional Meeting for Countries South of the Sahara, Nairobi, 3–5 September 1979, p. 31, table 10 (mimeographed).

[d] Data based on results of the Population Survey of 1970–1972.

[e] In 1977.

[f] Provisional figure.

[g] Data based on results of the 1970 sample survey covering 100,000 persons.

[h] Bureau of Statistics and University of Dar es Salaam, *1973 National Demographic Survey of Tanzania*, vol. 6, *The Demography of Tanzania: An Analysis of the 1973 National Demographic Survey of Tanzania*, Roushdi A. Henin, Douglas Ewbank and Howard Hogan, eds. (Dar es Salaam, 1977), pp. 91–92, table 5.15.

[i] Patrick O. Ohadike and Habtemariam Tesfaghiorghis, *The Population of Zambia*, CICRED Monograph Series, World Population Year 1974 (Lusaka, 1975), p. 43.

[j] Survey data excluding the populations of Bangui, Zone East and nomad population (Bororos, Babugas). See *Enquête démographique en République Centrafricaine 1959–1960: résultats définitifs*, Marcel Lafarge, ed. (attaché of the Institut national de la statistique et des études économiques; statistician, Ministère de la coopération).

[k] West Zaire only. See Dominique Tabutin, "Fécondité et mortalité dans l'ouest du Zaire", working paper No. 7, June 1979, prepared for the Meeting of the Panel on Tropical Africa of the Committee on Population and Demography of the National Academy of Sciences of the United States of America, Yaoundé, 7–9 August 1979, p. 7, table 1.

[l] Morocco, Direction de la statistique, Centre de recherches et d'études démographiques, *La fécondité marocaine*, Report No. 6 (Rabat, 1974), p. 11, table 8.

[m] Not including South Africa because no data are available for the major ethnic group.

[n] United States of America, Department of Commerce, Bureau of the Census, *Country Demographic Profiles: Ghana*, ISP-DP-5 (Washington, D.C., 1977), table 7.

[o] Liberia, Department of Planning and Economic Affairs, *Demographic Annual of the Population Growth Survey 1970: Patterns of Natality*, Series N-1 (Monrovia, 1971), table (a).

[p] D. Ian Pool and Sidiki P. Coulibaly, eds., *Demographic Transition and Cultural Continuity in the Sahel: Aspects of the Social Demography of Upper Volta* (Ithaca, New York, Cornell University Press, International Population Program, 1977), p. 11 and table 1.2 on p. 33.

[q] Data provided by the Latin American Demographic Centre (CELADE).

[r] Henri Léridon, "La situation démographique des départements français d'outre-mer", *Population* (Paris), vol. 31, No. 6 (November–December 1976), p. 1250.

[s] Department of Statistics, *Jamaica Fertility Survey 1975/76, Country Report*, vol. I, World Fertility Survey report (Kingston, 1979), p. 3, table 1.3; and p. 63, table 3.2.v.

[t] United States of America, Department of Commerce, Bureau of the Census, *Country Demographic Profiles: Costa Rica*, ISP-DP-4 (Washington, D.C., 1977), tables 3 and 7.

[u] United States of America, Department of Commerce, Bureau of the Census, *Country Demographic Profiles: Guatemala*, ISP-DP-6 (Washington, D.C., 1977), tables 3 and 7.

[v] United States of America, Department of Commerce, Bureau of the Census, *Country Demographic Profiles: Honduras*, ISP-DP-10 (Washington, D.C., 1977), p. 5, table 3; and p. 8, table 7.

[w] United States of America, Department of Commerce, Bureau of the Census, *Country Demographic Profiles: Mexico*, ISP-DP-14 (Washington, D.C., 1979), p. 6, table 3; and p. 9, table 7.

[x] United States of America, Department of Commerce, Bureau of the Census, *Country Demographic Profiles: Chile*, ISP-DP-13 (Washington, D.C., 1978), p. 5, table 3; and p. 8, table 7.

[y] Corporación Centro Regional de Población, *Encuesta Nacional de Fecundidad Colombia 1976—resultados generales*, World Fertility Survey report (Bogotá, 1977).

[z] Ministry of Economic Development, Statistical Bureau, *Guyana Fertility Survey, 1975—Country Report*, vol. I, World Fertility Survey report (1979), p. 48, table 3.2.z.

[aa] Excluding Indian and Negro populations living in tribes.

[bb] Chen Muhua, "Birth planning in China", translated by Pi-chao Chen, *International Family Planning Perspectives*, vol. 5, No. 3 (September 1979), p. 92.

[cc] For 1974, crude birth rate (26.0) calculated on the basis of data given in Republic of Korea, Economic Planning Board, National Bureau of Statistics; and Korean Institute for Family Planning, *The Korean National Fertility Survey—First Country Report*, World Fertility Survey report (Seoul, 1977), tables II.1B and 39; for total fertility rate, see p. 89, table 39.

[dd] George S. Siampos, "The population of Cambodia, 1945–1980", *The Milbank Memorial Fund Quarterly*, vol. XLVIII, No. 3 (July 1970), p. 336.

[ee] Including West Irian. Data taken from Jeanne Cairns Sinquefield and Bambang Sungkono, "Fertility and family trends in Java and Bali", *International Family Planning Perspectives*, vol. 5, No. 2 (June 1979), p. 45, table 1; and p. 46, table 2.

[ff] National Census and Statistics Office, University of the Philippines Population Institute, Commission on Population and National Economic and Development Authority, *Republic of the Philippines Fertility Survey, 1978—First Report*, World Fertility Survey report (Manila, 1979), p. 102, table 5.12.

[gg] Fred Arnold, Robert O. Retherford and Anuri Wanglee, *The Demographic Situation in Thailand*, Papers of the East-West Population Institute, No. 45 (Honolulu, Hawaii, East-West Center, 1977), table 9. See also Chulalongkorn University, Institute of Population Studies; and National Statistical Office, Population Survey Division, *The Survey of Fertility in Thailand: Country Report No. 1*, vol. I, World Fertility Survey report (Bangkok, 1977), p. 56, table 22.

[hh] Data for former Republic of South Viet-Nam. See Troung-Minh-Cac and Ngo Yeh-Tuan-Phong, "Viet-Nam (South)", in "East Asia Review, 1973", S. M. Keeney, ed., *Studies in Family Planning*, vol. 5, No. 5 (May 1974), p. 172.

[ii] James F. Spitler and Nancy B. Frank, *Afghanistan: A Demographic Uncertainty* (Washington, D.C., Department of Commerce, Bureau of the Census, International Statistical Program Center, 1978), p. 9.

[jj] Ministry of Health and Population Control, *Bangladesh Fertility Survey, 1975—First Report*, World Fertility Survey report (Dacca, 1978), p. 73, table 6.10.

[kk] India, Ministry of Home Affairs, Office of the Registrar General, *Sample Registration Bulletin*, vol. XI, No. 1 (January 1978), p. 2.

[ll] Habibollah Zandjani, "Evolution de la population iranienne à travers les recensements", *Population* (Paris), vol. 32, No. 6 (November–December 1977), p. 1281.

[mm] World Fertility Survey, *Nepal Fertility Survey, 1976: A Summary of Findings*, Summary Series No. 5 (Voorburg, The Hague, International Statistical Institute, 1978), p. 6.

[nn] Population Planning Council of Pakistan, *Pakistan Fertility Survey—First Report*, World Fertility Survey report (Lahore, 1976), p. 75.

[oo] Ministry of Plan Implementation, Department of Census and Statistics, *World Fertility Survey—Sri Lanka, 1975, First Report* (Colombo, 1978), p. 98, table 5.13.

[table notes continued on following page]

[*table notes continued from preceding page*]

[pp] Youssef Courbage and Philippe Fargues, "La population des pays arabes d'Orient", *Population* (Paris), vol. 30, No. 6 (November–December 1975), p. 1123, table VII.

[qq] K. C. Zachariah and Wided Hamoredi, "Use of census data for estimating demographic measures of Iraq", *Demographic Measures and Population Growth in Arab Countries*, Cairo Demographic Centre Research Monograph Series, No. 1 (Cairo, 1970), p. 46. See also Y. Courbage and P. Fargues, "La population des pays arabes d'Orient", p. 1123, table VII.

[rr] Jordan, Department of Statistics, *Draft Final Report of National Seminar on Population Policy as Related to Development Strategy*, Amman, 2–7 December 1972 (Amman, 1972), p. 1.

[ss] Youssef Courbage and Philippe Fargues, *La situation démographique au Liban*, vol. I. *Mortalité, fécondité et projection: méthodes et résultats* (Beirut, Université Libanaise, 1973), p. 36, table II. See also Y. Courbage and P. Fargues, "La population des pays arabes d'Orient", p. 1123, table VII.

[tt] Syrian Arab Republic, Office of the Prime Minister, Central Bureau of Statistics, *Statistical Abstract, 1977*, p. 92. See also Mouna Liliane Samman, "La situation démographique de la Syrie", *Population* (Paris), vol. 31, No. 6 (November–December 1976), p. 1276, table 17.

[uu] Data based on results of the Turkish Demographic Survey.

TABLE 5. CRUDE BIRTH RATES AND INDEX NUMBERS, DEVELOPED COUNTRIES AND SELECTED DEVELOPING COUNTRIES WITH RELATIVELY GOOD STATISTICS, 1970–1978

	Crude birth rate (per 1,000 population)					*Index number (1970 = 100)*				
Major area, region and country	*1970*	*1975*	*1976*	*1977*	*1978*	*1970*	*1975*	*1976*	*1977*	*1978*
AFRICA										
Eastern Africa										
Mauritius[a]	26.8	25.1	25.7	25.8	27.2[b]	100	96	102	102	101
Réunion	30.2	28.0	26.8	25.7[b]	. . .	100	93	89	85	. . .
Northern Africa										
Egypt	34.8	37.7	. . .	37.7[b]	37.6[b]	100	108	. . .	108	108
Tunisia	36.4	36.6	36.4	. . .	. . .	100	100	100	. . .	. . .
LATIN AMERICA										
Caribbean										
Cuba	27.7[b]	20.7[b]	19.8[b]	17.6[b]	. . .	100	75	71	64	. . .
Guadeloupe	28.7	. . .	. . .	19.3[b]	17.2[b]	100	. . .	. . .	67	60
Jamaica	34.4	30.1	29.8	. . .	21.3[b]	100	87	86	. . .	62
Martinique	27.5	. . .	. . .	16.7[b]	15.5[b]	100	. . .	. . .	61	56
Puerto Rico	24.8	22.4	22.6	22.6	22.8[b]	100	90	91	91	92
Trinidad and Tobago	24.4	23.7	24.7	24.2[b]	25.3[b]	100	97	101	99	104
Middle America										
Costa Rica	33.4	29.5	29.7	31.1	. . .	100	88	89	93	. . .
El Salvador	40.0	39.9	40.2	41.7[b]	. . .	100	100	100	104	. . .
Guatemala	40.3	41.0	42.6	. . .	. . .	100	102	106	. . .	. . .
Mexico	42.2	37.5	34.6	35.3	34.0	100	89	82	84	81
Panama	37.1	32.3	32.2[b]	28.8[b]	28.2[b]	100	87	87	78	76
Temperate South America										
Argentina	22.9	. . .	. . .	. . .	. . .	100	. . .	. . .	. . .	. . .
Chile	26.8	25.0	21.9	20.3	22.3	100	93	82	76	83
Uruguay	19.0	21.1	21.2	. . .	. . .	100	111	112	. . .	. . .
Tropical South America										
Guyana	33.4	. . .	26.9[b]	. . .	28.3[b]	100	. . .	79	. . .	85
Suriname	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
Venezuela	38.2	37.2	36.4[b]	36.6	. . .	100	97	95	96	. . .
NORTHERN AMERICA										
Canada	17.4	15.7	15.6	15.5	15.2	100	90	90	89	87
United States of America	18.3	14.8	14.8	15.3	15.3	100	81	81	84	84
EAST ASIA										
Japan	18.8	17.2	16.3	15.5	. . .	100	91	87	82	. . .
Other East Asia										
Hong Kong	20.0	18.1	17.2	17.5	17.5	100	91	86	88	88
SOUTH ASIA										
Eastern South Asia										
Malaysia[c]	34.0	31.3	31.7	30.7[b]	. . .	100	92	93	90	. . .
Singapore	22.1	17.8	18.8	16.6	17.0[b]	100	80	85	75	77
Middle South Asia										
Sri Lanka	29.4	. . .	. . .	. . .	. . .	100	. . .	. . .	. . .	. . .

TABLE 5 (*continued*)

Major area, region and country	Crude birth rate (per 1,000 population)					Index number (1970 = 100)				
	1970	1975	1976	1977	1978	1970	1975	1976	1977	1978
SOUTH ASIA (*continued*)										
Western South Asia										
Non-Arab countries										
Cyprus	19.5	16.0	18.7	18.4	19.3	100	82	96	94	99
Israel[d]	27.2	27.7	28.0	26.4	25.2	100	102	103	97	93
EUROPE										
Eastern Europe										
Bulgaria	16.3	16.6	16.5	16.1[b]	15.5[b]	100	102	101	98	95
Czechoslovakia	15.9	19.6	19.2	18.7	18.4[b]	100	123	121	118	115
German Democratic Republic[e]	13.9	10.8	11.6	13.3	13.9	100	78	84	96	100
Hungary	14.7	18.4	17.5	16.7	15.7	100	125	119	114	107
Poland	16.8	18.9	19.5	19.1	19.0[b]	100	113	116	114	113
Romania	21.1	19.7	19.5	19.6	. . .	100	93	92	93	. . .
Northern Europe										
Denmark[f]	14.4	14.2	12.9	12.2[b]	12.2[b]	100	99	90	85	85
Finland	14.0	13.9	14.1	13.9	13.5[b]	100	100	101	99	96
Ireland	21.7	21.5	21.6[b]	21.4[b]	21.7[b]	100	99	99	99	100
Norway	16.6	14.1	13.3	12.5	12.7[b]	100	85	80	75	77
Sweden	13.7	12.6	12.0	11.6[b]	11.2[b]	100	92	87	85	82
United Kingdom	16.3	12.5	12.1	11.8[b]	12.3[g]	100	77	74	72	75
England and Wales	16.1	12.3	11.9	11.6[b]	12.1[b]	100	76	74	72	75
Scotland	16.7	13.0	12.5	12.0	12.4[b]	100	78	75	72	74
Southern Europe										
Albania	32.5	. . .	. . .	. . .	. . .	100	. . .	. . .	. . .	. . .
Greece	16.5	15.7	16.0	15.4[b]	15.9[b]	100	95	97	94	97
Italy	16.8	14.8	13.9	13.2[b]	12.5[b]	100	88	83	78	74
Malta	16.3	18.3	18.0	17.9	17.4[b]	100	112	110	110	107
Portugal	19.4	19.0	19.3	18.4[b]	16.8[b]	100	97	99	95	87
Spain[h]	19.6	19.1	18.2	18.0[b]	17.2[b]	100	97	93	92	88
Yugoslavia	17.8	18.2	18.1	17.7[b]	17.4[b]	100	102	102	99	97
Western Europe										
Austria	15.1	12.5	11.6	11.3[b]	11.3[b]	100	83	77	75	75
Belgium	14.8	12.2	12.3	12.4[b]	12.4[b]	100	83	84	84	84
France	16.8	14.1	13.6	14.0[b]	13.8[b]	100	84	81	84	82
Germany, Federal Republic of[e]	13.4	9.7	9.8	9.5	9.4[b]	100	73	73	71	70
Luxembourg	13.0	11.2	11.0	11.4[b]	11.4[b]	100	86	84	88	88
Netherlands	18.3	13.0	12.9	12.5	12.6[b]	100	71	70	68	69
Switzerland	15.8	12.2	11.7	11.5	11.3	100	77	74	73	72
OCEANIA										
Australia-New Zealand										
Australia	20.6	16.9	16.4	16.1	15.7[b]	100	82	80	78	76
New Zealand	22.1	18.4	17.6	17.3	16.3	100	83	79	78	74
Micronesia-Polynesia										
Fiji	29.9	29.0	28.6	27.0	. . .	100	97	96	90	. . .
USSR	17.4	18.1	18.4	18.1	. . .	100	104	106	104	. . .

NOTE: Rates were calculated on the basis of total live births and of estimated mid-year total population obtained from the United Nations Statistical Office.

[a] Excluding dependencies.

[b] Provisional data.

[c] Data cover only Peninsular Malaysia.

[d] Including data provided by Israel for East Jerusalem and Israelis in certain territories under occupation by Israeli military forces since June 1967.

[e] Data that relate to the Federal Republic of Germany and the German Democratic Republic include the relevant data relating to Berlin, for which separate data have not been supplied. This is without prejudice to any question of status which may be involved.

[f] Excluding Faeroe Islands and Greenland.

[g] Excluding Northern Ireland.

[h] Excluding Ceuta and Melilla.

TABLE 6. TOTAL FERTILITY RATES AND INDEX NUMBERS, DEVELOPED COUNTRIES AND SELECTED DEVELOPING COUNTRIES WITH RELATIVELY GOOD STATISTICS, 1970–1977

Major area, region and country	Total fertility rate (per woman)				Index number (1970 = 100)			
	1970	1975	1976	1977	1970	1975	1976	1977
AFRICA								
Eastern Africa								
Mauritius[a]	3.8	3.3	3.1	3.0	100	87	82	79
Réunion	4.6	. . .	3.2	. . .	100	. . .	70	. . .
Northern Africa								
Algeria	7.0[b]	. . .	. . .	. . .	100	. . .	. . .	. . .
Tunisia	6.4	5.8	5.6	. . .	100	91	87	. . .
LATIN AMERICA								
Caribbean								
Cuba	4.0[c]	. . .	. . .	. . .	100	. . .	. . .	. . .
Guadeloupe	5.3[d]	. . .	. . .	. . .	100	. . .	. . .	. . .
Jamaica	5.3	4.5	4.3	. . .	100	85	81	. . .
Martinique	4.6	. . .	. . .	. . .	100	. . .	. . .	. . .
Puerto Rico	3.2	. . .	. . .	. . .	100	. . .	. . .	. . .
Trinidad and Tobago	3.4	3.1	3.1	. . .	100	91	91	. . .
Middle America								
Costa Rica	4.9	3.9	. . .	. . .	100	80	. . .	. . .
El Salvador	6.0	6.0[e]	. . .	. . .	100	100	. . .	. . .
Guatemala	6.0	5.7[f]	. . .	. . .	100	95	. . .	. . .
Mexico	6.5	. . .	. . .	. . .	100	. . .	. . .	. . .
Panama	5.3	4.4	4.4	. . .	100	83	83	. . .
Temperate South America								
Argentina	3.0	. . .	. . .	. . .	100	. . .	. . .	. . .
Chile	3.5	3.0	. . .	. . .	100	86	. . .	. . .
Uruguay	3.0[c]	. . .	. . .	. . .	100	. . .	. . .	. . .
Tropical South America								
Suriname	5.3	. . .	. . .	. . .	100	. . .	. . .	. . .
Venezuela[g]	5.3[e]	4.9[f]	. . .	. . .	100	92	. . .	. . .
NORTHERN AMERICA								
Canada[h,i]	2.3	1.9	1.8	. . .	100	83	76	. . .
United States of America	2.5	1.8	1.8	1.8	100	72	72	74
EAST ASIA								
Japan	2.1	2.0	1.9	1.8	100	95	90	86
Other East Asia								
Hong Kong	3.4	2.8	2.6	2.4	100	82	76	71
Republic of Korea	4.5	3.6	. . .	. . .	100	80	. . .	. . .
SOUTH ASIA								
Eastern South Asia								
Malaysia[j]	5.1	4.3	4.3	. . .	100	84	84	. . .
Singapore[k]	3.1	2.1	2.1	1.9	100	68	68	61
Middle South Asia								
Sri Lanka	4.2[e]	3.4[l]	. . .	. . .	. . .	. . .	. . .	. . .
Western South Asia								
Non-Arab countries								
Cyprus	2.4[f]	2.1	2.4	2.2	100	88	100	92
Israel[m]	4.0	3.7	3.7	3.5	100	93	93	87
EUROPE								
Eastern Europe								
Bulgaria	2.2	2.2	2.3	. . .	100	100	105	. . .
Czechoslovakia	2.1	2.5	. . .	. . .	100	119	. . .	. . .
German Democratic Republic[n]	2.2	1.5	1.6	1.8	100	68	73	82
Hungary	2.0	2.4	2.3	2.5	100	120	115	125
Poland	2.2	2.3	2.3	2.2	100	105	105	100
Romania	2.9	2.6	2.6	2.6	100	90	90	90
Northern Europe								
Denmark[o]	2.0	1.9	1.7	1.7	100	95	85	85
Finland	1.8	1.7	1.7	1.7	100	94	94	94
Ireland	3.8	3.5	. . .	. . .	100	92	. . .	. . .

TABLE 6 (*continued*)

Major area, region and country	Total fertility rate (per woman)				Index number (1970 = 100)			
	1970	1975	1976	1977	1970	1975	1976	1977
EUROPE								
Northern Europe (continued)								
Norway	2.5	2.0	1.9	1.8	100	80	76	72
Sweden	1.9	1.8	1.7	1.6	100	95	89	84
United Kingdom[p]	2.4	1.8	1.7	1.7	100	75	71	71
England and Wales	2.4	1.8	1.7	1.7	100	75	71	71
Scotland	2.5	1.9	1.8	1.7	100	76	72	68
Southern Europe								
Albania	4.8	...	...	...	100	...	...	...
Greece	2.4	2.3	2.4	2.3	100	96	100	96
Italy	2.3	2.3[l]	2.0	...	100	100	87	...
Malta	2.0	2.1	...	2.2	100	105	...	110
Portugal	2.8	2.6	...	...	100	93	...	...
Spain[q]	2.9	2.9[l]	...	...	100	100	...	...
Yugoslavia	2.3	2.3	2.3	...	100	100	100	...
Western Europe								
Austria	2.3	1.8	1.7	1.6	100	78	74	70
Belgium	2.2	1.7	1.7	...	100	77	77	...
France	2.5	1.9	1.9	...	100	78	74	...
Germany, Federal Republic of[n]	2.0	1.5	1.5	1.4	100	75	75	70
Luxembourg	2.0	1.6[l]	...	1.5	100	80	...	75
Netherlands	2.6	1.7	1.6	1.6	100	65	62	62
Switzerland	2.1	1.6	1.5	1.5	100	76	71	71
OCEANIA								
Australia-New Zealand								
Australia	2.9	2.2	...	2.0	100	76	...	69
New Zealand	3.2	2.4	2.3	2.2	100	75	71	70
Micronesia-Polynesia								
Fiji	3.8	3.5	3.5	...	100	92	92	...
USSR	2.4	2.4	2.4	...	100	100	100	...

Sources: Unless otherwise indicated, rates were calculated on the basis of data on live births by age of mother and of the estimated mid-year female population aged 15–49 years obtained from the United Nations Statistical Office.

Other sources for rates are given below in order of country listing in the table:

Réunion: France, Institut national de la statistique et des études économiques, *Annuaire statistique de la Réunion 1967–1972* (Paris, 1973), p. 36, table 3.

Algeria: Gourari Negadi, "La fécondité en Algérie: niveaux-tendances-facteurs", doctoral dissertation, Ecole pratique des hautes études, VIème section: Sciences économiques et sociales, Paris, 1975; p. 64, table II-4.

Tunisia: Institut national de la statistique, *Projections de la population de la Tunisie, 1976–2001* (Tunis, 1977), p. 4.

Cuba: *Latin America: Evaluation of the Demographic Situation in the Period 1970–1975*, CELADE Series A, No. 158 (Santiago, Chile, 1977), p. 25.

Jamaica: United States of America, Department of Commerce, Bureau of the Census, *Country Demographic Profiles: Jamaica, ISP-DP-9* (Washington, D.C., 1977), p. 18, table A-2.

Martinique: France, Institut national de la statistique et des études économiques, *Annuaire statistique de la Martinique 1969–1972* (Paris, 1973), p. 30, table 3.

Costa Rica: For 1970, rates calculated on the basis of number of births given in Costa Rica, *Anuario estadístico 1970* (San José, 1972), p. 25, table 11; and of female population aged 15–49 years taken from *Boletín Demográfico* (CELADE), vol. VII, No. 13 (January 1974), p. 21, table 2, with adjustment to agree with more recent official estimates of total mid-year population. For 1975, United States of America, Department of Commerce, Bureau of the Census, *Country Demographic Profiles: Costa Rica*, ISP-DP-4 (Washington, D.C., 1977), p. 8, table 7.

El Salvador: Rates calculated on the basis of female population aged 15–49 years given in *Boletín Demográfico*, vol. VII, No. 13 (January 1974), p. 22, table 2, with adjustment to agree with more recent official estimates of total mid-year population.

Guatemala: Rates calculated on the basis of female population aged 15–49 years taken from Juan Chackiel, *Guatemala: Evaluación del censo de 1973 y proyección de la población por sexo y edad 1950–2000*, CELADE Series A, No. 1021 (San José, Costa Rica, 1976), p. 43, table 26; and prorated to mid-year total population given in United States of America, Department of Commerce, Bureau of the Census, *Country Demographic Profiles: Guatemala*, ISP-DP-6 (Washington, D.C., 1977), p. 9, table 7.

Mexico: Rates calculated on the basis of female population aged 15–49 years taken from *Boletín Demográfico*, vol. VII, No. 13 (January 1974), pp. 26–27, table 2, with adjustment to agree with more recent official estimates of total mid-year population.

Panama: For 1970, rates calculated on the basis of female population aged 15–49 years taken from *Boletín Demográfico*, vol. VII, No. 13 (January 1974), pp. 26–27, table 2, with adjustment to agree with more recent official estimates of total mid-year population. For 1975 and 1976, United States of America, Department of Commerce, Bureau of the Census, *Country Demographic Profiles: Panama*, ISP-DP-7, (Washington, D.C., 1977), p. 19, table A-2.

Chile: United States of America, Department of Commerce, Bureau of the Census, *Country Demographic Profiles: Chile*, ISP-DP-13 (Washington, D.C., 1978), p. 8, table 7.

Uruguay: *Latin America: Evaluation of the Demographic Situation in the Period 1970–1975*, CELADE Series A, No. 158 (Santiago, Chile, 1977), p. 22.

Suriname: H. E. Lamur, *The Demographic Evolution of Surinam*, translated by Dirk H. van der Elst (The Hague, Martinus Nijhoff, 1973), p. 56.

Venezuela: For 1970 (1971), Universidad del Zulia, Facultad de Ciencias Económicas y Sociales, Centro de Investigaciones Económicas, *La Población de Venezuela*, CICRED Monograph Series, World Population Year 1974 (Maracaibo, 1974), p. 17, table 4.

United States of America: Department of Commerce, Bureau of the Census, *Statistical Abstract of the United States, 1978* (Washington, D.C., 1978), p. 60, table 81.

[*table notes continued on following page*]

Latin America

For all the countries of Latin America, crude birth rate estimates are available for the 1970s. Of the 27 countries for which data are shown in table 4, 13 countries, or roughly 59 per cent, have fertility estimates based on complete birth registration statistics. Over-all fertility in Latin America was lower than that in Africa and most of Asia. Eleven of the 26 countries in latin America for which crude birth rates are available showed measures below 30 per 1,000 population, the level traditionally used to distinguish the developing from the developed countries. Crude birth rates ranged from 20.4 in Martinique to 48.3 in Nicaragua and total fertility rates from 2.5 in Cuba to 7.2 in Honduras.

The over-all level of fertility in Latin America does not appear to have changed notably despite new data for 11 countries. Excluding the island containing the Dominican Republic and Haiti, all the countries of the Caribbean currently had crude birth rates well below 30 per 1,000. The countries of Middle and Tropical South America show significantly higher fertility, on average, than the rest of the major area; Costa Rica was the only country in this group showing a crude birth rate below 30 per 1,000 and a total fertility rate below 4. If anything, new fertility estimates for the countries of these two subregions show slightly higher levels of fertility than those presented in the previous monitoring report. The countries of Temperate South America show the lowest average fertility levels in Latin America.

Because of better data, it is possible to learn something about fertility trends in some of these countries. Although the total fertility rates presented in table 6 add little to the story already told by the gross reproduction rates presented in the previous monitoring report, some trends in the crude birth rates presented in table 5 are worthy of note. Excluding Puerto Rico, and Trinidad and Tobago, the Caribbean region shows continuing declines in crude birth rates, with Jamaica provisionally recording a particularly precipitous drop in 1978, implying a 38 per cent decline since 1970. Of the countries in Middle America and Tropical South America, three have recorded notable declines in their crude birth rates. The percentage declines (1970–1978) have amounted to 15 for Guyana, 19 for Mexico and 24 for Panama. The course of fertility decline in Mexico is of particular interest because of its large population and its recently announced regional demographic policy,[4] but any assessment of fertility trends for Mexico on the basis of crude birth rate data alone would appear to be hazardous in the absence of reasonably reliable data on the age composition of women of reproductive ages and on age at marriage (including consensual marriage) during recent years. In the case of Jamaica and Panama, however, the sharp declines in crude birth rates coincide with sharp fertility declines as evidenced by changes in the total fertility rate from 1970 to 1976.

Asia

East and South Asia are not only the most populated major areas of the world but are among the most heterogeneous from a demographic perspective. Of the 38 countries included in these major areas, only 8 have fertility data based on complete birth registration statistics and those countries include only roughly 13 per cent of the total population of Asia. However, excluding Democratic Kampuchea, Iraq and Turkey, the estimates of fertility levels presented in table 4 represent data collected in the 1970s.

Since 1979, new updated estimates of fertility levels have become available for 10 countries,[5] which together

[4] *Population Policy Compendium, Mexico*, joint publication of the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat and the United Nations Fund for Population Activities (New York, 1979).

[5] Bangladesh, China, Hong Kong, Indonesia, Japan, Malaysia (data only for Peninsular Malaysia), Nepal, the Philippines, Singapore and Sri Lanka.

[*table notes continued from preceding page*]

Republic of Korea: For 1970, Lee-Jay Cho, "The own-children approach to fertility estimation: an elaboration", *International Population Conference, Liège, 1973* (Liège, International Union for the Scientific Study of Population, 1974), vol. 2, p. 275. For 1975, United States of America, Department of Commerce, Bureau of the Census, *Country Demographic Profiles: Republic of Korea*, ISP-DP-17 (Washington, D.C., 1978), p. 9, table 7.

Sri Lanka: For 1970 (1971), United States of America, Department of Commerce, Bureau of the Census, *Country Demographic Profiles: Sri Lanka*, ISP-DP-8 (Washington, D.C., 1977), p. 8, table 7.

Hungary: For 1970, rate calculated on the basis of female population aged 15–49 years given in Statisztikai Hivatal, *Demografiai Evkonyv, 1971* (Budapest, Kozponti, 1973), p. 15.

England and Wales: For 1970, rate calculated on the basis of the 1970 female population aged 15–49 years given in *Demographic Yearbook 1970* (United Nations publication, Sales No. E/F.71.XIII.1), table 6, with adjustment to agree with the revised official population estimates given in United Kingdom, General Statistical Office, *Monthly Digest of Statistics*, No. 350 (February 1975), p. 14, table 10.

Australia: For 1975, rate calculated on the basis of female population aged 15–49 years given in Bureau of Statistics, *Official Yearbook of Australia, 1975 and 1976*, No. 61 (Canberra, 1977), p. 149.

USSR: Total fertility rates for the periods 1970–1971, 1975–1976 and 1976–1977 calculated on the basis of age-specific fertility rates given in Roland Pressat, "Situation démographique de l'U.R.S.S. à la veille de son cinquième recensement", *Population* (Paris), vol. 34, Nos. 4–5 (July-October 1979), p. 849, table 5.

[a] Excluding dependencies.
[b] For 1969.
[c] For 1970–1975.
[d] For 1967.
[e] For 1971.
[f] For 1973.
[g] Excluding Indian jungle population.
[h] Births in Newfoundland prorated to the distribution by age for Canada excluding Newfoundland.
[i] Births including Canadian residents temporarily in the United States of America but excluding residents of the United States temporarily in Canada.
[j] Data cover only Peninsular Malaysia.
[k] Excluding transients afloat and military and civilian services personnel and their dependants not locally domiciled.
[l] For 1974.
[m] Including data provided by Israel for East Jerusalem and Israeli residents in certain other territories under occupation by Israeli military forces since June 1967.
[n] Data that relate to the Federal Republic of Germany and the German Democratic Republic include the relevant data relating to Berlin, for which separate data have not been supplied. This is without prejudice to any question of status which may be involved.
[o] Excluding Faeroe Islands and Greenland.
[p] Excluding data for Northern Ireland.
[q] Excluding Ceuta and Melilla.

represent roughly 56 per cent of the total population of Asia. Although the sources and methods of estimation are subject to questions of interpretation in most cases, these new estimates provide a picture of substantially lower levels of fertility than previously presented. Excluding Japan, a developed country, the estimates of crude birth rates vary from a high of 50–53 per 1,000 population in Afghanistan to a low of 17.0 in Singapore, with 13 countries estimated to have birth rates below 40 per 1,000. Among the 20 countries having the data to calculate it, the total fertility rates range from 7.7 per woman in Afghanistan and Jordan to 3.4 in Sri Lanka.

Estimates of average fertility levels in Asia depend crucially upon the situation in China, where roughly 38 per cent of the Asian population resides. The estimate of the crude birth rate in China in 1978, shown in table 4, is 18.3 per 1,000 population, whereas the estimate for the period 1970–1975, published in the previous monitoring report, was 26 per 1,000. The basis of these estimates is not known, but it is clear that China is now engaged in an all-out effort to bring its rate of growth down precipitously to a natural rate of increase of 5 per 1,000 by 1985. This goal will be achieved with a new policy encouraging the one-child family with financial incentives; and, at the same time, discouraging families from having more than two children, through the imposition of financial penalties.[6] Although there remains some uncertainty about exact levels and trends, there is no doubt that China is undergoing rapid demographic change.

In general, fertility levels in East Asia are significantly lower than levels in South Asia. China, Hong Kong, the Republic of Korea and Singapore are notable in having crude birth rates well below 30 per 1,000 population. On the other hand, the Arab countries of Western South Asia, excluding Lebanon, have the highest fertility levels, on average, in that region.

Information on fertility trends is available for only a few relatively small and atypical countries of Asia. Hong Kong, Malaysia, the Republic of Korea, Singapore and Sri Lanka have all shown substantial declines in total fertility rates since 1970, with Hong Kong and Singapore showing particularly rapid declines. Israel also has experienced a notable decline in its total fertility rate since 1970.

C. More developed regions

From a demographic perspective, it is no longer possible to make a systematic distinction between the more developed regions, comprising the countries of Northern America and Europe, and Australia, Japan, New Zealand and the Union of Soviet Socialist Republics, and the rest of the world. Although the less developed regions of Africa, Latin America and Asia continue to have notably higher average levels of fertility than other regions, there is an increasing amount of overlap between those regions and the developed countries.

Not only is this group of countries more homogeneous with respect to fertility levels, but it has attained extraordinarily low levels of fertility. Using the most recent estimates available for each country and excluding two countries (Albania and Ireland) with atypically high fertility, one finds crude birth rates from a high of 19.6 per 1,000 population in Romania to a low of 9.4 in the Federal Republic of Germany. Total fertility rates ranged from 2.9 in Spain to 1.4 in the Federal Republic of Germany. Of 22 countries in this group for which measures were available in 1977, 14 had total fertility levels below the replacement level of 2.1.

Over-all fertility levels in countries of Northern and Western Europe are notably lower than in the rest of the group. In Northern Europe, only Ireland has a total fertility rate above the replacement level of 2.1; and in Western Europe, France has the highest level of fertility, with a total fertility rate of 1.9. Fertility rates in Canada, Japan and the United States of America are now also well below replacement, although rates of population growth are higher in Northern America because of higher crude birth rates, attributable to the age distribution of the population.

The fertility trend in Northern Europe (excluding Ireland) has been consistently downward for all countries in the group, with rates converging within a range of from 1.6 to 1.8. All the countries of Western Europe have also experienced steady declines; their fertility rates were currently from 1.4 to 1.9. Less information is available on recent trends in Southern Europe, but excluding Italy, which had a sharp decline in 1976, the other countries in this group show fairly stable fertility levels.

In Northern America, as well as Australia, Japan and New Zealand, fertility trends have continued downward. In the United States, however, both the crude birth rate and the total fertility rate moved upward during the years after 1975. During the same period in the USSR, both the crude birth rate and the total fertility rate remained remarkably stable.

Eastern Europe is particularly interesting because, although on the average these countries had the lowest fertility levels in Europe in 1970, the levels currently recorded generally exceed the levels prevailing in Western and Northern Europe. Excluding Italy, all the countries of Southern Europe had fertility rates above replacement.

In all of these countries, fertility measures are based on complete birth registration, which permits an analysis of trends for most or at least part of the decade of the 1970s. In the Eastern European countries, excluding Poland and Romania, the most striking trend was one of increases in fertility from levels recorded in 1970 or 1975. During the past 10–15 years, all of the Eastern European countries except Poland have had aggressive policies to increase population growth. The package of policies has been different in each country and the policies have evolved in unique ways, but the net result appears to be some definite impact on fertility levels, at least in the short run.[7] In the

[6] Chen Muhua, "Birth planning in China", translated by Pi-chao Chen, *International Family Planning Perspectives*, vol. 5, No. 3 (September 1979), pp. 92–101.

[7] Roland Pressat, "Mesures natalistes et relèvement de la fécondité en Europe de l'Est", *Population*, vol. 34, No. 3 (May–June 1979), pp. 533–547.

case of Hungary, the total fertility rate has shown a steady rise since 1974 despite continuing declines in the crude birth rate. The increased fertility can be explained, at least in part, by the severe restrictions on abortion introduced in Hungary in 1974, as well as by an expansion of various family benefits. The total fertility rate in the German Democratic Republic fell to the record low level of 1.5 after the institution of abortion on demand in 1972 and has since rebounded steadily in response to greatly expanded family benefits, in particular, the extremely generous maternity and education leave benefits now granted to women after the birth of their second child.

The figures for Bulgaria and Czechoslovakia refer to less recent years, but they also show increases since 1970. In Czechoslovakia, the early 1970s were a period of rapidly expanding benefits for second and third children.[8] In Bulgaria, laws calling for further restrictions on abortion and expanded benefits for the second and third child were passed in 1973. Fertility levels continue to decline in Romania from the height achieved after extreme abortion restrictions were imposed at the end of 1966. But despite the fairly steady declines, the fertility rate in Romania remained the highest in Eastern Europe.

A very weak increase of crude birth rates in 1979 has been reported for several of the developed countries, including Belgium, France, the Federal Republic of Germany, the German Democratic Republic, Sweden, Switzerland and the United States, but the changes were slight; and inasmuch as the observation period is for only one year, the movements may merely be minor fluctuations.[9] They are mentioned, however, because they occurred so widely: the decline in birth rates was uninterrupted in only 14 of the 34 developed countries during the last half of the 1970s. In 20 countries, it either fluctuated slightly upward in 1978 or 1979, or it appeared to be stabilized. A few of the countries that posted slightly higher birth rates registered declining total fertility rates, indicating that the rise of the birth rate or its stabilization was due to changes in the population composition rather than to a shift in reproductive patterns. Among the latter group of countries were Austria, Belgium and the Federal Republic of Germany, France, Sweden, Switzerland, the United Kingdom of Great Britain and Northern Ireland, and the United States appear to have posted real, if slight, gains, with rises of from 1 to 6 per cent in total fertility.[10] It is clearly too early to determine whether these changes signal an altered course for fertility.

[8] Tomas Frejka, "Fertility trends and policies: Czechoslovakia in the 1970s", *Population and Development Review*, vol. 6, No. 1 (March 1980), pp. 65–93.

[9] Council of Europe, *Recent Demographic Developments in the Member States of the Council of Europe*, Country Reports (Strasbourg, 1980), pp. 1–10.

[10] *Ibid.*, pp. 9–10.

Chapter III

DIFFERENTIAL FERTILITY*

A. CUMULATIVE FERTILITY

Differences among countries in cumulative fertility

In 15 developing countries that are participating in the World Fertility Survey,[1] the range in cumulative fertility, as measured by mean number of children ever born alive per woman, was found to be comparatively wide: from 3.3 children in Nepal to 4.5 in Mexico and Peru. A standard deviation of 2.3 births per woman indicates the least dispersion in the Republic of Korea, where very large families are no longer a commonplace; and a corresponding value of 3.3 for Colombia, the Dominican Republic and Pakistan is evidence of greater dispersion in those countries. Differences were also found among them with respect to the proportions childless and with large families. Childlessness ranged from 4.8 per cent in Peru to 17.8 in Nepal, a country in which marriage frequently occurs at a very early age and adolescent sterility appears to be very high. On the other hand, those with nine or more live births comprised 2.3 per cent of the total in the Republic of Korea and 13.8 per cent in Mexico (table 7).

One of the convenient measures that can be derived from the data of the World Fertility Survey is the average number of children that had been born alive to a cohort of ever-married women up to the time of the survey. The ranges in distribution of women by numbers of children ever born (see table 7) are attributable, *inter alia*, to the heterogeneity of the samples in respect of distributions by current age, marital duration and current marital status. The cumulative fertility of birth and marriage cohorts is discussed below.

Age-specific cumulative fertility

Homogeneity is increased when the women are grouped roughly according to their time of birth, the advantage being that each group of women will have experienced similar cultural and related conditioning and will have been exposed to similar changes in national tastes, values and economic and social conditions.

Table 8 gives the mean parity of successive five-year age groups of all ever-married women, the mean for the sample and a standardized total. It is immediately clear that the sample means do not give a full picture of the cross-national variations in cumulative fertility. The highest sample means were found for Mexico, Peru, Colombia and Pakistan; but for age group 25–29, for example, the highest values were found for Bangladesh (4.2) and for the Dominican Republic, Mexico and Pakistan (3.4). In some countries, such as Bangladesh, the Dominican Republic, Indonesia and Nepal, there was comparatively little difference between cumulative fertility at ages 35–39 and at ages 45–49 years, suggesting that childbearing is virtually completed by age 40. In others, however, such as Colombia, Costa Rica and Peru, completed fertility was nearly one third higher than the level attained by age group 35–39. Because the data concern ever-married women, existing differences among the countries in levels of adult male mortality and the incidence of divorce also represent determinants of variations in cumulative fertility for the older age groups.

These data do not represent the fertility of a single group of women as they pass through the reproductive ages, because of possible changes in fertility patterns over time. They reflect behaviour that, in some cases, took place several decades prior to the survey. None the less, certain differences in patterns of family building can be observed among the countries. The values given in table 8 for women under age 20 were very low in Nepal and the

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* Prepared by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat.

[1] The 15 countries discussed here are Bangladesh, Colombia, Costa Rica, Dominican Republic, Fiji, Indonesia, Malaysia, Mexico, Nepal, Pakistan, Panama, Peru, Republic of Korea, Sri Lanka and Thailand.

The data for them referred to herein were taken from the following World Fertility Survey reports: Ministry of Health and Population Control, *Bangladesh Fertility Survey 1975—First Report* (Dacca, 1978); Corporación Centro Regional de Población, *Encuesta Nacional de Fecundidad Colombia 1976—Resultados generales* (Bogotá, 1977); Dirección General de Estadística y Censos, *Encuesta Nacional de Fecundidad 1976, Costa Rica* (San José, 1978); Dominican Republic, Consejo Nacional de Población y Familia, *Encuesta Nacional de Fecundidad—Informe general* (Santo Domingo, 1976); Bureau of Statistics, *Fiji Fertility Survey 1974, Principal Report* (Suva, 1976); Central Bureau of Statistics, *Indonesia Fertility Survey 1976—Principal Report* (Jakarta, 1978); Department of Statistics and National Family Planning Board, *Malaysian Fertility and Family Survey—First Report* (Kuala Lumpur, 1977); Secretaria de Programación y Presupuesto, *Encuesta Mexicana de Fecundidad, Primer informe nacional*, vols. I and II (Mexico, 1979); Ministry of Health, *Nepal Fertility Survey, 1976, First Report* (Kathmandu, 1977); Population Planning Council of Pakistan, *Pakistan Fertility Survey—First Report* (Lahore, 1976); Panama, Oficina de Estudios de Población, *Encuesta Nacional de Fecundidad, Informe general* (1977); Instituto Nacional de Planificación, *Encuesta Nacional de Fecundidad de Peru, 1977–1978, Informe general* (Lima, Dirección General de Censos, Encuesta y Demografía, Dirección de Demografía, 1979); Republic of Korea, Economic Planning Board, National Bureau of Statistics; and Korean Institute for Family Planning, *The Korean National Fertility Survey—First Country Report* (Seoul, 1977); Ministry of Plan Implementation, Department of Census and Statistics, *World Fertility Survey—Sri Lanka, 1975, First Report* (Colombo, 1978); Chulalongkorn University, Institute of Population Studies; and National Statistical Office, Population Survey Division, *The Survey of Fertility in Thailand: Country Report No. 1*, vols. I and II (Bangkok, 1977).

TABLE 7. PERCENTAGE DISTRIBUTION[a] OF ALL EVER-MARRIED WOMEN ACCORDING TO TOTAL NUMBER OF CHILDREN EVER BORN, SELECTED WORLD FERTILITY SURVEY COUNTRIES

Number of children ever born	*Bangladesh*	*Colombia*	*Costa Rica*	*Dominican Republic*	*Fiji*	*Indonesia*	*Malaysia*	*Mexico*	*Nepal*	*Pakistan*	*Panama*	*Peru*	*Republic of Korea*	*Sri Lanka*	*Thailand*
Zero	14.3	7.8	6.1	11.2	11.4	13.4	7.5	7.7	17.8	14.1	5.9	4.8	6.5	8.4	8.0
One	13.0	13.4	14.7	15.1	13.6	17.1	12.3	12.0	13.9	11.5	13.0	12.7	13.2	14.6	15.2
Two	11.8	15.7	18.1	13.5	14.3	14.9	14.0	13.7	13.7	11.2	16.8	14.3	15.3	14.0	15.6
Three	10.5	14.1	14.6	11.7	13.5	12.2	13.9	12.6	12.9	10.4	16.0	13.8	17.4	13.5	12.9
Four	10.1	10.2	10.1	10.5	11.0	10.1	11.4	10.5	11.3	99.7	12.2	11.4	15.9	11.8	11.9
Five	9.5	9.0	7.8	9.0	10.1	8.8	10.2	9.1	9.0	9.2	10.1	9.7	12.1	9.9	9.6
Six	8.6	6.4	6.9	7.1	7.6	8.0	8.3	8.0	7.5	8.7	7.7	7.9	8.4	8.4	7.8
Seven	7.4	6.0	5.0	5.0	6.5	5.6	7.1	7.0	5.5	8.5	6.1	7.0	5.8	6.5	5.5
Eight	5.6	4.9	3.8	4.6	4.5	4.3	5.4	5.5	3.6	6.1	4.1	5.6	3.2	5.2	4.9
Nine or more	9.2	12.5	13.0	12.5	7.5	5.6	9.8	13.8	4.7	10.5	8.1	12.9	2.3	7.7	8.6
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Mean parity	4.0	4.3	4.2	4.1	3.8	3.5	4.2	4.5	3.3	4.3	4.0	4.5	3.6	3.9	3.9
Standard deviation[b]	3.1	3.3	3.2	3.3	2.9	2.8	3.0	3.2	2.7	3.3	2.7	3.2	2.3	2.8	2.9
First quartile[c]	0.8	1.2	1.2	1.1	1.0	0.7	1.4	1.4	0.5	0.9	1.4	1.5	1.3	1.1	1.1
Second quartile[c]	3.0	2.9	2.8	2.9	2.8	2.4	3.2	3.4	2.4	3.3	2.9	3.4	2.9	3.0	2.9
Third quartile[c]	5.7	5.7	5.5	5.6	5.2	4.8	5.7	6.2	4.6	6.0	5.1	6.1	4.6	5.3	5.2

Sources: Data taken from the following World Fertility Survey reports: Ministry of Health and Population Control, *Bangladesh Fertility Survey 1975—First Report* (Dacca, 1978); Corporación Centro Regional de Población, *Encuesta Nacional de Fecundidad Colombia 1976,—Resultados generales* (Bogotá, 1977); Dirección General de Estadística y Censos, *Encuesta Nacional de Fecundidad 1976, Costa Rica* (San José, 1978); Dominican Republic, Consejo Nacional de Población y Familia, *Encuesta Nacional de Fecundidad—Informe general* (Santo Domingo, 1976); Bureau of Statistics, *Fiji Fertility Survey 1974, Principal Report* (Suva, 1976); Central Bureau of Statistics, *Indonesia Fertility Survey 1976—Principal Report* (Jakarta, 1978); Department of Statistics and National Family Planning Board, *Malaysian Fertility and Family Survey—First Report* (Kuala Lumpur, 1977); Secretaría de Programación y Presupuesto, *Encuesta Mexicana de Fecundidad, Primer informe nacional*, vols. I and II (Mexico, 1979); Ministry of Health, *Nepal Fertility Survey, 1976, First Report* (Kathmandu, 1977); Population Planning Council of Pakistan, *Pakistan Fertility Survey—First Report* (Lahore, 1976); Panama, Oficina de Estudios de Población, *Encuesta Nacional de Fecundidad, Informe General* (1977); Instituto Nacional de Planificación, *Encuesta Nacional de Fecundidad de Peru, 1977–1978, Informe general* (Lima, Dirección General de Censos, Encuesta y Demografía, Dirección de Demografía, 1979); Republic of Korea, Economic Planning Board, National Bureau of Statistics; and Korean Institute for Family Planning, *The Korean National Fertility Survey—First Country Report* (Seoul, 1977); Ministry of Plan Implementation, Department of Census and Statistics, *World Fertility Survey—Sri Lanka, 1975, First Report* (Colombo, 1978); Chulalongkorn University, Institute of Population Studies; and National Statistical Office, Population Survey Division, *The Survey of Fertility in Thailand: Country Report No. 1*, vols. I and II (Bangkok, 1977).

[a] Number of cases omitted in the interest of brevity.
[b] Partially estimated.
[c] Calculated.

TABLE 8. MEAN NUMBER OF CHILDREN EVER BORN TO ALL EVER-MARRIED WOMEN, BY AGE GROUP AT TIME SURVEY, SELECTED WORLD FERTILITY SURVEY COUNTRIES

Age group at time of survey	*Bangladesh*	*Colombia*	*Costa Rica*	*Dominican Republic*	*Fiji*	*Indonesia*	*Malaysia*	*Mexico*	*Nepal*	*Pakistan*	*Panama*	*Peru*	*Republic of Korea*	*Sri Lanka*	*Thailand*
Under 20	0.7	1.0	[a]	0.8	0.5	0.6	0.8	1.0	0.3	0.6	[a]	1.0	0.5	0.7	0.7
20–24	2.4	1.8	1.6	1.8	1.5	1.7	1.7	2.0	1.4	1.9	1.7	2.0	1.0	1.6	1.5
25–29	4.2	3.1	2.5	3.4	2.7	2.8	2.8	3.4	2.9	3.4	2.9	3.2	2.0	2.6	2.6
30–34	5.7	4.5	3.9	4.8	4.2	4.1	4.2	5.0	4.1	5.1	4.1	4.5	3.4	3.9	3.9
35–39	6.7	5.6	5.4	6.5	5.2	4.8	5.5	6.3	5.1	6.2	5.2	5.9	4.4	4.9	5.0
40–44	7.1	6.6	6.7	6.5	6.2	5.3	6.1	7.0	5.5	7.2	5.8	6.6	5.1	5.5	6.1
45–49	6.7	7.3	7.2	6.8	6.6	5.2	6.2	7.1	5.7	7.1	5.9	7.0	5.8	6.0	6.8
TOTAL	4.0	4.3	4.2	4.1	3.8	3.5	4.2[b]	4.5	3.3	4.3	4.0	4.5	3.6	3.9	3.9
Standardized total[c]	4.8	4.2	4.2	4.4	3.8	3.5	3.9	4.5	3.6	4.5	4.0	4.3	3.1	3.6	3.6

Sources: World Fertility Survey reports cited for table 7.

[a] Data not published in the World Fertility Survey report.

[b] Including 193 women aged 50 years.

[c] Standardized on the "over-all" distribution of 13 countries (excluding Costa Rica and Panama). Although this standard is arbitrary, it has the advantage of a considerable history of use in demographic research.

TABLE 9. MEAN NUMBER OF CHILDREN EVER BORN TO ALL EVER-MARRIED WOMEN, BY NUMBER OF YEARS SINCE FIRST MARRIAGE, SELECTED WORLD FERTILITY SURVEY COUNTRIES

Number of years since first marriage	*Bangladesh*	*Colombia*	*Costa Rica*	*Dominican Republic*	*Fiji*	*Indonesia*	*Malaysia*	*Mexico*	*Nepal*	*Pakistan*	*Panama*	*Peru*	*Republic of Korea*	*Sri Lanka*	*Thailand*
0–4	0.6	1.2	1.3	0.9	1.0	0.7	1.1	1.2	0.5	0.6	1.2	1.3	1.1	0.9	1.0
5–9	2.1	2.8	2.5	2.6	2.6	2.0	2.8	3.0	1.7	2.5	2.7	3.0	2.7	2.5	2.5
10–14	3.5	4.3	4.0	4.2	3.9	3.2	4.1	4.7	3.1	4.1	3.8	4.4	3.7	3.7	3.8
15–19	5.0	5.7	5.5	5.8	5.0	4.2	5.3	6.1	4.4	5.6	5.1	5.8	4.4	4.8	5.0
20–24	6.1	6.8	7.0	6.8	5.7	5.0	6.2	7.3	5.2	6.8	5.9	6.7	5.1	5.7	6.1
25–29	6.9	8.1	8.7	7.1	6.7	5.3	6.8	7.7	5.8	7.1	6.6	7.8	5.5	6.5	7.2
30 or more	6.8	9.1	8.4	8.0	7.5	5.3	6.2	8.6	6.0	7.4	7.3	8.4	6.3	6.9	7.5
TOTAL	4.0	4.3	4.2	4.1	3.8	3.5	4.2	4.5	3.3	4.3	4.0	4.5	3.6	3.9	3.9

Sources: World Fertility Survey reports cited for table 7.

Republic of Korea, but for different reasons. There appeared to be some subfecundity in Nepal that was attributable to marriage at too early an age, while women in the Republic of Korea had begun to advance the age at which they bear their first child.

Cumulative fertility, defined as the mean number of children born to women aged 40–44 years,[2] varied relatively widely, from more than seven children in Bangladesh and Pakistan to about five children in the Republic of Korea. It is also of interest that the prevalence of primary sterility, measured by the proportion reported childless for this age group, was quite low in all countries, from 6.0 per cent in the Dominican Republic to 1.5 per cent in the Republic of Korea.

Duration of marriage and age at marriage

The use of marriage duration as a control in the analysis of fertility has the advantage of being very closely linked to the stages of reproduction. The period of reproductive risk normally is specified better by marriage duration than by age, except where first marriage commonly occurs very early, as in Nepal, or after the peak reproductive years. In a comparative analysis such as this, however, it is important to bear in mind some problems of inter-country comparability with respect to duration of marriage.

Among the problems are that, in some cultures, the date of first marriage may not coincide with the beginning of cohabitation; and marital stability varies significantly cross-nationally. For example, at the time of the survey more than four times as many first marriages had been dissolved in the Dominican Republic (44 per cent) as in Pakistan (10 per cent). Moreover, the causes of marital dissolution vary, as do the customs concerning remarriage. In some countries, marriages are dissolved more frequently by separation or divorce, and remarriage is fairly common. In others, the majority of marital disruptions are due to widowhood and presumably occur later in the life cycle; and in some cultures, remarriage of women is not common. Thus, although duration of marriage was defined in each survey as "years since first marriage" the proportions of ever-married women who had been in continual exposure to childbearing, i.e., in unbroken marriages, differed cross-nationally. "Duration-specific" fertility also is influenced by age at first marriage, because the median varies among countries. The data given in table 9 show that in the youngest marriage duration group, the mean number of children ever born varied substantially among the countries, with a range that is at first glance somewhat surprising, from 0.5 child in Nepal and 0.6 in Bangladesh and Pakistan to 1.3 children in Costa Rica and Peru. The prevalence of adolescent sterility has been proposed as a reason for low marital fertility rates at early ages and for short durations of marriage. For example, in Bangladesh and Nepal, early adolescent marriage and the consummation of these marriages is not uncommon.

[2] This method avoids the particular problem of underreporting of children ever born to women aged 45–49 years.

Completed family size, i.e., cumulative fertility after 30 or more years, was generally highest in the countries of South Asia and Middle America. Indeed, among the 15 countries, the range, while less broad than at the early durations, was still considerable: from 5.3 children per woman in Indonesia to 9.1 in Colombia.

The data given in table 9 also suggest that in Bangladesh, Indonesia, Malaysia, Nepal and Pakistan, there is very little childbearing during the latter part of the reproductive cycle. In these countries, the cumulative fertility of women married 20–24 years was from 87 to 100 per cent as high as that of women who had been married 30 years or longer. The significance of this situation is suggested by the finding for the remaining 10 countries, in which the differences in cumulative fertility between these two duration groups ranged from 75 per cent in Colombia, where completed family size was largest, to 85 per cent in the Dominican Republic and Mexico. As these figures relate to behaviour 20 and more years prior to the survey, a fertility decline would probably not explain these differences, although the differential incidence of widowhood and of recall lapse among women at higher durations cannot be discounted as possible factors. On the other hand, varying practices in respect of remarriage and the continuation of childbearing after a daughter bears a child could also have an effect on these data.

Further analysis of the First Country Reports also revealed that the distributions by age at first marriage of ever-married women whose first marriage had been contracted from 10 to 19 years before the survey varied substantially from country to country. The percentage of women already married at age 20 ranged from 88.4 in Nepal to 39.0 in the Republic of Korea. Accordingly, there were large differences among these countries in mean age at first marriage of the women in age group 25–29 at the time of the survey; a range of from 12.8 years in Bangladesh to 21.6 years in the Republic of Korea can be observed.

Generally speaking, age at first marriage in these countries is inversely related to fertility cumulated within a given time span. However, when broad groups of age at first marriage are used, the groupings camouflage the fact, as stated above, that this relationship frequently does not hold at the shortest durations of marriage. In addition to adolescent subfecundity, already mentioned, in some countries early marriage often results in separations, reducing the total exposure time for women currently in a second or later marriage.

Socio-economic differentials in cumulative fertility

The comparative analysis of variations in fertility among population subgroups of different countries is an aid in identifying important influences on fertility behaviour and in explaining, at least in part, the variations among these countries in fertility levels and trends. For many purposes, it may be sufficient to establish the existence of certain patterns, either globally or in groups of countries with common characteristics, rather than to measure differences among countries in the strength of a

relationship. In this case, cumulative fertility differentials between levels of education and occupational groups, as well as urban/rural residence, are examined briefly. These differentials were chosen for illustrative purposes because of their coverage in the First Country Reports.

In table 10, the mean number of children ever born to ever-married women by the wife's level of education is given for three broad marital-duration groups, namely, for those whose first marriage had been less than 10 years, 10–19 years or 20 years or more prior to the survey. Use of marriage cohorts controls somewhat for marital exposure; but the most educated women, for example, tended to be the younger women who also had married later and, for both those reasons, there is some small confounding effect of age at marriage and current age.

Although some studies have revealed a curvilinear relationship between levels of fertility and wife's educational status in various European countries and in the United States of America, classically it has been inverse—the higher the education, the lower the fertility. The latter finding holds true for all but one of the 15 countries, the exception being Indonesia. Marriage dissolution is a commonplace in Indonesia; and this exception reflects, *inter alia*, the greater marriage stability of better educated women, so that they are in a marital union more consistently than women with less education. In all the other countries surveyed, the average number of births to women married 10–19 years was found to decrease from the lowest educational categories to the highest, the difference ranging from 3.2 births in Costa Rica to 0.2 birth in Nepal.

In general, the data on differentials in fertility according to education for the countries of Latin America show stronger variation than was found for the countries of Asia. In those countries, excluding the Republic of Korea, only small or no differences were found in the fertility of women with "no" education and those with "primary" education; and a substantial negative effect was apparent only at the highest educational levels (of course, again excluding Indonesia). It should be of interest to determine how and to what extent the individual-level relationships were associated with the general level of education in these societies.

In the guide-lines for the First Country Reports,[3] there is no explicit suggestion to relate women's fertility to the educational attainment of their husbands, so that only a few reports included tabulations on this topic. Owing to space restrictions, it is possible only to relate here such insights as are provided by data in the First Country Report for Thailand, which provides a cross-tabulation of the mean number of children ever born by the educational levels attained by each spouse. The general impression is that the relationship between husband's education and fertility is similar in direction and strength to that between wife's education and fertility.

It is generally believed that in societies undergoing demographic, social and economic changes, characteristics associated with current urban living and lifestyles initiate and promote the desire for smaller families and a reduction of fertility. However, a current characteristic, in this case rural or urban residence, may mask a different trait with an influence that has crystallized over many years and that would affect the validity of the information provided by the characteristic. For example, the presence of a large number of recent rural migrants could inflate the aggregate fertility level of women enumerated in an urban area.

Excluding Indonesia and Pakistan, women who were residing in urban areas had lower fertility than did those living in rural areas (table 11). In respect of Indonesia, the fact that urban fertility was higher than rural fertility may reflect not only more complete urban reporting but possibly greater stability of marriage in urban areas. In Pakistan, this finding may result from better health and nutritional conditions and/or more complete reporting of births among urban women or heavy recent rural in-migration.[4]

The excess of rural over urban fertility for women who had married from 10 to 19 years prior to the survey ranged from 0.3 in Sri Lanka to 1.6 in Costa Rica. The countries with the highest proportion of respondents in urban areas also had the largest urban/rural differential (coefficient of correlation, $r = 72$ among 10 countries considered). One possible explanation of this finding is that the effect of urban life on fertility may become more pronounced as urbanization spreads.

Data for the Republic of Korea, given in the First Country Report, support the hypothesis that fertility levels not only are influenced by the current residence of the respondent but are affected by the place of childhood residence. Thus, fertility was highest among women who had grown up in villages and were residing there at the time of the survey, and was lowest among women with place of residence in cities both in childhood and at the time of the survey, the values for women married 10–19 years being, respectively, 4.5 and 3.2 live births. Fertility of "migrants" appears to fall between these extremes. Of course, these findings are subject to many qualifications but they appear broadly to confirm those of some earlier studies.[5]

Occupation, especially of the husband, has been probably the most widely utilized index of socio-economic status in the study of fertility differentials. Classically, changes in the occupational distribution of the population of industrially advanced countries have accompanied general declines in fertility. Relatively high fertility has been associated with occupations in the primary industries, particularly agriculture and mining, while lower fertility has been associated with the professional classes, white-collar workers and urban industrial workers.

[3] World Fertility Survey, *Guidelines for Country Report No. 1*, Basic Documentation, No. 8 (Voorburg, The Hague, International Statistical Institute, 1977).

[4] World Fertility Survey, *The Pakistan Fertility Survey 1975: A Summary of Findings*, Summary Series, No. 3 (Voorburg, The Hague, International Statistical Institute, 1977).

[5] *Fertility and Family Planning in Europe Around 1970: A Comparative Study of Twelve National Surveys* (United Nations publication, Sales No. E.76.XIII.2).

TABLE 10. MEAN NUMBER OF CHILDREN EVER BORN TO EVER-MARRIED WOMEN BY NUMBER OF YEARS SINCE FIRST MARRIAGE AND LEVEL OF EDUCATION, SELECTED WORLD FERTILITY SURVEY COUNTRIES

Number of years since first marriage and level of education	*Bangladesh*	*Colombia*	*Costa Rica*	*Dominican Republic*	*Fiji*	*Indonesia*	*Malaysia*	*Mexico*	*Nepal*	*Pakistan*	*Panama*	*Peru*	*Republic of Korea*	*Sri Lanka*	*Thailand*
Less than 10 years															
No education	[a]	2.5	2.9	2.2	1.9	1.2	2.2	2.5	1.1	1.5	3.0	2.5	2.5	1.9	1.8
Primary	[a]	2.1	2.1	1.8	2.0	1.4	2.0	2.2	1.2	1.4	2.4	2.3	2.0	1.7	1.8
More than primary	[a]	1.4	1.5	1.2	1.6	1.4	1.4	1.6	1.1[b]	1.6	1.7	1.8	1.7	1.6	1.3
TOTAL	1.3	2.0	1.9	1.7	1.8	1.3	1.9	2.1	1.1	1.5	2.0	2.1	1.8	1.7	1.7
10–19 years															
No education	[a]	5.8	6.4	5.7	4.6	3.6	4.8	5.9	3.7	4.8	5.4	5.8	4.6	4.5	4.6
Primary	[a]	5.0	4.9	5.0	4.6	3.6	4.8	5.5	3.8	4.8	4.8	5.2	4.2	4.4	4.4
More than primary	[a]	3.8	3.2	3.6	4.0	4.2	3.4	3.8	3.5[b]	4.1	3.5	3.7	3.3	4.0	3.4
TOTAL	4.1	5.0	4.6	4.9	4.4	3.7	4.7	5.3	3.7	4.8	4.4	5.1	4.1	4.3	4.4
20 years or more															
No education	[a]	8.0	9.3	7.5	6.8	5.1	6.4	8.0	5.6	7.1	7.9	8.3	6.0	6.6	6.6
Primary	[a]	7.6	8.0	7.2	6.3	5.6	6.6	7.8	5.2	6.5	6.6	7.1	5.3	6.2	6.8
More than primary	[a]	5.8	4.8	4.0	5.5	5.9	4.9	5.1	4.0[b]	6.3	4.8	4.8	4.3	5.6	4.3
TOTAL	6.6	7.5	7.8	7.1	6.3	5.2	6.4	7.7	5.6	7.1	6.4	7.4	5.6	6.2	6.7
All durations															
No education	[a]	5.7	7.3	5.5	5.2	3.9	5.4	6.0	3.3	4.4	6.1	6.2	5.3	5.1	5.1
Primary	[a]	4.3	4.7	4.2	4.4	3.1	3.9	4.5	2.2	3.4	4.6	4.5	3.6	4.2	3.8
More than primary	[a]	2.7	2.3	2.2	2.8	2.8	2.1	2.6	1.9[b]	2.9	2.7	2.7	2.3	2.9	2.1
TOTAL	4.0	4.3	4.2	4.1	3.8	3.5	4.2	4.5	3.3	4.3	4.0	4.5	3.6	3.9	3.9

Sources: World Fertility Survey reports cited for table 7.

[a] Data not published in the World Fertility Survey report.
[b] Twenty or fewer cases.

TABLE 11. MEAN NUMBER OF CHILDREN EVER BORN TO EVER-MARRIED WOMEN, BY NUMBER OF YEARS SINCE FIRST MARRIAGE AND TYPE OF PLACE OF RESIDENCE, SELECTED WORLD FERTILITY SURVEY COUNTRIES

Number of years since first marriage and type of place of residence	*Bangladesh*	*Colombia*	*Costa Rica*	*Dominican Republic*	*Fiji*	*Indonesia*	*Malaysia*	*Mexico*	*Nepal*	*Pakistan*	*Panama*	*Peru*	*Republic of Korea*	*Sri Lanka*	*Thailand*
Less than 10 years															
Urban	[a]	1.8	1.7	1.6	1.8	1.6	1.7	[a]	[a]	1.6	1.7	2.0	1.8	1.7	1.6
Rural	[a]	2.3	2.2	1.9	1.7	1.3	1.9	[a]	[a]	1.5	2.2	2.2	1.9	1.7	1.7
TOTAL	1.3	2.0	1.9	1.7	1.7	1.3	1.9	2.1	1.1	1.5	2.0	2.1	1.8	1.7	1.7
10–19 years															
Urban	[a]	4.5	3.9	4.4	4.0	4.0	3.9	[a]	[a]	5.1	3.6	4.4	3.6	4.1	3.9
Rural	[a]	6.0	5.5	5.6	4.6	3.7	4.8	[a]	[a]	4.7	4.7	5.5	4.4	4.4	4.5
TOTAL	4.1	5.0	4.6	4.9	4.4	3.7	4.7	5.3	3.7	4.8	4.4	5.1	4.1	4.3	4.4
20 years or more															
Urban	[a]	7.0	6.2	6.0	5.7	5.5	6.3	[a]	[a]	7.1	5.1	6.1	4.8	5.8	5.7
Rural	[a]	8.4	9.1	8.0	6.7	5.2	6.5	[a]	[a]	7.1	6.8	8.0	6.1	6.4	6.8
TOTAL	6.6	7.5	7.8	7.1	6.4	5.2	6.4	7.7	5.6	7.1	6.4	7.4	5.6	6.2	6.7
All durations															
Urban	[a]	3.9	3.5	3.5	3.5	3.6	3.7	[a]	[a]	4.4	3.0	3.7	3.0	3.6	3.3
Rural	[a]	5.0	5.1	4.8	4.0	3.4	4.3	[a]	[a]	4.2	4.4	5.1	4.2	4.0	4.0
TOTAL	4.0	4.3	4.2	4.1	3.8	3.5	4.2	4.5	3.3	4.3	4.0	4.5	3.6	3.9	3.9

Sources: World Fertility Survey reports cited for table 7.

[a] Data not published in the World Fertility Survey report.

TABLE 12. MEAN NUMBER OF CHILDREN EVER BORN TO EVER-MARRIED WOMEN, BY NUMBER OF YEARS SINCE FIRST MARRIAGE AND OCCUPATIONAL STATUS OF HUSBAND, SELECTED WORLD FERTILITY SURVEY COUNTRIES

Number of years since first marriage and occupational status of husband	*Bangladesh*	*Colombia*	*Costa Rica*	*Dominican Republic*	*Fiji*	*Indonesia*	*Malaysia*	*Mexico*	*Nepal*	*Pakistan*	*Panama*	*Peru*	*Republic of Korea*	*Sri Lanka*	*Thailand*
Less than 10 years															
Professional, managerial, technical, clerical	[a]	1.5	[a]	[a]	1.5	1.7	1.6	1.7	[a]	1.5	1.7	[a]	1.8	1.6	1.2
Sales and service	[a]	1.8	[a]	[a]	1.6	1.4	2.0	2.1	[a]	1.5	1.9	[a]	1.8	1.7	1.6
Agricultural	[a]	2.3	[a]	[a]	1.9	1.2	1.9	2.2	[a]	1.6	2.7	[a]	2.0	1.7	1.8
Skilled manual	[a]	1.9	[a]	[a]	1.8	1.5	1.9	2.1	[a]	1.5	2.0	[a]	1.8	1.6	1.7
Unskilled manual	[a]	1.9	[a]	[a]	1.8		2.2	2.2	[a]	1.5	2.5	[a]	2.0	1.8	1.7
TOTAL	1.3	2.0	1.9	1.7	1.7	1.3	1.9	2.1	1.1	1.5	2.0	2.1	1.8	1.7	1.7
10–19 years															
Professional, managerial, technical, clerical	[a]	3.8	[a]	[a]	3.9	4.1	4.0	4.3	[a]	4.5	3.5	[a]	3.5	3.6	3.5
Sales and service	[a]	4.2	[a]	[a]	4.1	3.9	4.4	5.1	[a]	5.0	3.9	[a]	3.7	4.2	3.8
Agricultural	[a]	5.8	[a]	[a]	4.7	3.5	4.8	5.8	[a]	4.7	5.2	[a]	4.6	4.5	4.6
Skilled manual	[a]	4.8	[a]	[a]	4.3	3.8	4.8	5.5	[a]	4.9	4.4	[a]	3.8	4.2	4.2
Unskilled manual	[a]	5.7	[a]	[a]	4.4		5.0	5.6	[a]	4.8	5.1	[a]	4.2	4.4	4.3
TOTAL	4.1	5.0	4.6	4.9	4.4	3.7	4.7	5.3	3.7	4.8	4.4	5.1	4.1	4.3	4.4
20 years or more															
Professional, managerial, technical, clerical	[a]	5.6	[a]	[a]	5.8	5.7	5.6	6.2	[a]	7.0	4.7	[a]	4.7	5.1	5.2
Sales and service	[a]	6.8	[a]	[a]	6.2	5.4	6.5	7.1	[a]	7.2	6.0	[a]	4.9	6.0	6.3
Agricultural	[a]	8.4	[a]	[a]	6.8	5.1	6.5	8.2	[a]	7.1	7.4	[a]	6.2	6.5	7.1
Skilled manual	[a]	7.0	[a]	[a]	6.2	5.5	6.5	7.8	[a]	7.2	6.1	[a]	4.9	6.1	5.6
Unskilled manual	[a]	7.7	[a]	[a]	5.9		6.7	6.4[b]	[a]	6.7	6.9	[a]	5.5	6.2	7.4
TOTAL	6.6	7.5	7.8	7.1	6.4	5.2	6.4	7.7	5.6	7.1	6.4	7.4	5.6	6.2	6.7
All durations															
Professional, managerial, technical, clerical	[a]	2.8	[a]	[a]	3.2	3.5	3.2	3.3	[a]	3.9	2.7	[a]	2.9	3.0	2.9
Sales and service	[a]	3.8	[a]	[a]	3.2	3.6	4.5	4.3	[a]	4.3	3.6	[a]	3.1	3.7	3.5
Agricultural	[a]	5.1	[a]	[a]	4.4	3.4	4.6	5.3	[a]	4.4	5.3	[a]	4.6	4.3	4.3
Skilled manual	[a]	4.0	[a]	[a]	3.7	3.5	4.1	4.5	[a]	4.2	3.9	[a]	3.0	3.6	3.2
Unskilled manual	[a]	4.5	[a]	[a]	3.7		4.4	4.5	[a]	4.1	4.8	[a]	3.8	4.1	4.2
TOTAL	4.0	4.3	4.2	4.1	3.8	3.5	4.2	4.5	3.3	4.3	4.0	4.5	3.6	3.9	3.9

Sources: World Fertility Survey reports cited for Table 7.

[a] Data not published in World Fertility Survey report.
[b] Twenty or fewer cases.

In the First Country Reports, not all countries used the classification of occupations recommended by the World Fertility Survey. Therefore, the data given in table 12 have been collapsed into five categories so as to secure some comparability among the countries. A problem of ambiguity also arises in respect of the time reference: husbands of the respondents may have had a different occupation or none at all at important times in the past.

Concentrating on women whose first marriage had been from 10 to 19 years earlier, in 7 out of 10 countries with available data, those whose husbands were engaged in agriculture tended to have the largest number of children. In contrast, wives of professionals, technicians, administrators and clerks in those seven countries had the lowest fertility, while the fertility of wives of manual workers occupied an intermediary position. A difference of more than one child between the agricultural occupation and the professional, managerial, technical and clerical occupations was reported for Colombia, Mexico, Panama, the Republic of Korea and Thailand. Within the manual-worker category, spouses of men classified as "skilled" in the seven countries had fewer children than those of "unskilled" workers. The difference, however, except for Colombia and Panama, was usually small. In general, it has been found that the relationship between fertility and wife's occupation is similar to its relationship with the husband's occupation.

It is expected not only that the type of work (i.e., occupation) will affect fertility but, in the case of women, the degree of participation itself will be an important determining factor. As this question was not well covered in the First Country Reports, lack of information prohibits a full discussion. Suffice it to say that in six of the seven countries that reported fertility differentials by women's pattern of work, for women whose first marriage was 10–19 years' duration, those who had ever worked since marriage had lower fertility than those who had not worked at all. However, the complexity of this relationship and the paucity of data published in the First Country Reports prohibit any conclusions.

B. Current fertility

Age patterns

A very useful indicator of current fertility behaviour that is available from the World Fertility Survey data is the mean number of children born during the five years immediately preceding the survey to currently married women who had been married for at least five years. Those women constituted from 54 per cent of all ever-married women in the Dominican Republic to 74 per cent in Nepal and Pakistan.

Tables 13 and 14 give the mean number of births in the five years prior to the survey to women continuously married in that interval, according to the woman's current age. For women currently aged 20–24 years, the mean number of births ranged from 1.1 in Thailand to 2.2 in Peru, corresponding to about 220–440 births per annum per 1,000 married women during the five years. After the age at which peak fertility was recorded, the mean number of births decreased as age increased in all countries, so that at ages 45–49 years current fertility rates were very low, varying from 0.1 in Malaysia, Panama and the Republic of Korea to 0.3 in four other countries.

As would be expected, because at the time of the survey women in the samples differed with respect to average age at first marriage, mean parity and other related factors, such as length of breast-feeding, considerable variations were found in age patterns of "current" fertility. Among the 12 countries for which the fertility of all five-year age groups could be examined, there were four patterns, as indicated by the age group in which "current" fertility was highest. Both Mexico and Pakistan were characterized by broad periods of peak fertility, but among Mexican women the peak age groups were under 20–24 years (roughly, ages 15–24); whereas in Pakistan, the peak was later, at ages 20–29. A very early peak period, i.e., ages under 20 years, was found for Colombia, Malaysia and Thailand, while for Bangladesh, the Dominican Republic, Indonesia, Peru and Sri Lanka, the measures were highest for age group 20–24, indicating peak fertility at moderately early years. It is significant that a peak at ages as advanced as 25–29 years was observed only for Nepal where, as previously mentioned, the wide prevalence of adolescent marriage tends to suppress fertility among young women. For all women, the mean number of children born in the preceding five years varied from 0.6 in Thailand to 1.3 in Mexico and Nepal; the standardized over-all mean range was from 0.7 in Thailand to 1.4 in Mexico.

Number of living children

Considerable interest surrounds the question whether the number of children that a woman has is related to her current fertility. Logically, if women were to stop childbearing upon attaining desired family size, one would expect to find that the smaller the number of children living at the beginning of that period, the larger the mean number of children born during the five-year period. The mean number of children born in the five years preceding the survey to women currently aged 25–29, classified by number of living children five years previously, is shown in table 15. There the expected relationship is found for Costa Rica, Indonesia, Panama and the Republic of Korea, but is not seen in the figures for Bangladesh, Colombia, Mexico, Nepal and Peru, which suggests that for the latter group of countries, more intensive analysis should be undertaken at a future date to determine whether larger numbers were wanted or whether there was a greater tendency to exceed desired family size.

Child mortality may influence fertility and decisions about family size; but, for a variety of reasons, evidence of variations in child mortality may not be interpreted as being necessarily a cause of observed cross-national variations in fertility and family size preferences. There is a link, however; and it is for this reason that data on the survival of children ever born are presented here.

One difficulty with studies of the relationship between fertility and mortality is that the effect of mortality on

TABLE 13. MEAN NUMBER OF CHILDREN BORN DURING THE PAST FIVE YEARS TO WOMEN CONTINUOUSLY MARRIED DURING THAT INTERVAL, BY CURRENT AGE GROUP, AND MEAN NUMBER OF LIVING CHILDREN FIVE YEARS AGO, SELECTED WORLD FERTILITY SURVEY COUNTRIES

Current age group	Bangladesh		Colombia		Costa Rica		Indonesia		Mexico		Nepal		Panama		Peru		Republic of Korea	
	Number of cases	Mean	Number of cases	Mean	Number of cases	Mean	Number of cases	Mean	Number of cases	Mean	Number of cases	Mean	Number of cases	Mean	Number of cases	Mean	Number of cases	Mean
Under 20	317	1.3	14	2.3	[a]	[a]	84	1.4	30	2.1	139	0.8	[a]	[a]	24	2.1	0	0.0[b]
20–24	1 067	1.6	179	1.9	152	1.6	761	1.6	396	2.1	801	1.5	152	1.9	331	2.2	54	1.9
25–29	999	1.5	424	1.6	382	1.2	1 158	1.4	863	1.9	1 045	1.6	392	1.4	733	1.8	581	1.8
30–34	702	1.3	429	1.2	445	0.9	1 169	1.2	887	1.6	796	1.5	502	1.0	750	1.4	977	1.3
35–39	557	1.0	391	1.0	413	0.6	1 190	0.8	844	1.3	653	1.2	393	0.7	794	1.2	943	0.7
40–44	478	0.6	339	0.6	335	0.5	981	0.5	653	0.7	603	0.8	317	0.4	664	0.7	749	0.4
45–49	340	0.3	263	0.2	300	0.2	699	0.2	517	0.3	381	0.3	261	0.1	554	0.3	523	0.1
TOTAL	4 460	1.2	2 039	1.1	2 027	0.8	6 042	1.0	4 190	1.3	4 418	1.3	2 017	0.9	3 850	1.2	3 827	0.9
Standardized total[c]		1.1		1.1		0.8		1.0		1.4		1.2		0.9		1.3		1.0
Mean number of living children five years ago[d]		2.8		4.3		3.8		2.7		3.8		2.0		3.6		3.3		3.0

Sources: World Fertility Survey reports cited for table 7.

NOTE: The terms "past five years" and "five years ago" refer, respectively, to the five-year period preceding the time of the survey and to the date five years prior to the survey.

[a] Data not published in the World Fertility Survey report.

[b] No cases reported.

[c] Standardized on the "over-all" distribution of 12 countries (excluding Costa Rica, Fiji and Panama).

[d] Partially estimated.

TABLE 14. MEAN NUMBER OF CHILDREN BORN DURING THE PAST FIVE YEARS TO WOMEN CONTINUOUSLY MARRIED DURING THAT INTERVAL, BY CURRENT AGE GROUP, AND MEAN NUMBER OF LIVING CHILDREN, SELECTED WORLD FERTILITY SURVEY COUNTRIES

Current age group	Dominican Republic		Fiji		Malaysia		Pakistan		Sri Lanka		Thailand	
	Number of cases	Mean	Number of cases	Mean	Number of cases	Mean	Number of cases	Mean	Number of cases	Mean	Number of cases	Mean
Under 20	12	1.7	256	1.9	10	3.0	46	1.2	14	1.7	6	1.2
20–24	145	2.1			283	2.1	524	1.8	330	1.8	184	1.1
25–29	248	1.8	811	1.4	789	1.7	784	1.8	828	1.5	529	0.8
30–34	231	1.5	1 540	0.9	966	1.3	757	1.6	1 004	1.2	515	0.8
35–39	269	1.3			982	1.0	573	1.2	981	0.9	518	0.6
40–44	163	0.7	936	0.3	743	0.5	554	0.8	774	0.4	489	0.4
45–49	152	0.2			731	0.1	430	0.2	755	0.2	380	0.2
TOTAL	1 220	1.3	3 543	0.9	4 504	1.0	3 668	1.3	4 686	0.9	2 621	0.6
Standardized total[a]		1.3		1.0		1.2		1.3		1.0		0.7
Mean number of living children[b]		4.7		4.3		4.7		4.0		4.2[c]		4.2

Sources: World Fertility Survey reports cited in table 7.

NOTE: The term "past five years" refers to the five-year period preceding the time of the survey.

[a] Standardized on the "over-all" distribution of 12 countries (excluding Costa Rica, Fiji and Panama).

[b] Partially estimated.

[c] The title of the table in the published report reads "by the number of living children 5 years ago", but obviously should read "by number of living children".

TABLE 15. MEAN NUMBER OF CHILDREN BORN DURING THE PAST FIVE YEARS TO WOMEN CURRENTLY IN AGE GROUP 25–29 AND CONTINUOUSLY MARRIED DURING THAT INTERVAL, BY NUMBER OF LIVING CHILDREN FIVE YEARS AGO, SELECTED WORLD FERTILITY SURVEY COUNTRIES

	Bangladesh		*Colombia*		*Costa Rica*		*Indonesia*		*Mexico*		*Panama*		*Nepal*		*Peru*		*Republic of Korea*	
Number of living children	*Number of women*	*Mean*	*Number of women*	*Mean*	*Number of women*	*Mean*	*Number of women*	*Mean*	*Number of women*	*Mean*	*Number of women*	*Mean*	*Number of women*	*Mean*	*Number of women*	*Mean*	*Number of women*	*Mean*
Zero	78	1.4	65	1.6	81	1.4	225	1.5	122	1.9	64	1.7	314	1.5	[a]	1.9	209	2.1
One	208	1.5	110	1.8	118	1.2	395	1.4	188	1.8	105	1.4	384	1.7	[a]	1.8	255	1.7
Two	300	1.5	101	1.4	95	1.1	342	1.4	253	1.9	91	1.5	239	1.7	[a]	1.8	100	1.4
Three	255	1.5	73	1.6	50	1.0	136	1.4	184	1.8	75	1.3	88	1.6	[a]	1.7	15	0.9
Four	122	1.4	44	1.3	26	1.0	47	1.2	84	1.9	41	1.3	20	1.9	[a]	1.8	1	1.0
Five or more	36	1.6	31	1.8	12	0.7	15	1.1	32	2.0	16	0.9	0	0.0[b]	[a]	1.8	1	0.0[b]
TOTAL	999	1.5	424	1.6	382	1.2	1 158	1.4	863	1.9	392	1.4	1 045	1.6	733	1.8	581	1.8
Mean number of living children five years ago[c]		2.3		2.1		1.6		1.5		2.0		1.9		1.2		1.8		0.9

Sources: World Fertility Survey reports cited in table 7.

NOTE: The terms "past five years" and "five years ago" refer, respectively, to the five-year period preceding the time of the survey and to the date five years prior to the survey.

[a] Data not published in the World Fertility Survey report.
[b] No cases reported.
[c] Partially estimated.

TABLE 16. PERCENTAGE[a] OF CURRENTLY MARRIED FECUND WOMEN WHO DID NOT WANT MORE CHILDREN, ACCORDING TO NUMBER OF LIVING CHILDREN, SELECTED WORLD FERTILITY SURVEY COUNTRIES

Number of living children	*Bangladesh*[b]	*Colombia*	*Costa Rica*	*Dominican Republic*	*Fiji*	*Indonesia*	*Malaysia*	*Mexico*	*Nepal*	*Pakistan*	*Panama*	*Peru*	*Republic of Korea*	*Sri Lanka*	*Thailand*
Zero	13.3	9.0	5.3	3.1	2.1	4.0	0.4	9.8	1.3	2.0	7.7	6.3	12.5	2.2	5.4
One	42.5	19.0	13.0	10.5	6.7	9.1	3.5	10.0	5.2	7.0	12.0	19.9	13.0	14.2	18.7
Two	56.4	52.0	35.2	33.3	34.0	28.5	21.4	42.4	23.4	30.0	42.0	48.2	65.6	49.6	46.1
Three	66.4	65.0	58.9	54.0	48.5	45.0	31.1	53.5	39.4	48.0	72.6	62.2	85.8	72.7	64.1
Four	76.7	79.0	68.4	61.6	66.6	57.4	51.9	69.4	58.0	69.0	81.7	74.2	92.0	86.9	81.3
Five	84.5	78.0	74.7	72.1[c]	82.6[c]	68.3	78.3[c]	77.2	66.3	87.3[c]	85.1	80.1	95.3	92.5[c]	90.4
Six	90.3	85.0	77.8	[d]	[d]	77.7	[d]	81.6	80.5	[d]	86.7	80.7	96.2	[d]	90.5
Seven	92.4	93.0	77.3	[d]	[d]	87.1	[d]	86.3	88.0	[d]	86.4	87.2	99.1	[d]	95.9
Eight	90.6	89.0	86.7	[d]	[d]	84.1	[d]	89.0	88.9	[d]	86.6	88.1	100.0	[d]	92.9
Nine or more	96.0	90.0	85.0	[d]	[d]	93.9	[d]	91.1	92.9[e]	[d]	88.6	94.7	100.0[e]	[d]	97.3
TOTAL	60.8	61.0	52.0	44.7	49.5	38.8	42.7	57.1	29.6	49.0	63.0	61.4	71.6	61.4	56.9
Estimated median parity level (number of children) at which 50 per cent of the women do not want more children	1.5	1.9	2.6	2.8	3.1	3.4	3.9	2.7	3.6	3.1	2.3	2.1	1.7	2.0	2.2

Sources: World Fertility Survey reports cited for table 7.

[a] Number of cases omitted in the interest of brevity.
[b] Some women were asked "Do you want to have another child soon?", rather than "Do you want to have another child some time?".
[c] Five or more children.
[d] Data not published in the World Fertility Survey report.
[e] Twenty or fewer cases.

fertility is not isolated from the reverse and sometimes stronger effects of fertility on mortality.[6] Even data associating the fertility of women with their own child mortality experience do not disentangle this complex relationship. The figures from Colombia, Panama and Sri Lanka show that within each marriage duration group, those with a child death consistently demonstrated higher cumulative fertility; and the greater the number of deaths, the higher the fertility. That positive relationship held within all marriage duration groups and for all three countries.[7]

Utilizing similar data and methodology, some researchers have concluded that the observed positive relationship validated the "child survival hypothesis".[8] As has been mentioned, such findings are insufficient evidence for that conclusion because, among other things, the influence of fertility on mortality has not been eliminated. The positive relationship between the number of child losses experienced and the number of children ever born reflects, at least in part, the fact that more children ever born represent a larger number of potential child losses. Moreover, the mortality experiences are cumulated over a long period and to women of widely differing ages even within the same marriage duration group.

C. Fertility preferences: desire to cease childbearing

If a respondent's stated fertility preferences are related in some way to her eventual fertility, then information on fertility preferences should have a predictive value in forecasting the future course of fertility. Studies of this phenomenon in developed countries appear to have confirmed this possibility.[9] But it has not been established whether it is also true for developing countries, in many of which there is a high degree of fatalism and belief in divine influence on conception. There is some question also as to the validity of results obtained from analyses of data on attitudes, such as ideals and preferences with regard to family size, additional children wanted or sex of children yet to be born. As phrased in the schedules, the questions are very hypothetical and frequently foreign to thinking in the cultural and social settings of women in many developing countries. Even if such were not the case, it is conceivable that answers given by women about their fertility preferences would have no predictive value, because their stated preferences are an expression of current intentions only; and those intentions could be altered by a change in any of several of her circumstances.[10] In addition, her preferences may not coincide with her husband's (information about which is usually not sought) and any such differences could be important in societies where husbands make major family decisions.[11]

Fertility preferences are measured from the World Fertility Survey data by two sets of questions: one asks about the desire for more children; the other inquires about the total number of children desired. Here, only the findings on the first measure are discussed. It has been reported that results from the country surveys support the view that there is a large unmet need for family planning services, based on the evidence that a large proportion of respondents wanted to cease childbearing (but were not using contraceptives).[12]

Number of living children

Table 16 gives the percentage of currently married fecund women who reported that they did not want more children, by number of living children. There is no doubt that the desire to cease childbearing, as indicated by these data, was surprisingly high: from 30 per cent in Nepal to 72 per cent in the Republic of Korea. In all countries, a strong positive association was found between the proportion who wanted to stop childbearing and current family size; a majority of the women with four living children reported that they did not want any more. The range was substantial, from 52 per cent in Malaysia to 92 per cent in the Republic of Korea.[13]

In most countries, childlessness, or even the one-child family, is clearly regarded as undesirable. But in Bangladesh, Mexico and the Republic of Korea, 10–13 per cent of the women with no living children reported that they wanted no more children; and in Colombia and Peru, almost 2 per cent of the women with only one child stated that they wanted no more. With respect to Bangladesh, the explanation lies in part in the nature of the question, which was posed as "Do you want to have another child soon?", rather than "Do you want another child some time?",[14] as was asked in other countries. The

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[6] See, for instance, Dorothy Nortman, *Parental Age As a Factor in Pregnancy Outcome and Child Development*, Reports on Population/Family Planning, No. 16 (New York, The Population Council, 1974); and Joe D. Wray, "Population pressure on families: family size and child spacing", *Rapid Population Growth: Consequences and Policy Implications* (Baltimore, Maryland; and London, Johns Hopkins University Press, for National Academy of Sciences, 1971), pp. 403–461.

[7] *Selected Factors Affecting Fertility and Fertility Preferences in Developing Countries* (ST/ESA/SER.R/37).

[8] J. B. Wyon and J. E. Gordon, *The Khanna Study: Population Problems in the Rural Punjab* (Cambridge, Massachusetts, Harvard University Press, 1971); and J. A. Harrington, "The effect of high infant and childhood mortality on fertility: the West African case", *Concerned Demography*, vol. 3 (1971), pp. 22–35.

[9] See, for instance, *Fertility and Family Planning in Europe Around 1970: A Comparative Study of Twelve National Surveys.*

[10] For an extensive discussion, see Helen Ware, *Ideal Family Size*, World Fertility Survey Occasional Paper No. 13 (Voorburg, The Hague, International Statistical Institute, 1974).

[11] For a fuller discussion, see *Selected Factors Affecting Fertility and Fertility Preferences in Developing Countries.*

[12] Lee-Jay Cho, "Fertility preferences in five Asian countries", *International Family Planning Perspectives and Digest*, vol. 4, No. 1 (Spring 1978), pp. 2–8; and Sir Maurice Kendall, *The World Fertility Survey: Current Status and Findings*, "Editor's summary", Population Reports, Series M, Special Topics, No. 3 (Baltimore, Maryland, Johns Hopkins University Press, July 1979).

[13] The importance of this relationship is substantiated in a multivariate analysis of factors affecting the desire for another child, using the standard recode tapes for Colombia, Panama and Sri Lanka. It was found that the number of living children was more important than education, years since first marriage and sex composition of living children in explaining the variation in a woman's desire for more children. For a full discussion, see *Selected Factors Affecting Fertility and Fertility Preference in Developing Countries.*

[14] M. Kendall, *op. cit.*, p. M–83.

high figures shown in table 16 raise the possibility that the question might have been misunderstood by respondents in some other countries as well and that, as has been found in other fertility surveys, the women who responded negatively to the question interpreted it to mean in the near future.[15]

Another explanation for the relatively high figures shown in table 16 could be that, in accordance with the questionnaire design, the question on desire for more children was not put to currently married women who had been sterilized or whose husbands had been sterilized for medical or contraceptive reasons; they were assumed to have responded negatively to it. Also, women who subjectively felt that they were infecund (for unspecified reasons) were not asked about their desire for more children. Thus, the questionnaire omitted the group of women who might desire more children but for whom having an additional child would be difficult or impossible because of possible biological impairments. This procedure could have upwardly biased the proportion who did not want more children.

The manner in which currently pregnant women were processed may also have introduced an upward bias. Because currently pregnant women were treated as if they had already achieved the next parity, the desire to cease childbearing was exaggerated, especially for women with 0–3 children, the group in which the largest proportion of currently pregnant women was found. The procedure of mixing currently pregnant women (parity X-1) with women who already had X number of living children (parity X) carries an assumption that there will be no spontaneous or induced abortions, or stillbirths, and that among those currently pregnant women who experience either foetal loss or an infant death, a certain proportion would want to replace that loss and continue childbearing.

An alternative method of determining the percentage of women who did not want more children, by parity, is illustrated below, using data for the Republic of Korea:

Number of children living	Distribution of currently married women who wanted no more children: Measured by ratio of number of children desired to number living	Measured by number who stated they wanted no more children
Zero	0.6	12.5
One	3.4	13.0
Two	38.0	65.6
Three	72.8	85.8
Four	89.7	92.0
Five	97.1	95.3
Six	96.9	96.2
Seven	99.4	99.1
Eight	97.6	100.0
Nine or more	97.6	100.0
TOTAL	61.0	71.6

Sources: For column (1), *World Population Trends and Policies—1979 Monitoring Report*, vol. I, *Population Trends* (United Nations publication, Sales No. E.79.XIII.4), p. 59, table 17; for column (2), table 16 of this chapter.

[15] Helen Ware, *Language Problems in Demographic Field Work in Africa: The Case of the Cameroon Fertility Survey*, World Fertility Survey, Scientific Report No. 2 (Voorburg, The Hague, International Statistical Institute, 1977).

In this method, information based on the question about number of children desired was cross-classified with number of children living. It was then possible to determine those who had not achieved desired family size, those who had the exact number wanted and those who had more than was presumably desirable. The latter two categories of women constituted the group that did not want any more children. Measured in this way, the proportions at each parity who wanted no more children was considerably less than when determined by the proportion of women who stated that they did not want more children.

Age and marital duration

The data given in table 17 suggest, as would be expected in view of the relationships between a woman's age, marital duration and parity, that, in general, the proportions of women wanting no more children rise with increasing age or years since first marriage. Furthermore, in nine countries, well over one half of the currently married fecund women aged 25–34 years who had three living children wanted to cease childbearing. In five of them (excluding Bangladesh, for which the data are not comparable), the figures ranged from 60 to 84 per cent. That situation was found also when marriage durations of less than 20 years were examined. In Fiji, Indonesia, Malaysia, Nepal and Sri Lanka, the percentage of women who wanted to stop childbearing did not differ very much between the two youngest age groups; a substantial increase in the percentage began with women aged 34–44 years. In Colombia, the Dominican Republic and Thailand, there was no clear relation between the desire to cease childbearing and age or years since first marriage. This finding suggests that, in a majority of cases, women do not wish to bear children throughout their reproductive years but would cease as soon as they have the number wanted, no matter how young they are or how few years they have been married.

Socio-economic factors

If the factors that influence a woman's desires about future childbearing were the same as those which influence cumulative fertility, one would expect the following situation. The percentage of currently married fecund women who desire to stop childbearing would rise with increasing levels of education, would be higher in urban areas than in rural areas and would be greater among women whose husbands are professionals or other white-collar workers and lower among women whose husbands have agricultural occupations; it would be higher for women who have ever worked since marriage than for those who have never worked.

In general, the results shown in table 18 follow the expected pattern, except that the educational level attained was not a very closely associated variable in Fiji; and, in some countries, the proportion of women with no education who wanted no more children was greater than that for women who had graduated from primary school. The findings for Fiji reflect the socio-economic and fertility characteristics of the two ethnic groups which,

TABLE 17. PERCENTAGE[a] OF CURRENTLY MARRIED FECUND WOMEN WITH THREE LIVING CHILDREN WHO DID NOT WANT MORE CHILDREN, BY CURRENT AGE GROUP AND NUMBER OF YEARS SINCE FIRST MARRIAGE, SELECTED WORLD FERTILITY SURVEY COUNTRIES

Current age group and number of years since first marriage	*Bangladesh*[b]		*Colombia*		*Costa Rica*		*Dominican Republic*		*Fiji*		*Indonesia*		*Malaysia*		*Mexico*	
	Number of women	*Percentage*	*Number of women*	*Percentage*	*Number of women*	*Percentage*	*Number of women*	*Percentage*	*Nmber of women*	*Percentage*	*Number of women*	*Percentage*	*Number of women*	*Percentage*	*Number of women*	*Percentage*
Current age group																
Under 25	317	62	107	68	60	45	83	52	132	42	206	36	168	22	245	44
25–34	353	66	214	63	205	55	84	54	414	44	574	40	459	25	360	54
35–44	77	79	84	67	89	73	35	51	114	71	173	62	162	52	94	71
45 or over	19	100	15	47	28	75	9	89			37	88	27	59	13	85
TOTAL	765	66	420	65	382	59	211[c]	54	660	48	990	45	816[c]	31	712	53
Years since first marriage																
Less than 10	[d]	[d]	237	64	182	52	124	52	371	43	309	36	459	24	486	49
10–19	[d]	[d]	146	68	160	63	65	57	220	47	489	43	263	37	192	62
20 or more	[d]	[d]	37	57	40	75	22	55	69	84	191	64	93	49	34	77
TOTAL	765	66	420	65	382	59	211	54	660	48	989	45	815	31	712	53

Current age group and number of years since first marriage	*Nepal*		*Pakistan*		*Panama*		*Peru*		*Republic of Korea*		*Sri Lanka*		*Thailand*	
	Number of women	*Percentage*	*Number of women*	*Percentage*	*Number of women*	*Percentage*	*Number of women*	*Percentage*	*Number of women*	*Percentage*	*Number of women*	*Percentage*	*Number of women*	*Percentage*
Current age group														
Under 25	139	36	155	31	70	59	193	60	30	57	128	66	70	71
25–34	477	35	337	46	232	73	383	58	651	84	488	69	230	60
35–44	157	52	113	64	94	78	163	70	251	94	214	80	92	70
45 or over	26	65	40	92	24	87	32	77	10	100	26	100	6	50
TOTAL	799	39	646[e]	48	420	73	711	62	942	86	856	73	398[c]	64
Years since first marriage														
Less than 10	166	38	[d]	39	188	66	[d]	61	519	80	389	66	203	66
10–19	466	34	[d]	42	176	78	[d]	61	356	92	365	75	156	63
20 or more	167	56	[d]	[d]	56	79	[d]	75	67	96	80	94	41	63
TOTAL	799	39	646	48	420	73	771	62	942	86	835	72	400	64

Sources: World Fertility Survey reports cited for table 7.

[a] Based on figures given for number of women.

[b] Some women were asked, "Do you want to have another child soon?", rather than "Do you want to have another child some time?"

[c] Excluding sterilized couples.

[d] Data not published in the World Fertility Survey report.

[e] Including "other fecund".

TABLE 18. PERCENTAGE[a] OF CURRENTLY MARRIED FECUND WOMEN WITH THREE LIVING CHILDREN WHO DID NOT WANT MORE CHILDREN, BY SPECIFIC BACKGROUND CHARACTERISTICS, SELECTED WORLD FERTILITY SURVEY COUNTRIES

Background characteristic	*Bangladesh*[b]	*Colombia*	*Costa Rica*	*Dominican Republic*	*Fiji*	*Indonesia*	*Malaysia*	*Mexico*	*Nepal*	*Pakistan*	*Panama*	*Peru*	*Republic of Korea*	*Sri Lanka*	*Thailand*
Level of education															
No education	64	53	57[c]	50[c]	55	51	32	48	39	47	75	58	87	66	54
Primary	73	68	55	53	46	37	29	51	51	59	67	60	82	73	66
More than primary	68	63	69	62	48	48	45	65	100[d]	68	78	69	91	75	75[c]
TOTAL	66	65	59	54	48	45	31	53	39	48	73	62	86	73	64
Urban/rural residence															
Urban	74	67	64	55	59	43	49	[e]	[e]	53	76	69	90	76	56
Rural	66	59	52	53	42	45	27	[e]	[e]	47	71	57	79	71	65
TOTAL	66	65	59	54	48	45	31	53	39	48	73	62	86	72	64
Husband's occupational status															
Professional, managerial, technical, clerical	[e]	[e]	[e]	65[c]	55	45	43	61	[e]	[e]	81	[e]	93	77	48
Sales and service	[e]	[e]	[e]	48	50	42	32	61	[e]	[e]	68	[e]	92	74	75
Agricultural	[e]	[e]	[e]	57	39	46	25	45	[e]	[e]	62	[e]	76	71	66
Skilled manual	[e]	[e]	[e]	51	53	44	30	52	[e]	[e]	78	[e]	88	75	59
Unskilled manual	[e]	[e]	[e]	50[c]	49	43[c]	39	62[c]	[e]	[e]	70[c]	[e]	75	66	75[c]
TOTAL	66	65	59	54	48	45	31	53	39	48	73	62	86	73	64
Wife's work pattern															
Ever worked since marriage	[e]	[e]	65	[e]	49	48	32	59	[e]	[e]	74	63	84	74	66
Worked before marriage only	[e]	[e]	61	[e]	47	39	34	52	[e]	[e]	74	66	85	78	48
Never worked	[e]	[e]	47	[e]	49	39	29	50	[e]	[e]	69	55	90	71	47
TOTAL	66	65	59	54	48	45	31	53	39	48	73	62	86	73	64

Sources: World Fertility Survey reports cited for table 7.

[a] Number of cases omitted in the interest of brevity.

[b] Some women were asked, "Do you want to have another child soon?", rather than "Do you want to have another child some time?".

[c] Twenty or fewer cases.

[d] Only one case reported.

[e] Data not published in the World Fertility Survey report.

when pooled, do not give a representative picture of either. An explanation of the differential between women with no education and those with a primary-school education requires more intensive analysis.

Excluding Indonesia and Thailand, in all the countries surveyed, women living in urban areas showed a greater desire to stop childbearing than did women living in rural areas. As expected, in most countries, the desire to cease childbearing was greater among women whose husbands were professionals and lower for those whose husbands had agricultural occupations; but, again, there were exceptions. With respect to the wife's pattern of work, substantial differences in the percentages between women who had ever worked since marriage and those who had never worked were found for Costa Rica and Thailand; and, to a lesser extent, for Indonesia and Mexico. In all the countries but Fiji, Indonesia and the Republic of Korea, the lowest proportion of third-parity fecund married women who desired to cease childbearing was among those who had never worked. There was no systematic difference between women who had ever worked since marriage and those who had worked before marriage only.

Child mortality experience

The differential cumulative fertility of women in Colombia, Panama and Sri Lanka, according to their child mortality experience, was discussed above. It would be helpful if, in support of the present discussion, an assessment could be made of cross-national variations in the relationship between experience of a child death and a woman's desire to cease childbearing. Such an assessment would not be hampered by problems relating to differences between desires and behaviour, and impediments that individuals may encounter when they attempt to behave in accordance with their desires. Because data for such an assessment are available only from the data tapes, information for Colombia is offered here for illustrative purposes.

In Colombia, it was found that at a given effective family size, the proportion of women who desired to cease childbearing was not necessarily greater if they had experienced a child death than if they had not. However, the desire of women to cease childbearing at a given number of children ever born varied significantly in relation to the women's differential child mortality experience: women with such experience showed substantially less readiness to cease childbearing. It appears that women in Colombia intend to have a certain number of children, and if any die, they attempt to have a replacement birth. Of course, a different pattern of behaviour may be found for other countries participating in the World Fertility Survey; and, in the future, analysis of data for these countries will be undertaken.

D. Sex preferences for children

Preferences as to the sex of children are known to exist in some countries. In developing countries, the preference is most often for sons, because family values emphasize their importance for economic, lineal or religious reasons. Existence within a culture of a preference for children of one sex and the strength of the preference can influence completed family size. Consider a society in which women would voluntarily stop childbearing only when they had achieved the sex composition that they desired. Or consider the implications of three types of sex preferences: (*a*) a certain minimum number of boys, such as two; (*b*) a balance, with at least one boy and one girl; and (*c*) a combination of balance and male preference, i.e., the parents would ideally like to have two boys and one girl.[16]

As noted in the report on the survey in Sri Lanka, a child has nearly as much of a chance of being a girl as it has of being a boy, particularly if foetal mortality is taken into account. Thus, each of the three types of sex preferences leads to a certain average number of children required: four children in the first case; three, on the average, in the second; and 4.5 in the last case.[17] The relation between the number and sex of children preferred is not as simple as in the example given above, where the total number would depend upon the achievement of the desired sex composition.[18]

The World Fertility Survey did not ask for a sex breakdown of the total number of children desired. Therefore, sex preference can be measured by: (*a*) the percentage who wanted no more children at all, while having current combinations of living sons and daughters; (*b*) the preferred sex of the next child, given the sex of those already born and living: (*c*) the dependence of the mean additional number of children wanted on the current combination of sons and daughters. Only the findings for the first two of these measures are discussed here.[19]

Desire to cease childbearing according to number of living children and sons

Consistent with Freedman and Coombs,[20] inferences about sex preferences from statements about future childbearing may be based on the following conventions. If, at given parities, the percentage wanting no more children is higher among those with one or two sons than it is among those with no sons, and if the percentage among those with two sons is higher than among those with one, these relationships are considered to be consistent with a preference for sons. At the same time, it will be taken that there is a preference for girls if the

[16] This example was taken from *World Fertility Survey — Sri Lanka, 1975, First Report*, p. 118.

[17] Cf. Mindel C. Sheps, "Effects of family size and sex ratio of preference regarding the sex of children", *Population Studies*, vol. XVII, No. 1 (July 1963), pp. 66–72. For a careful study, see Ronald Freedman and Lolagene C. Coombs, *Cross-Cultural Comparisons: Data on Two Factors in Fertility Behavior*, Population Council Occasional Paper No. 110 (New York, 1974).

[18] For discussion, see Lolagene C. Coombs, *Are Cross-Cultural Preference Comparisons Possible? A Measurement–Theoretic Approach*, IUSSP Paper No. 5 (Liège, International Union for the Scientific Study of Population, 1975).

[19] As mentioned in the introduction to section C, problems of interpretation limit the use of information derived from questions on family size.

[20] *Op. cit.*, p. 26.

TABLE 19. PERCENTAGE[a] OF CURRENTLY MARRIED FECUND NON-PREGNANT WOMEN WHO DID NOT WANT MORE CHILDREN, BY NUMBER OF LIVING CHILDREN AND NUMBER OF LIVING SONS, SELECTED WORLD FERTILITY SURVEY COUNTRIES

Number of living children and living sons	Group I															
	Bangladesh		Colombia		Costa Rica		Indonesia		Mexico		Nepal		Peru		Republic of Korea	
	Number of women	Percentage	Number of women	Percentage	Number of women	Percentage	Number of women	Percentage	Number of women	Percentage	Number of women	Percentage	Number of women	Percentage	Number of women	Percentage
None	727	13	139	9	95	5	685	4	235	10	938	1	[b]	6	168	12
One child																
No son	411	48	151	19	173	16	572	10	240	10	391	4	[b]	23	230	12
One son	341	52	169	21	180	11	543	9	248	9	445	7	[b]	18	267	17
Two children																
No son	147	50	95	45	94	38	252	32	139	32	170	10	[b]	46	112	36
One son	358	67	206	53	248	35	552	35	339	41	368	27	[b]	50	361	71
Two sons	187	69	106	49	117	32	229	18	176	37	217	33	[b]	42	244	77
Three children																
No son	94	56	38	53	40	47	90	35	69	48	777	10	[b]	56	60	47
One son	216	67	139	61	130	59	342	51	224	48	255	36	[b]	63	252	82
Two sons	264	80	145	68	137	58	310	50	239	62	249	54	[b]	67	402	96
Three sons	79	70	33	52	42	55	105	32	75	49	103	42	[b]	57	128	94
Four or more children																
No son	45	68	26	81	19	58	92	55	47	66	46	7	[b]	75	47	51
One son	261	85	112	84	124	78	317	68	250	71	197	56	[b]	70	308	83
Two sons	452	85	250	84	207	71	534	68	512	75	332	68	[b]	79	567	98
Three sons	517	92	290	81	238	79	504	72	530	79	303	80	[b]	79	437	99
Four or more sons	534	90	424	86	378	81	500	79	741	85	219	79	588	87	268	100
TOTAL	4 632	64	2 323	61	2 222	52	5 628	40	4 064	56	4 310	30	3 851	61	3 851	74

Number of living children and living sons	Group II													
	Dominican Republic		Fiji		Malaysia		Pakistan		Panama		Sri Lanka		Thailand	
	Number of women	Percentage	Number of women	Percentage	Number of women	Percentage	Number of women	Percentage	Number of women	Percentage	Number of women	Percentage	Number of women	Percentage
None or one child														
No son	220	6	564	4	516	2	818	4	232	9	733	9	378	12
One son	91	12	258	8	281	4	287	11	141	11	396	14	239	21
Two children														
No son	47	30	101	23	144	15	109	12	76	34	176	39	93	33
One son	83	22	311	36	371	25	259	35	210	49	393	60	230	51
Two sons	53	28	138	30	180	17	146	44	109	34	205	41	118	42
Three or more children														
No son	30	40	40	34	114	17	67	14	73	68	147	56	551	63
One son	126	59	440	58	522	40	405	44	277	73	550	82	257	69
Two sons	158	63	651	71	800	59	646	77	412	82	821	88	338	84
Three or more sons	356	69	1 083	79	1 335	74	1 094	90	727	85	1 285	90	541	89
TOTAL	1 164	43	3 635	50	4 263	43	3 831	50	2 257	63	4 706	62	2 245	56

Sources: World Fertility Survey reports cited for table 7.

[a] Based on figures given for number of women.

[b] Data not published in the World Fertility Survey report.

TABLE 20. AMONG CURRENTLY MARRIED FECUND NON-PREGNANT WOMEN WHO WANTED ANOTHER CHILD AND STATED A SEX PREFERENCE, THE PERCENTAGE[a] WHO PREFERRED A BOY, BY NUMBER OF LIVING CHILDREN AND NUMBER OF LIVING SONS, SELECTED WORLD FERTILITY SURVEY COUNTRIES

	Group I															
	Bangladesh		*Colombia*		*Costa Rica*		*Indonesia*		*Mexico*		*Nepal*		*Peru*		*Republic of Korea*	
Number of living children and living sons	*Number of women*	*Percentage*	*Number of women*	*Percentage*	*Number of women*	*Percentage*	*Number of women*	*Percentage*	*Number of women*	*Percentage*	*Number of women*	*Percentage*	*Number of women*	*Percentage*	*Number of women*	*Percentage*
None	564	62	99	62	88	21	640	30	210	32	744	99	[b]	36	146	60
One child																
No son	183	84	101	90	144	68	476	67	214	72	347	99	[b]	71	201	94
One son	131	32	114	8	156	11	448	4	226	10	255	73	[b]	7	220	26
Two children																
No son	64	95	47	94	56	80	159	79	94	72	149	99	[b]	88	69	100
One son	84	67	74	47	148	20	306	30	199	34	179	97	[b]	37	100	80
Two sons	46	15	49	2	79	5	162	2	110	6	96	32	[b]	5	56	2
Three children																
No son	37	97	16	100	20	95	49	79	35	71	71	100	[b]	81	31	100
One son	47	62	42	90	51	57	120	59	117	67	118	100	[b]	71	43	100
Two sons	34	49	39	15	53	11	113	10	92	14	55	73	[b]	9	113	23
Three sons	20	6	14	0	18	6	58	3	38	3	41	10	[b]	10	8	12
Four or more children																
No son	12	100	3	100	8	63	25	83	16	88	44	100	[b]	71	22	100
One son	27	87	14	100	24	79	68	57	71	72	57	98	[b]	48	48	100
Two sons	32	45	26	58	57	32	94	24	128	48	40	95	[b]	44	9	78
Three sons	18	68	35	29	42	29	83	7	109	25	18	78	[b]	27	3	67
Four or more sons	25	24	34	24	62	16	51	6	107	12	16	31	47	16	1	0
TOTAL	1 326	62	707	50	1 006	33	2 855	34	1 764	38	2 230	90	1 318	38	970	66

	Group II													
	Dominican Republic		*Fiji*		*Malaysia*		*Pakistan*		*Panama*		*Sri Lanka*		*Thailand*	
	Number of women	*Percentage*	*Number of women*	*Percentage*	*Number of women*	*Percentage*	*Number of women*	*Percentage*	*Number of women*	*Percentage*	*Number of women*	*Percentage*	*Number of women*	*Percentage*
None or one child														
No son	200	56	364	88	503	63	789	75	211	58	644	69	322	73
One son	76	8	187	9	267	7	255	47	121	8	332	7	182	3
Two children														
No son	29	86	70	97	120	96	96	99	47	85	102	98	58	100
One son	61	30	100	69	279	39	169	77	103	29	120	63	105	50
Two sons	36	8	81	1	149	2	82	30	68	3	104	1	64	2
Three or more children														
No son	13	(92)	52	100	94	94	58	100	23	91	58	97	17	100
One son	39	74	119	96	302	75	228	90	70	73	69	84	68	75
Two sons	52	31	111	45	313	28	148	59	68	38	60	48	49	37
Three or more sons	79	20	131	5	330	9	106	45	93	19	74	16	55	9
TOTAL	585	40	1 215	57	2 357	42	1 931	70	804	40	1 563	51	920	48

Sources: World Fertility Survey reports cited for table 7.

[a] Based on figures given for number of women.

[b] Data not published in the World Fertility Survey report.

percentage who want no more children is greater for those with no sons than for those with one or two sons.

Couples may also want to have at least one son and one daughter. Because the open-ended category of three or more children, for example, gives no precise information about the number of daughters born to women of third parity and higher, a preference for balance can be inferred from the data given in table 19 only in one set of circumstances: if, at second parity, the percentage who wanted no more children was greater for those with one son (and one daughter) than for those with no son or two sons.[21]

Table 19 gives the percentage of currently married fecund non-pregnant women who did not want more children, according to number of living children and living sons. It is quite apparent that, in all countries, the sex composition of the living children influences women's desire for another child. Applying the definitions mentioned above, the data show the existence of a fairly strong preference for sons in Bangladesh, Nepal, Pakistan and the Republic of Korea. In Pakistan, for example, 44 per cent of second-parity women with two living sons wanted no more children, as compared with 35 per cent of those with one son and only 12 per cent of those with no sons.

In these countries, the proportion of third-parity women with no sons who wanted to stop childbearing is lower than the proportion of second-parity women with at least one son, which may be an indication that in those countries the motivation of women to have no more children could be more strongly affected by the achievement of a satisfying sex preference than by the preference concerning the number of children wanted. In Fiji, Malaysia and Thailand, a mild preference for sons as well as a mild preference for balance was found. In Fiji, for example, second-parity women who had one child of each sex were more willing to stop childbearing than were those who had only boys or only girls; and among the second-parity women with children of one sex only, the percentage of women who wanted to stop childbearing was somewhat higher for women with two sons than for those with two daughters. In Indonesia, Panama and Sri Lanka, women had a fairly strong preference for balance; and in the other countries, a milder preference.[22] Especially from the data for the countries of Latin America, the impression may be gained that the motivation of women to have no more children is more strongly affected by the achievement of a satisfying number of children wanted than by the preference concerning the sex of children.

Preferred sex of the next child by sex of those already born and living

If, in a society, women have a preference for at least one child of each sex, the sex of the first child should not be so important and a strong sex preference should first be seen for the second child, in order to complete the balance. A question on sex preference for the next birth could be answered with "boy", "girl" or "either", so that one would expect the one third of the women who have a preference for balance would prefer that their first child be a boy. In table 20, it can be seen that, in these countries, the proportion of childless women who preferred their first child to be a boy ranged from 21 per cent in Costa Rica to 99 per cent in Nepal. On the other hand, a preference for balance existed in Mexico, Indonesia and Peru, while in Costa Rica, there was some evidence of a preference for girls among childless women.

At a given parity in all the countries surveyed, the proportion of women who preferred their next child to be a boy decreased with an increasing number of sons, thus indicating that in no country was there a stated preference for sons to the exclusion of daughters. In Bangladesh, Nepal, Pakistan and the Republic of Korea, however, the decrease in the proportion of women who preferred their next child to be a boy with an increasing number of sons became substantial only when the women had at least two sons.

[21] *Ibid.*

[22] In Costa Rica, preference for girls also appears to exist among second-parity women.

Chapter IV

FACTORS AFFECTING USE AND NON-USE OF CONTRACEPTIVES*

The populations of the developed and developing countries differ with respect to the relative importance of the principal determinants of fertility, which have been identified as the proportion married, contraceptive prevalence, the incidence of induced abortion and the duration of lactational amenorrhoea.[1] The focus here is the incidence and form of contraceptive practice, in most countries among married women only.

In the modern, industrial societies, couples tend to have a clear notion as to the number of children that they want; and the vast majority have the knowledge and means of ensuring that they shall not exceed that number. That fertility is more or less uniformly low in these societies attests to the general conformity of reproductive behaviour with family size preference. Conversely, in the more traditional, less industrialized societies, even when couples do have a preference in respect to family size—and, for a variety of reasons, many do not—they are very often unable or unwilling to take the steps required to realize their preference. A question of overriding importance is why preferences are not supported by behaviour.

Fertility is regulated either by natural means (abstinence, which may be for contraceptive or non-contraceptive reasons; sterility, nutrition, breast-feeding, post-partum ammenorrhoea etc.) or by the application of contraceptives, abortion or other birth control methods. Whether a couple or an individual resorts to the application of a birth control technique depends very often, but not invariably, upon the intensity of motivation to restrict births. Only couples or individuals who have as many as or more children than they want or who want more children but at intervals of some desired length can be expected consciously and deliberately to regulate their fertility. This study seeks to determine the prevalence of contraceptive use and to ascertain which factors, among a given set, influence whether contraception is practised and, if so, the type of method applied.

The data upon which this analysis is based were obtained in surveys conducted in 20 developing countries and in a few developed countries that are associated with the World Fertility Survey.

* Prepared by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat.

[1] John Bongaarts, "The fertility-inhibiting effects of the intermediate fertility variables", Center for Policy Studies Working Paper No. 57, New York, The Population Council, May 1980.

A. Characteristics of developing countries for which World Fertility Survey data are available

The World Fertility Survey data used in this study were obtained either from the First Country Reports[2] or from the data tapes that were available at the time. The discussion also covers, in less detail, the level of contraceptive use in developed countries that are associated with the World Fertility Survey and the trends in use in both developed and developing countries that are covered.

The developing countries for which World Fertility Survey data are currently (1981) available and the year of the survey are given below by major area:

(a) *Africa*: Kenya (1977);

(b) *Latin America*: Colombia (1976); Costa Rica (1976); Dominican Republic (1975); Guyana (1975); Jamaica (1975/76); Mexico (1976/77); Panama (1976); Peru (1977);

[2] Data referred to herein were taken from the following reports: Ministry of Health and Population Control, *Bangladesh Fertility Survey 1975—First Report* (Dacca, 1978); Corporación Centro Regional de Población, *Encuesta Nacional de Fecundidad Colombia 1976—Resultados generales* (Bogota, 1977); Dirección General de Estadística y Censos, *Encuesta Nacional de Fecundidad 1976, Costa Rica* (San José, 1978); Dominican Republic, Consejo Nacional de Población y Familia, *Encuesta Nacional de Fecundidad—Informe general* (Santo Domingo, 1976); Bureau of Statistics, *Fiji Fertility Survey 1974, Principal Report* (Suva, 1976); Ministry of Economic Development, Statistical Bureau, *Guyana Fertility Survey, 1975—Country Report*, vols. I and II (1979); Central Bureau of Statistics, *Indonesia Fertility Survey, 1976—Principal Report* (Jakarta, 1978); Department of Statistics, *Jamaica Fertility Survey, 1975/76, Country Report*, vols. I and II (Kingston, 1979); Department of Statistics, *Jordan Fertility Survey, 1976, Principal Report*, vols. I and II (Amman, 1979); Department of Statistics and National Family Planning Board, *Malaysian Fertility and Family Survey—First Report* (Kuala Lumpur, 1977); Secretaría de Programación y Presupuesto, *Encuesta Mexicana de Fecundidad, Primer informe national*, vols. I and II (Mexico, 1979); Ministry of Health, *Nepal Fertility Survey, 1976, First Report* (Kathmandu, 1977); Population Planning Council of Pakistan, *Pakistan Fertility Survey—First Report* (Lahore, 1976); Panama, Oficina de Estudios de Población, *Encuesta Nacional de Fecundidad, Informe general* (1977); Instituto Nacional de Planificación, *Encuesta National de Fecundidad de Peru, 1977–1978, Informe general* (Lima, Dirección General de Censos, Encuesta y Demografía, Dirección de Demografía, 1979); National Census and Statistics Office, University of the Philippines Population Institute, Commission on Population and National Economic and Development Authority, *Republic of the Philippines Fertility Survey 1978—First Report* (Manila, 1979); Republic of Korea, Economic Planning Board, National Bureau of Statistics; and Korean Institute for Family Planning, *The Korean National Fertility Survey—First Country Report* (Seoul, 1977); Ministry of Plan Implementation, Department of Census and Statistics, *World Fertility Survey—Sri Lanka, 1975, First Report* (Colombo, 1978); Chulalongkorn University, Institute of Population Studies; and National Statistical Office, Population Survey Division, *The Survey of Fertility in Thailand: Country Report No. 1*, vols. I and II (Bangkok, 1977).

(c) *East Asia*: Republic of Korea (1974);

(d) *South Asia*: Bangladesh (1976); Indonesia (1976); Jordan (1976); Malaysia (1974); Nepal (1976); Pakistan (1975); Philippines (1978); Sri Lanka (1975); Thailand (1975);

(e) *Oceania*: Fiji (1974).

Although these countries cannot be regarded as representative of all developing countries, the group does include countries of widely varying cultural and economic backgrounds. All of them were experiencing rapid population growth in the mid-1970s: the estimated rates of natural increase ranged from approximately 2 to over 3 per cent per annum.[3]

In some of the countries, a high level of mortality rather than a relatively low level of fertility currently modifies the rate of natural increase. For example, in Bangladesh, Indonesia, Nepal and Pakistan, life expectancy at birth is estimated to be under 50 years.[4] The group also include several countries where life expectancy at birth is 65 years or more: Costa Rica; Fiji; Jamaica; Malaysia;[5] Panama; and Sri Lanka.[6] In most of the countries considered in this discussion, evidence of a recent decline in fertility was found, although none had approached the low fertility levels of developed countries. In Bangladesh, Jordan, Nepal and Pakistan, there was no firm evidence of a decline in marital fertility; and it is possible that fertility has been increasing in Kenya. The total fertility rate for the 20 countries ranged from an estimated 8 children per woman in Kenya to approximately 3.5 children per woman in the Republic of Korea and Sri Lanka.[7]

The countries in each range of total fertility rates are listed below:

(a) *Six or more*: Bangladesh; Jordan; Kenya; Nepal; Pakistan; Peru;

(b) *From 5.0 to 5.9*: Dominican Republic; Mexico; Philippines; Thailand;

(c) *From 4.0 to 4.9*: Colombia; Fiji; Guyana; Indonesia; Malaysia;[8] Panama;

(d) *From 3.0 to 3.9*: Costa Rica; Jamaica; Republic of Korea; Sri Lanka.

B. Family planning policies and programmes

Of the 20 developing countries discussed in this analysis, 17 had an organized and Government-supported family planning programme at the time of the survey, although the amount of support provided and the duration of the programmes varied considerably. The classification[9] of the countries according to the support given to the programmes in 1977 is as follows:

(a) *Strong programme*: Costa Rica; Fiji; Indonesia; Jamaica; Philippines; Republic of Korea; Thailand;

(b) *Moderate programme*: Colombia; Dominican Republic; Malaysia; Mexico; Panama; Sri Lanka;

(c) *Weak programme*: Bangladesh; Kenya; Nepal; Pakistan;

(d) *No official programme*: Guyana; Jordan; Peru.

The lack of an official family planning programme did not necessarily mean that family planning services were unavailable to the population. None of the countries surveyed had a policy of limiting access to modern contraceptive methods. In Guyana, as there was no organized family planning programme, the contraceptive knowledge and use that existed were considered "essentially the result of personal effort on the part of women and their partners".[10] Regulations in Peru with respect to family planning underwent a change shortly before the survey was conducted: sterilization for contraceptive purposes was prohibited, as were organizations devoted exclusively to fertility control; family planning was required to be totally integrated with other health services.[11] A number of Government-supported clinics provided family planning services, but such services were not widely available in the period preceding the survey.[12] In Jordan, the Government supports the Jordan Family Planning and Protection Association, which is responsible for implementing family planning. A number of clinics offer services and contraceptive pills may be purchased at pharmacies without a prescription, but subsidized services are not readily available for most couples.[13]

As it has been demonstrated that family planning programmes have influenced the prevalence and pattern of contraceptive practice among women in some of these countries, the absence or presence, quality and age of a national programme should systematically be taken into account. For technical reasons, this course has not been followed for the present analysis. However, the classification presented above should be borne in mind as a possible explanation for some of the observed differences in contraceptive use among countries.

[3] *World Population Trends and Policies: 1979 Monitoring Report*, vol. I, *Population Trends*, (United Nations publication, Sales No. E.79.XIII.4), chap. II.

[4] For details, see chap. VI of the present report.

[5] Data only for Peninsular Malaysia.

[6] Most recent available year. Guyana probably should be included in the "low mortality" group; the most recent data-based estimate for Guyana dates from around 1970. See chaps. VI and XI in the present report.

[7] For details, see chap. II of the present report.

[8] Data only for Peninsular Malaysia.

[9] The data that contributed to the ratings are described in Robert J. Lapham and W. Parker Mauldin, "National family planning programs: review and evaluation", *Studies in Family Planning*, vol. 3, No. 3 (March 1972), pp. 29–52. The ratings are given in W. Parker Mauldin and Bernard Berelson, "Conditions of fertility decline in developing countries 1965–75", *Studies in Family Planning*, vol. 9, No. 5 (May 1978), p. 103. The programme strength was rated at roughly mid-decade for the period 1965–1975. A further elaboration by Mauldin and Berelson indicates that certain programmes were gaining strength over the decade and should be upgraded if an evaluation were made at the end of the decade under review.

[10] *Guyana Fertility Survey, 1975—Country Report*, vol. I, pp. 53–54.

[11] *Annual Review of Population Law 1978* (New York, United Nations Fund for Population Activities, 1979), p. 2.

[12] *Population Policy Compendium: Peru*, joint publication of the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat and the United Nations Fund for Population Activities (New York, 1979), p. 4.

[13] International Planned Parenthood Federation, *Family Planning in Five Continents* (London, 1979), p. 42.

C. Knowledge of contraception in developing countries

Knowledge of any method

Results of the World Fertility Survey show that the level of awareness of contraception was quite high in most of the countries surveyed to date (table 21). In 14 of the 20 developing countries for which information is available, at least 90 per cent of ever-married women of reproductive ages had heard of one or more methods; and in all but one country, Nepal, at least three fourths of the women had heard of a modern method. In all countries, the percentage of women who had heard of one or more of the modern[14] methods—sterilization, the pill, injectables, intra-uterine device (IUD), condom or other effective female methods (diaphragm, foam and other spermicides)—was almost as large as the percentage that had heard of any method.

Simple recognition of a method does not, of course, imply that the method can be used effectively. The more effective methods require regular supplies or expert medical attention; and many methods, including some of those which are less effective, require detailed instructions for proper use.

Knowledge of specific methods

The most widely recognized methods are the pill, IUD and female sterilization (table 21). In all but one country (Nepal), at least one half of the ever-married women interviewed knew about the pill; and in 14 of the 20 countries, at least three fourths of them recognized this method. Three fourths of the women recognized IUDs in 12 countries and three fourths knew about female sterilization in 10 countries. Male sterilization was less widely known (at least by women) than female sterilization, except in Nepal and the Republic of Korea. The other major male method (condom) was, with a few exceptions, less widely known than the major female methods. It is possible that there is a greater awareness of male methods among men, who were not interviewed, than among women.[15]

In all countries, the traditional methods (rhythm, withdrawal, abstinence, douche and other methods not listed by name in table 21) were relatively less widely recognized than the modern methods, probably a reflection of the influence of family planning programmes, which emphasize the modern methods. Rhythm and withdrawal were the most widely known of the traditional methods, but in only one country (Costa Rica) did as many as three fourths of the women recognize either of these methods.

It should be noted that, with a few exceptions, all the figures given in table 21 represent the level of knowledge after the interviewer described each method with a probe question, thereby possibly influencing greatly the apparent level of knowledge of all the specific methods, but especially of the traditional methods.[16] To the extent that those probe questions influenced the answers, some international incomparability was introduced.

It is of interest that in all the countries except Fiji, only a minority of the women reported knowing about abstinence, which, along with the relatively small number who knew of withdrawal, suggests " . . . that what is being measured is not simply a technical type of knowledge but rather an orientation to fertility regulation".[17]

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[14] For convenience in discussion, contraceptive methods are classified as modern — intra-uterine device (IUD), pill, injectables, sterilization, condom and female chemical and barrier methods (diaphragm form, jelly etc.) — and traditional, even though some of the "modern" methods have a long history and although there are some variants of the rhythm method that are of recent origin. (The two method groups are called "efficient" and "inefficient" in the First Country Reports of the World Fertility Survey.)The modern group includes the methods most frequently offered by family planning programmes, although few programmes make all these methods generally available.The modern methods are also distinguished by their requirements for supplies and/or medical attention and by their greater effectiveness in preventing accidental pregnancies. There are few measurements of rates of contraceptive failure in developing countries for methods other than IUD, the pill, injectables and sterilization. Studies of other methods, conducted primarily in developed countries, show wide variations in failure rates, depending at least in part upon the age and degree of motivation of the groups of users studied. It is quite possible that in some countries certain traditional methods, such as withdrawal, have lower failure rates than some modern methods, in particular, the condom and the female chemical and barrier methods. For reviews of effectiveness of various methods, see A. L. Southam, "Contraceptive methods: use, safety, and effectiveness", *Family Planning and Population Programs: A Review of World Development*, Bernard Berelson and others, eds., (Chicago, University of Chicago Press, 1966), pp. 385–386; Christopher Tietze, "The use-effectiveness of contraceptive methods", *Research in Family Planning*, Clyde V. Kiser, ed. (Princton, New Jersey, Princeton University Press, 1962), pp. 357–359; and the following issues of the Population Reports series published by Johns Hopkins University (Baltimore, Maryland): Malcolm Potts and others, *Advantages of Orals Outweigh Disadvantages*, Series A, No. 2 (March 1975); Phyllis T. Piotrow, Ward Rinehart and John C. Schmidt, *IUDS — Update on Safety, Effectiveness, and Research*, Series B, No. 3 (May 1979); Judith Wortman and P. T. Piotrow, *Laparoscopic Sterilization — A New Technique, Laparoscopic Sterilization II: What Are the Problems?*, and *Colpotomy — The Vaginal Approach*, Series C, Nos. 1–2 (March 1973) and No. 3 (June 1973) respectively; Judith Wortman, Jaroslav Hulba and P. T. Piotrow, *Laparoscopic Sterilization with Clips*, Series C, No. 4 (March 1974); Judith Wortman, *Female Sterilization by Mini-Laparotomy, Female Sterilization Using the Culdoscope* and *Tubal Sterilization — Review of Methods*, Series C, No. 5 (November 1974), No. 6 (May 1975) and No. 7 (May 1976), respectively; Alice Henry, Ward Rinehart and Phyllis T. Piotrow, *Reversing Female Sterilization*, Series C, No. 8 (September 1980); Judith Wortman, *Vasectomy — What Are the Problems?*, Series D, No. 2 (January 1975); Raymond Belsky and others, *Vaginal Contraceptives — Time for Reappraisal?*, Series H, No. 3 (January 1975); Judith Wortman, *Diaphragm and Other Intravaginal Barriers — A Review*, Series H, No. 4 (January 1976); Samuel Coleman and Phyllis T. Piotrow, *Spermicides—Simplicity and Safety Are Major Assets*, Series H, No. 5 (September 1979); Clara Ross and P. T. Piotrow, *Birth Control Without Contraceptives*, Series I, No. 1 (June 1974); Ward Rinehart and Jane Winter, *Injectable Progestogens — Officials Debate but Use Increases*, Series K, No. 1 (March 1975).

[15] This finding was true for Thailand, where both husbands and wives were interviewed. Husbands reported a higher level of knowledge of male sterilization and the condom than did wives, while wives more frequently recognized the pill, intra-uterine device and female sterilization. *The Survey of Fertility in Thailand: Country Report No. 1*, vol. II, table 6.2.1.

[16] See, for example, *World Fertility Survey — Sri Lanka, 1975, First Report*, p. 127, table 7.2. Knowledge of traditional methods was probably seriously underreported when probes were omitted. The following countries omitted certain probes:

(*a*) On injectables: Bangladesh, Jordan, Nepal, Panama, Philippines, Republic of Korea;

(*b*) On douche: Malaysia, Nepal;

(*c*) On abstinence: Dominican Republic, Nepal, Panama;

(*d*) On rhythm: Nepal.

(This information was not available for Kenya.) No probe questions were asked in the survey in Pakistan.

[17] *World Fertility Survey—Sri Lanka, 1975, First Report*, p. 125.

TABLE 21. PERCENTAGE OF EVER-MARRIED WOMEN WHO HAD HEARD OF SPECIFIC CONTRACEPTIVE METHODS, SELECTED WORLD FERTILITY SURVEY COUNTRIES

Major area and country	Number of women[a]	Any method	Any modern method[b]	Any traditional method[b]	Sterilization		Pill	Injectables	Intra-uterine device	Condom	Foam, diaphragm etc.	Rhythm	Withdrawal	Abstinence	Douche	Other
					Female	Male										
AFRICA																
Kenya[c]	8 100	88	84	...	54	14	74	55	49	40	20	50	25	45	12	2
LATIN AMERICA																
Colombia	3 302	96	95	74	72	38	90	71	82	60	56	56	47	28	41	9
Costa Rica[d]	3 037	100	100	91	94	67	98	88	92	91	71	81	67	31	60	7
Dominican Republic	2 256	98	98	75	95	30	——	92 ——	78	72	70	43	56	——	6	——
Guyana	3 616	95	95	71	78	22	78	38	79	73	45	46	48	32	36	10
Jamaica	2 765	98	98	78	88	40	95	87	85	90	67	39	59	38	43	3
Mexico	6 255	90	89	63	68	38	83	68	75	42	20	48	47	[e]	38	4
Panama[d]	3 203	99	98	86	93	64	95	26	89	76	56	66	61	35	62	4
Peru	5 639	82	78	69	60	19	63	61	42	40	31	55	40	24	47	11
EAST ASIA																
Republic of Korea	5 430	97	97	68	66	84	94	5	91	75	5	58	37	25	27	2
SOUTH ASIA																
Bangladesh	6 515	82	80	49	53	51	64	...	40	21	10	28	15	11	30	5
Indonesia	9 155	77	75	34	11	8	71	17	50	41	4	12	7	13	3	28
Jordan	3 611	97	97	81	79	19	96	...	76	51	21	50	54	33	20	55
Malaysia	6 318	92	90	61	——	73 ——	——	88 ——	40	52	26	38	30	30	...	21
Nepal	5 940	23	22	6	13	16	12	0	6	5	0	0	0	5	0	1
Pakistan	4 952	75	75	4	7	2	68	13	48	14	7	0	0	2	0	1
Philippines	9 268	94	94	79	75	70	90	...	86	88	40	66	65	36	21	4
Sri Lanka	6 808	91	90	56	82	38	79	43	62	51	11	44	20	31	9	3
Thailand	3 820	97	96	55	87	70	92	70	85	48	21	31	22	36	17	1
OCEANIA																
Fiji	4 928	100	100	87	96	40	98	50	97	83	41[f]	57	56	56	[f]	5

Sources: Data taken from the following World Fertility Survey reports: Ministry of Health and Population Control, *Bangladesh Fertility Survey, 1975—First Report* (Dacca, 1978); Corporación Centro Regional de Población *Encuesta Nacional de Fecundidad Colombia 1976—Resultados Generales* (Bogotá, 1977); Dirección General de Estadística, y Censos, *Encuesta Nacional de Fecundidad 1976, Costa Rica* (San Jose, 1978); Dominican Republic, Consejo Nacional de Población y Familia, *Encuesta Nacional de Fecundidad—Informe General* (Santo Domingo, 1976); Bureau of Statistics. *Fiji Fertility Survey 1974, Principal Report* (Suva, 1976); Ministry of Economic Development, Statistical Bureau, *Guyana Fertility Survey, 1975—Country Report, vols. I and II* (1979); Central Bureau of Statistics, *Indonesia Fertility Survey, 1976—Principal Report* (Jakarta, 1978); Department of Statistics, *Jamaica Fertility Survey, 1975/76, Country Report*, vols. I and II (Kingston, 1979); Department of Statistics, *Jordan Fertility Survey, 1976, Principal Report*, vols. I and II (Amman, 1979); Department of Statistics and National Family Planning Board, *Malaysian Fertility and Family Survey—First Report* (Kuala Lumpur, 1977); Secretaría de Programación y Presupuesto, *Encuesta Mexicana de Fecundidad, Primer Informe Nacional*, vols. I and II (Mexico, 1979); Ministry of Health, *Nepal Fertility Survey, 1976, First Report* (Kathmandu, 1977); Population Planning Council of Pakistan, *Pakistan Fertility Survey—First Report* (Lahore, 1976); Panama, Oficina de Estudios de Población, *Encuesta Nacional de Fecundidad, Informe General* (1977); Instituto Nacional de Planificación, *Encuesta Nacional de Fecundidad de Peru, 1977–1978, Informe General* (Lima, Dirección General de Censos, Encuesta y Demografía, Dirección de Demografía, 1979); National Census and Statistics Office, University of the Philippines Population Institute, Commission on Population and National Economic and Development Authority, *Republic of the Philippines Fertility Survey 1978—First Report* (Manila, 1979); Republic of Korea, Economic Planning Board, National Bureau of Statistics; and Korean Institute for Family Planning, *The Korean National Fertility Survey—First Country Report* (Seoul, 1977); Ministry of Plan Implementation, Department of Census and Statistics, *World Fertility Survey—Sri Lanka, 1975, First Report* (Colombo, 1978); Chulalongkorn University, Institute of Population Studies; and National Statistical Office, Population Survey Division, *The Survey of Fertility in Thailand: Country Report No. 1*, vols. I and II (Bangkok, 1977).

[a] Unless otherwise indicated, based on women aged under 50 years or 15–49 years ever married or in a union.

[b] Modern methods are sterilization, pill, injectables, intra-uterine device, condom and female vaginal methods (diaphragm, foam and other spermicides). Other methods are counted as traditional.

[c] Based on all women aged 15–50 years.

[d] Based on ages 20–49 years.

[e] Included with "other".

[f] Douche included with foam etc.

The proportion of women who recognized at least one traditional method tended to be higher in countries where knowledge of modern methods is widespread than in the other countries (table 21). In several, a fairly large fraction of women mentioned that they knew one or more methods in addition to those shown by name in table 21, including 55, 28 and 21 per cent, respectively, in Jordan, Indonesia and Malaysia. Except in Indonesia, such methods were mentioned spontaneously.[18] For most of the countries, there is no detailed information as to other methods that women mentioned. Among the three countries, herbal medicines were mentioned most frequently in Malaysia.[19] It is likely that many of these medicines, if they have any effect on reproduction, act as abortifacients rather than as contraceptives.

Knowledge of a place to obtain contraceptive services and supplies

In the nine countries for which the information is available, relatively fewer women knew of a contraceptive outlet than recognized a contraceptive method (table 22). Although three fourths or more of married women had heard of one of the modern methods in eight of the nine countries, it is only in three countries (Costa Rica, Malaysia and Republic of Korea) that an equal proportion of the women knew of a place to obtain services.

In several countries, the difference between knowledge of a modern method and knowledge of a place where one could be obtained was very large. For example, in Nepal Pakistan and Kenya, relative numbers of currently married women who knew of at least one modern method were, respectively, 22, 75 and 88 per cent, while only 6, 32 and 42 per cent, respectively, knew of an outlet, suggesting that low levels of use might have been influenced to some extent by an inability to obtain supplies, service and information.

Information for three countries of Asia and two countries of Latin America suggests that women with little education and those who live in rural areas are usually less likely than others to know of a family planning outlet.[20] The data, adapted from a recent analysis, show that in all five countries studied, there was a regular and strong increase with education in the likelihood that a woman would know of an outlet, before or after control statistically for the other variables (table 23). In four of the five countries, 88–95 per cent of the women with post-secondary education knew of an outlet, while the proportion of women with no education who knew of an outlet ranged from 40 to 80 per cent. In Nepal, there was also a strong differential, but the level of knowledge was relatively low in all educational groups. The inter-country differences in knowledge in rural and urban areas are related to activities of the family planning programmes in those countries. Where the programme is regarded as strong (as in Costa Rica and the Republic of Korea) or where there has been considerable emphasis within the programme on serving rural areas (Malaysia), rural women are nearly as likely as urban women to know of an outlet. In Colombia and Nepal, where programme services have been concentrated in urban areas, urban women are much more likely than rural women to know of an outlet. The findings attest to the importance of service/supply outlets for contraceptive practice in these countries.[21]

TABLE 22. PERCENTAGE OF CURRENTLY MARRIED WOMEN WHO HAD HEARD OF AN EFFICIENT METHOD OF CONTRACEPTION AND PERCENTAGE WHO KNEW OF A FAMILY PLANNING OUTLET, SELECTED WORLD FERTILITY SURVEY COUNTRIES

Country	*Women who had heard of an efficient method*[a] *(percentage)*	*Women who knew of an outlet*
Colombia	96	66
Costa Rica[b]	100[c]	89
Indonesia	80	53
Kenya	88[d]	42[e]
Malaysia	90[c]	77
Nepal	22[c]	6
Pakistan	75	32
Panama[b]	99	72
Republic of Korea	98	86

Sources: Unless otherwise noted, percentages are taken from the World Fertility Survey reports cited in table 21 or from data tapes. For Costa Rica, Malaysia and Nepal, data on women who knew of an outlet taken from G. Rodriguez, "Family planning availability and contraceptive practice", *Family Planning Perspectives*, vol. 11, No. 1 (January/February 1979), p. 53, table 1.

NOTE: Percentages based on currently married women aged 15–49 years or under age 50, except as indicated.

[a] Sterilization, pill, injectables, intra-uterine device, condom, diaphragm, foam and other spermicides.

[b] Ages 20–49 years.

[c] Based on ever-married women.

[d] Based on all women aged 15–50 years.

[e] Based on ever-married women aged 15–50 years.

D. LEVELS OF AND TRENDS IN CONTRACEPTIVE USE

This section discusses and provides data for the levels of contraceptive use and the type of method used at the

[18] In Fiji, in addition to the methods listed in table 21, women were asked if they had heard of breast-feeding being practised for contraceptive reasons; 50 per cent of ever-married women responded that they had. *Fiji Fertility Survey 1974, Principal Report*, table H1.

[19] Other traditional methods mentioned in Malaysia included massaging of the uterus, exercise immediately after intercourse and ceremonies involving incantations and the eating of special foods. *Malaysian Fertility and Family Survey—First Report*, p. 130. In Indonesia, the other methods were primarily herbal medicines, massage of the uterus and "uterus inversion". *Indonesia Fertility Survey, 1976—Principal Report*, p. 39.

[20] G. Rodriguez, "Family planning availability and contraceptive practice", *Family Planning Perspectives*, vol. 11, No. 1 (January/February 1979), pp. 51–71.

[21] John Stoeckel, "Differentials in fertility, family planning, and family size values in South Korea, 1965–1971", *Studies in Family Planning*, vol. 6, No. 11 (November 1975), p. 378 (data refer to the Republic of Korea); Ronald Freedman and Bernard Berelson, "The record of family planning programs", *Studies in Family Planning*, vol. 7, No. 1 (January 1976), pp. 22 and 26; and United Nations Fund for Population Activities, *Malaysia: Report of Mission on Needs Assessment for Population Assistance*, report No. 10 (New York, 1979); and *Nepal: Report of Mission on Needs Assessment for Population Assistance*, report No. 21 (New York, 1979). In some countries, including Nepal, some services are provided by mobile workers or teams, so that there may be no fixed outlet in many areas that receive some services.

TABLE 23. PERCENTAGE OF CURRENTLY MARRIED WOMEN WHO KNEW OF A FAMILY PLANNING OUTLET, BY EDUCATION AND TYPE OF PLACE OF RESIDENCE, SELECTED WORLD FERTILITY SURVEY COUNTRIES

	Percentage who knew of an outlet							
		Level of education				*Type of place of residence*		
							Urban	
Country	*Total*	*None*	*Primary*	*Secondary*	*Higher*	*City*	*Town*	*Rural*
Colombia								
Unadjusted percentage	66	36	66	90	93		79	43
Adjusted percentage[a]	66	42	66	83	87		88	42
Costa Rica								
Unadjusted percentage	89	68	88	93	95		92	85
Adjusted percentage[a]	89	71	89	92	94		93	85
Malaysia								
Unadjusted percentage	77	62	84	90	90	80	83	75
Adjusted percentage[a]	77	66	81	89	91	80	82	75
Nepal								
Unadjusted percentage	6	4	30	48	...		38	5
Adjusted percentage[a]	6	5	29	38	...		37	5
Republic of Korea								
Unadjusted percentage	86	76	87	91	88	87	83	85
Adjusted percentage[a]	86	77	86	93	91	87	83	85

Source: Adapted from G. Rodriguez, "Family planning availability and contraceptive practice", *Family Planning Perspectives*, vol. 11, No. 1 (January/February 1979), p. 54, tables 2 and 2A.

[a] Education percentages adjusted using analysis of covariance for years since first marriage, number of living children and type of place of residence. Percentages for type of place of residence adjusted for years since first marriage and number of living children.

time of the World Fertility Survey; and, where roughly comparable survey information was available, use over time. Contraceptive use at the time of the survey is discussed first.

Levels of ever-use and current use of contraception

Among the developing countries for which data are available, contraceptive use is, on the average, highest in the countries of Latin America (see table 24). In the countries of Asia and Oceania, from 4 per cent (Nepal) to 69 per cent (Fiji) of currently married women of reproductive ages had used contraception at some time. In Latin America, the range is smaller, from 47 (Mexico) to 84 per cent (Costa Rica). In Asia and Oceania, the percentage using contraception at the time of the survey ranged from 2 (Nepal) to 41 (Fiji); in Latin America, it varied from 30 (Mexico) to 64 (Costa Rica). Preliminary data are available for one country of Africa—Kenya. Although approximately one third of ever-married Kenyan women aged 15–50 years had used contraception at some time, only 7 per cent of the currently married women were using at the time of the survey.

Among the countries of Asia included in the study there are three—Bangladesh, Nepal and Pakistan—in which 15 per cent or fewer of the married women had ever used contraception and less than 10 per cent were currently using. These countries are clearly separated, in their level of use, from the other Asian countries; in Indonesia, the country shown in table 24 to have the next lowest level of use, about one fourth of the married women were currently using. The level of use in two of the countries of Latin America, Costa Rica and Panama, is within or near the range observed among the developed countries.

Available data for developed countries affiliated with the World Fertility Survey are also shown in table 24. It should be mentioned that because no attempt was made to utilize a common or very similar questionnaire or to have conformity with respect to the age and marital-status categories of the women interviewed, the data on contraceptive use vary among the developed countries much more than among the developing countries[22] and further limit the precision of comparisons among the developed countries or between the developed and developing countries.[23]

In the developed countries represented in table 24, excluding Romania, from approximately two thirds to three fourths of the sexually active or married women of reproductive age were using contraception. The percentages at the time of the survey ranged from 57 (Romania) to 79 (France).[24] It is reported that contraceptive use is somewhat less prevalent among married women in Spain, with only 47 per cent using a method in

[22] See notes to table 24.

[23] Incomparabilities due solely to differences in sample composition can be reduced by producing special tabulations and applying techniques of standardization. For many of the developed countries, the requisite data were not available at the time of writing. However, the Economic Commission for Europe is undertaking a comparative analysis of the surveys for developed countries.

[24] For more precise definitions of the base populations for these figures, see notes to table 24.

TABLE 24. LEVELS OF AND TRENDS IN KNOWLEDGE, EVER-USE AND CURRENT USE OF CONTRACEPTION, SELECTED WORLD FERTILITY SURVEY COUNTRIES

Major area and country	World Fertility Survey report	Year of survey	Currently married women[a]				Exposed women[b]	
			Number	Percentage who: Knew a method	Had used a method	Were currently using	Number	Percentage using
A. Developing countries								
AFRICA								
Kenya	X	1977	...	88[c]	32[d]	7	4 217	9
LATIN AMERICA								
Colombia								
Urban		1969	...	65[e]	...	45	...	...
Rural		1969	...	36[e]	...	15	...	...
Urban	X	1976	...			54		
Rural	X	1976	...			32		
	X	1976	2 827	96	62	43	2 323	52
		1978	2 086	94[e]	62	46	1 871	52
Costa Rica	X	1976[f]	2 699[g]	100[d]	84	64	2 222	78
		1978	2 037[g]	...	83	64	1 708	76
Dominican Republic	X	1975	1 842[g]	97[d]	49	31	1 378	41
Guyana	X	1975	3 216	96	55	32	2 735	38
Jamaica	X	1976/77	2 302[g]	98[d]	66	38	1 939	45
Mexico	X	1977	5 659[g]	90	47	30	4 107	42
		1978	2 855	94	65	40	1 975	56
Panama		1974[h]	...	...	...	31[h]	...	...
	X	1976[f]	2 723	99	75	54	2 257	65
Peru	X	1977	5 060	82	50	31	3 853	41
EAST ASIA								
Republic of Korea		1971[h]	4 949	...	...	25	...	...
	X	1974	5 062	98	59	35	3 866	46
		1978[i]	...	...	...	49		...
SOUTH ASIA								
Bangladesh	X	1976	5 762	83	15	8	4 645	10
Indonesia		1973[h]	...	56	12	10	...	...
	X	1976	7 880	80	38	26	5 638	37
Jordan		1972	4 938	94[d]	49[d]	22	...	...
	X	1976	3 458	97	46	25	2 337	37
Malaysia		1966/67[h]	...	...	...	9	...	...
	X	1974	5 811[g]	92[d]	50	33	4 487	42
Nepal		1976	5 502[g]	22[d]	4	2	4 325	3
Pakistan		1968	2 910	97	12	6	...	...
	X	1975	4 667	75	10	5	3 334	7
Philippines		1968[h]	...	63	19	16	...	...
	X	1978	8 866[g]	94[d]	58	36	6 684	48
Sri Lanka	X	1975	6 159	92	45	32	4 709	41
Thailand		1969/70[h]	...	...	...	15	...	...
	X	1975	3 517	97	48	33	2 569	45
OCEANIA								
Fiji	X	1974	4 658[g]	100[d]	69	40	3 314	56[j]
B. Developed countries								
NORTHERN AMERICA								
United States of America		1973[h]	7 566	...	...	70	...	82
	X	1976[h]	6 414	...	...	68	...	83
EAST ASIA								
Japan[k]		1950	5 579	...	...	20	...	...
		1965	3 140	...	...	56	...	...
	X	1974	2 519	100	78	67	...	...
EUROPE								
Czechoslovakia		1970[l]	2 548	91	...	66	...	...
	X	1977[m]	3 041	96	...	...	...	88[n]
Denmark		1970[l,o]	2 397	99	88	67[p]	...	84[q]
	X	1979	...	...	...	...	3 292	76[q]
France		1972[l,r]	2 434	100	73	64	...	71
	X	1978[s]	...	...	...	79	...	88

TABLE 24 (*continued*)

Major area and country	World Fertility Survey report	Year of survey	Currently married women[a] Number	Percentage who: Knew a method	Had used a method	Were currently using	Exposed women[b] Number	Percentage using
B. *Developed countries* (continued)								
Hungary[l,t]		1966	6 094	...	...	67	5 591	73
	X	1977	4 011	...	...	73	3 626	81
Netherlands		1969[l,u]	...	...	...	59	...	...
	X	1975[v]	4 364	...	89	73	3 900	82
Norway	X	1977	3 941[w]	...	90[w]	...	...	84[l,x]
Romania	X	1978[y]	10 141	86	...	57	8 554	65[z]
United Kingdom[aa]		1967/68[l,bb]	1 631	...	88	67	...	...
	X	1976	1 718[cc]	...	...	72	...	81

Sources: Unless otherwise stated, data are from the World Fertility Survey First Country Reports cited in table 21 and/or tapes. When data from those reports were used for a year other than the World Fertility Survey year indicated, the report is cited below with the other sources (in order of country listing in the table):

Colombia, 1969 and 1978: Corporación Regional de Población, *Encuesta Nacional de Prevalencia de Uso de Anticoncepción, Colombia, 1978* (Bogotá, 1979), pp. 52, 60 and 65; tables 5.5, 6.6 and 6.13.

Costa Rica, 1978: Dirección General de Estadística y Censos, *Informe de la Encuesta Nacional de Uso de Anticonceptivos, Costa Rica, 1978* (San Jose; 1978), pp. 50 and 51, tables 7.2 and 7.3.

Mexico, 1978: Coordinación del Programa Nacional de Planificación Familiar, *Encuesta Nacional de Prevalencia en el Uso de Métodos Anticonceptivos: Informe de resultados* (Mexico, D.F., 1979), pp. 99 and 103, table 5.1 and 5.4; and Raúl Rodríguez-Barocio and others, "Fertility and family planning in Mexico", *International Family Planning Perspectives*, vol. 6, No. 1 (March 1980), p. 6, table 5.

Panama, 1974: R. W. Rochat and others, "Using contraceptive prevalence surveys to study the demographic impact of contraceptive sterilization in Latin America", paper presented at the International Union for the Scientific Study of Population Workshop on Methodological Aspects of Contraceptive Sterilization, Atlanta, Georgia, Center for Disease Control, 1979.

Republic of Korea: For 1971, *The Korean National Fertility Survey, 1974—First Country Report*, p. 122, table 69; for 1978, Dorothy L. Nortman and Ellen Hofstatter, *Population and Family Planning Programs*, 10th ed., A Population Council Fact Book (New York, The Population Council, 1980), table 21.

Indonesia, 1973: Jeanne Cairns Sinquefield and Bamtong Sungkono, "Fertility and family planning trends in Java and Bali", *International Family Planning Perspectives*, vol. 5, No. 2 (June 1979), pp. 49–51 and table 9.

Jordan, 1972: Department of Statistics, *National Fertility Survey in Jordan 1972* (Amman, 1976), pp. 80, 114 and 128; tables 33, 51 and 58.

Malaysia, 1966/67: Malaysian Fertility and Family Survey—First Report, p. 143, table 8.11.

Pakistan, 1968: Nasra M. Shah, "Past and current contraceptive use in Pakistan", *Studies in Family Planning*, vol. 10, No. 5 (May 1979), p. 166, tables 1 and 2.

Philippines, 1968: Mercedes B. Concepción and P. C. Smith, *The Demographic Situation in the Philippines: An Assessment in 1977*, Papers of the East-West Population Institute, No. 44 (Honolulu, Hawaii, East-West Center, 1977), p. 34, table 9.

Thailand, 1969/70: Nibhon Debavalya and John Knodel, *Fertility Transition in Thailand: A Comparative Analysis of Survey Data* (Bangkok, National Statistical Office and Chulalongkorn University, 1978), p. 13, table 8.

United States of America, 1973 and 1976: Kathleen Ford, "Contraceptive use in the United States, 1973–1976", *Family Planning Perspectives*, vol. 10, No. 5 (September/October 1978), p. 265, table 1.

Japan: for 1950 and 1965, Y. Okazaki, "Knowledge, attitudes and practice of family planning", *Fertility and Family Planning in Japan* (Tokyo, Japanese Organization for International Cooperation in Family Planning, 1977), p. 120, table 1; for 1975, World Fertility Survey, *The 1974 Japan National Fertility Survey: A Summary of Findings*, Summary Reports, No. 14 (Voorburg, The Hague, International Statistical Institute, 1979), p. 2; and p. 8, table 10.

Czechoslovakia: for 1970, *Fertility and Family Planning in Europe Around 1970: A Comparative Study of Twelve National Surveys* (United Nations publication, Sales No. E.76.XIII.2), pp. 7, 11, 21, and 151; tables 1, 4, 8 and 124; for 1977, Federální Statistizky Úrad, *Setreni Plodnosti* (Prague, 1979), pp. XIV and 16, tables 16 and 35.

Denmark: for 1970, *Fertility and Family Planning in Europe Around 1970*, pp. 7, 11, 21 and 151; tables 1, 4, 8 and 124; for 1975, Gert Schmidt, "Use of contraceptives in 1975 among Danish women 18–49 years", *The Fifth Scandinavian Demographic Symposium* (Oslo, The Scandinavian Demographic Society, 1979), p. 248, table 3.

France: for 1972, *Fertility and Family Planning in Europe Around 1970*, pp. 7, 11, 21 and 151; tables 1, 4, 8 and 124; for 1978, Henri Léridon, "Contraceptive practice in France in 1978", *International Family Planning Perspectives*, vol. 5, No. 1 (March 1979), p. 26, table 1.

Hungary, 1966 and 1977: Federal Statistical Office, *Main Results of the 1977 Hungarian Fertility, Family Planning and Birth Control Study*, TCS-77 (Budapest, 1979), pp. 96–99, tables 16.1 and 16.2.

Netherlands: for 1969, *Fertility and Family Planning in Europe Around 1970*, pp. 7, 11, 21 and 151; tables 1, 4, 8 and 124; for 1975, H. G. Moors and others, *Nationaal Onderzoek Vruchtbaarheid en Ouderschapsmotivatie, Erste Resultaten* (National Survey on Fertility and Parenthood Motivation, First Results) (Voorburg, The Hague, Nederlands. Interuniversitair Demografisch Institut, 1976), tables 2.2 and 2.51.

Norway, 1977: Turid Noack and Lars Østby, "Some results from the Norwegian fertility survey 1977", *The Fifth Scandinavian Demographic Symposium*, p. 222, table 4.

Romania, 1978: data supplied by the Government of Romania.

United Kingdom: for 1967/68, C. M. Langford, *Birth Control Practice and Marital Fertility in Great Britain* (London, London School of Economics, 1976), pp. 7 and 32, table 4.4; for 1976, "Widespread contraceptive use found in Britain; condom popular; two-child families preferred", *Family Planning Perspectives*, vol. 12, No. 2 (March/April 1980), p. 109, table 1.

[a] For currently married women, percentages calculated on basis of women currently married or in a union, aged 15–49 years, unless otherwise specified.

[b] For exposed women, percentages calculated on basis of women aged under 50 years, married or in a union, excluding those currently pregnant or infecund (but including those sterilized for contraceptive purposes), unless otherwise specified.

[c] Percentage calculated on basis of all women aged 15–50 years.

[d] Percentages calculated on basis of ever-married women.

[e] Percentages calculated on basis of all women aged 15–49 years.

[f] For age group 20–49.

[g] Including currently pregnant women who were not currently married, if any.

[h] For age group 15–44.

[i] For age group 20–44.

[j] Excluding women who were practising post-partum abstinence.

[k] Figures for 1960 and 1965 taken from a long series of surveys conducted by the Mainichi newspaper. The 1975 survey in this series shows a level of use somewhat lower than the World Fertility Survey in 1974 (61 versus 67 per cent); this variation is probably the result of different methods of posing the questions.

[l] Contraceptive use figures excluding sterilization.

[m] For women aged 18–44 years, in first marriage.

[n] Percentage of fecund non-pregnant women who normally used a method.

[*table notes continued on next page*]

1977.[25] When pregnant and involuntarily infecund women are excluded, table 24 shows that 76–88 per cent of such "exposed" women in the developed countries are seen to have been using contraception (in Romania, 65 per cent).

The women who were not using contraception included, along with those who were pregnant and those who believed themselves infecund, women who wished to have another child soon. In France, Hungary, Norway and the United States of America, 3, 12, 7 and 9 per cent, respectively, of "exposed" women (3–11 per cent of married women) were not using a method even though they were not trying to become pregnant and they believed themselves fecund.[26]

In the developed countries and the developing countries (excluding Kenya) for which an assessment could be made, a very large proportion of ever-users were currently using at the time of the survey.[27] Among the developing countries (excluding Kenya), the percentage of currently married women who had ever used contraception correlates almost perfectly with the percentage currently using ($r = 0.94$). Thus, because the time reference of current use may be somewhat more accurately measured than ever-use, the remainder of this discussion focuses on current use.

Trends in contraceptive use

For several of the developing countries and most of the developed countries under discussion, other surveys conducted before or after the World Fertility Survey permit an examination of trends in the level of contraceptive use.[28] These figures show a rapid increase in the level of use between the late 1960s and the mid-1970s in Colombia, Malaysia, the Philippines, the Republic of Korea and Thailand. The percentage of currently married women who were using contraception more than doubled (beginning from low levels) in a period of less than 10 years in Malaysia, the Philippines and Thailand; and it approximately doubled in the Republic of Korea between 1971 and 1978. Surveys taken in Mexico at an interval of roughly two years show that contraceptive use had increased markedly, from 30 to 40 per cent. However, some part of the difference in findings between the two surveys may be attributable to sampling error or to differences in survey coverage and procedures.

In contrast, surveys in Costa Rica, Jordan and Pakistan reveal little if any change in the level of use. The surveys in Costa Rica were conducted only two years apart and the level of use was already quite high at the time of the earlier survey. In Pakistan, however, the methodology of the two surveys differed in a way that probably led to an understatement of use at the later date.[29] There may have been a modest increase in contraceptive use in Pakistan, but there is no reason to suppose that the increase has been as dramatic as that recorded in some other countries of Asia. The reported level of contraceptive use in Jordan increased only slightly between 1972 and 1976.

In most of the developed countries represented in table 24, some increase in the level of contraceptive use occurred during the 1970s. In Japan, for which results of a 1950 survey are also shown, there was a dramatic and sustained increase in use over time until, in the mid-1970s, the level of use was close to that found in the United States of America and in many European countries. In most developed countries, however, the level of use, already quite high in the late 1960s or early 1970s, was approaching or might have reached a ceiling. As mentioned earlier,

[25] Henri Léridon, "Les facteurs de la fécondité dans les pays developpés", paper presented to the World Fertility Survey Conference, London, 7–11 July 1980, p. 25.

[26] Henri Léridon, "Contraceptive use in France in 1978", *International Family Planning Perspectives*, vol. 5, No. 1 (March 1979), p. 26, table 2; Hungary, Federal Statistical Office, *Main Results of the 1977 Hungarian Fertility, Family Planning and Birth Control Study*, TCS-77 (Budapest, 1979), pp. 96–97, tables 16.1 and 16.2; Turid Noack and Lars Østby, "Some results from the Norwegian fertility survey 1977", *The Fifth Scandinavian Demographic Symposium* (Oslo, The Scandinavian Demographic Society, 1979), p. 222, table 4 and Kathleene Ford, "Contraceptive use in the United States, 1973–1976", *Family Planning Perspectives*, vol. 10, No. 5 (September/October 1978), p. 265, table 1.

[27] This comparison is made for results from World Fertility Survey data only.

[28] This comparison is restricted to countries for which World Fertility Survey data are available. Figures shown in tables 24 and 25 are taken from surveys that were judged roughly comparable to the World Fertility Survey. For estimates derived from surveys and other sources, cf. Dorothy L. Nortman and Ellen Hofstatter, *Population and Family Planning Programs*, 10th ed., A Population Council Fact Book (New York, The Population Council, 1980), table 21. Differences between successive surveys in question wording, in training of interviewers and in other interviewing conditions may have affected the estimates of changes over time in the level of use of contraception and in the types of methods used. In particular, the level of use of traditional methods appears to be much lower if these methods were mentioned spontaneously by the interviewer than if "probe" questions were introduced. Differences in question wording were judged not to affect the general impression of time trends that these tables convey, but the figures should be treated with caution.

[29] Nasra M. Shah, "Past and current contraceptive use in Pakistan", *Studies in Family Planning*, vol. 10, No. 5 (May 1979), pp. 164–173.

[*table notes continued from previous page*]

[o] Excluding oentral municipalities of Copenhagen.

[p] Had used a method during the previous two months.

[q] Had used a method during the previous two months, based on currently married or cohabiting women who could have become pregnant during that period.

[r] Percentages calculated on basis of ever-married women aged under 45 years.

[s] Percentages calculated on basis of currently married and sexually active unmarried women aged 20–44 years.

[t] Percentages calculated on basis of currently married women aged 15–39 years.

[u] Percentages calculated on basis of women in marriage cohorts of 1958 and 1963, aged under 45 years at marriage, in first marriage.

[v] Percentages calculated on basis of women from marriage cohorts of 1963–1973 in first marriage.

[w] Percentages calculated on basis of women aged 18–44 years who had ever had intercourse.

[x] Percentage who had used contraception at least once in the previous four weeks, based on fecund non-pregnant women who had had intercourse at least once in the previous four weeks.

[y] Percentages calculated on basis of women in first marriage.

[z] Including women who were uncertain whether they were fecund.

[aa] Excluding Northern Ireland.

[bb] Based on women married between 1941 and 1965, in first marriage and aged under 35 years at marriage.

[cc] For age group 16–49.

TABLE 25. PERCENTAGE DISTRIBUTION OF CURRENT CONTRACEPTIVE USERS, BY METHOD USED, SELECTED WORLD FERTILITY SURVEY COUNTRIES

Major area and country	World Fertility Survey report	Year of survey	Total users[b]	Modern method[b]	Sterilization: Female	Sterilization: Male	Pill	Injectables	Intra-uterine device	Condom	Diaphragm, foam, etc[c]	Rhythm	Withdrawal	Abstinence	Douche	Other
A. *Developing countries*																
LATIN AMERICA																
Colombia																
Urban		1969	100	51	4	0	22	0	11	7	7	16	24	...	—	9
Rural		1969	100	40	7	0	13	0	7	7	7	20	33	...	—	7
	X	1976	100	72	9	0	31	1	20	4	5	12	11	2	1	2
		1978	100	81	16	0	37	[d]	17	3	8	9	[e]	...	—	10
Costa Rica	X	1976	100	83	19	2	35	3	8	14	3	8	7	1	0	0
		1978	100	86	22	1	37	3	7	14	2	8	6	...	—	1
Dominican Republic	X	1975	100	84	38	0	26		9	5	7	4	11	...	...	1
Guyana	X	1975	100	90	27	0	29	1	18	9	6	3	4	2	0	1
Jamaica	X	1975/76	100	94	21	0	31	16	5	17	4	1	4	1	0	0
Mexico	X	1976/77	100	77	9	1	36	6	19	2	5	10	12	...	1	0
		1978	100[f]	83	18	0	35	7	16	3	4	7	7	...	—	3
Panama	X	1976	100[g]	85	39	1	32	1	7	2	3	5	6	3	1	1
Peru	X	1977	100	36	9	0	13	3	4	3	3	35	10	7	11	2
EAST ASIA																
Republic of Korea		1971	100[h]	...	—	12	30	0	28	14				17		
	X	1974	100	77	5	9	24	1	23	15	1	13	7	1	1	0
		1978	100[i]	...	22	11	13		20					34		
SOUTH ASIA																
Bangladesh	X	1976	100	61	4	6	35	0	6	9	0	13	7	15	1	3
Indonesia	X	1976	100	87	1	0	56	1	21	7	0	3	1	4	0	5
Jordan		1972	100[j]	...	—	4	63	...	4	5	8	10	14	3	5	...
	X	1976	100	69	7	0	47	...	8	6	1	8	13	1	0	8
Malaysia		1966/67	100[k]	...	[e]	[e]	46		2	9	2				40	
	X	1974	100	72	10	1	49		2	9	1	11	6	5	6	
Nepal	X	1976	100	98	3	65	17	0	3	9	0	0	0	2	0	0
Pakistan	X	1975	100	72	18	1	18	0	12	19	3	2	2	22	0	2
Philippines		1968	100	17	—	1	9	0	3	3	1	32	47	...	2	2
	X	1978	100	45	13	2	13	0	6	10	0	24	26	5	0	0
Sri Lanka	X	1975	100	59	—	31	5	1	15	7	0	25	5	11	0	0
Thailand	X	1975	100	92	19	6	41	6	18	1	0	3	3	2	0	1
OCEANIA																
Fiji	X	1974	100[l]	86	—	39	20	...	11	15	[e]	6	6	—	3	—
B. *Developed countries*																
NORTHERN AMERICA																
United States of America[k]		1973	100	91	12	11	36	—	10	14	8	4	2	...	1	2
	X	1976	100	89	14	14	33	—	9	11	9	5	3	...	1	1
EAST ASIA																
Japan		1950	100[j]	...	...	...	0	—	0	36	[m]	27	13	—	9	—
		1965	100[j]	...	—	6	0	—	4	65	[n]	39	10	—	2	—
	X	1974[o]	100[p]	86	...	...	2	—	7	75	2	7	4	0	3	—

TABLE 25 (*continued*)

Major area and country	World Fertility Survey report	Year of survey	Total users[a]	Modern method[b]	Sterilization: Female	Sterilization: Male	Pill	Injectables	Intra-uterine device	Condom	Diaphragm, foam, etc[c]	Rhythm	Withdrawal	Abstinence	Douche	Other
							B. *Developed countries* (continued)									
EUROPE																
Czechoslovakia[q]		1970	100[p]	35	...	...	4	—	14	19	...	3	52	...	—— 8 ——	
	X	1977[r]	100[j,p]	...	...	...	17	—	25	20	1	12	52	2	...	...
Denmark[s]		1970	100[p,t]	80	...	...	37	—	4	30	9	2	7	...	—— 11 ——	
	X	1975	100[p,u]	93	...	...	39	—	13	33	7	——	——	7	——	——
France		1972	100[p,v]	32	...	...	17	—	2	12	1	14	52	...	—— 2 ——	
	X	1978	100[w]	64	—— 6 ——		39	—	12	7	[e]	8	25	...	—— 3 ——	
Hungary[x]		1966	100[p]	27	...	...	0	—	0	17	10	4	63	...	5	1
	X	1977	100[p]	71	...	...	49	—	13	6	2	4	23	...	1	1
Netherlands		1969	100[p,y]	71	...	...	45	—	1	23	2	19	9	...	—— 1 ——	
	X	1975	100[z]	92	3	3	66	—	6	14	1	4	3	...	—— 1 ——	
Norway	X	1977	100[p,aa]	...	...	...	23	—	39	25	2	7	11	...	...	...
Romania	X	1978	100[j,p,bb]	9	...	...	1	—	0	6	2	[cc]	43	...	7	0
United Kingdom[dd]		1967/68[ee]	100[j]	...	...	...	16	—	2	47	18[ff]	6	31	...	—— 2 ——	
	X	1976	100[j]	...	10	10	33	—	8	26	2	...	9	...	—— 3 ——	

Sources: Unless otherwise stated, data are from the World Fertility Survey First Country Reports cited in table 21 and data tapes. When data from those reports were used for a year other than the World Fertility Survey year indicated, the report is cited below with the other sources (in order of country listing in the table):

Colombia, 1969 and 1978: Corporación Regional de Población, *Encuesta Nacional de Prevalencia de Uso de Anticoncepción, Colombia, 1978* (Bogotá, 1979), p. 65, table 6.13.

Costa Rica, 1978: Dirección General de Estadística y Censos, *Informe de la Encuesta Nacional de Uso de Anticonceptivos, Costa Rica, 1978* (San Jose, 1978), p. 55, table 7.6.

Mexico, 1978: Coordinación del Programa Nacional de Planificación Familiar, *Encuesta Nacional de Prevalencia en el Uso de Métodos Anticonceptivos: Informe de resultados* (Mexico, D.F., 1979), p. 102, table 5.3.

Republic of Korea: for 1971, *Factors Affecting the Use and Non-use of Contraception: Findings from a Comparative Analysis of Selected KAP Surveys* (United Nations publication, Sales No. E.79.XIII.6), p. 52, table 6; for 1978, Dorothy L. Nortman and Ellen Hofstatter, *Population and Family Planning Programs*, 10th ed., A Population Council Fact Book (New York, The Population Council, 1980), table 21.

Jordan, 1972: Department of Statistics, *National Fertility Survey in Jordan 1972* (Amman, 1976), pp. 123 and 128; tables 56 and 58.

Malaysia, 1966/67: *Malaysian Fertility and Family Survey—First Report*, p. 143, table 8.11.

Philippines, 1968: data supplied by the Government of the Philippines.

United States of America, 1973 and 1976: Kathleen Ford, "Contraceptive use in the United States, 1973–1976", *Family Planning Perspectives*, vol. 10, No. 5 (September/October 1978), p. 265, table 1.

Japan: for 1950 and 1965, Y. Okazaki, "Knowledge, attitudes and practice of family planning", *Fertility and Family Planning in Japan* (Tokyo, Japanese Organization for International Cooperation on Family Planning, 1977), p. 135, table 12; for 1974, data supplied by the Government of Japan.

Czechoslovakia: for 1970, *Fertility and Family Planning in Europe Around 1970: A Comparative Study of Twelve National Surveys* (United Nations publication, Sales No. E.76.XIII.2), p. 151, table 124.

Denmark: for 1970, *Fertility and Family Planning in Europe Around 1970*, p. 151; table 124; for 1975, Gert Schmidt, "Use of contraceptives in 1975 among Danish women 18–49 years", *The Fifth Scandinavian Demographic Symposium* (Oslo, The Scandinavian Demographic Society, 1979), p. 248, table 3.

France: for 1972, *Fertility and Family Planning in Europe Around 1970*, p. 151; table 124; for 1978, Henri Léridon, "Contraceptive Practice in France in 1978", *International Family Planning Perspectives*, vol. 5, No. 1 (March 1979), p. 25, table 1.

Hungary, 1966 and 1977: Federal Statistical Office, *Main Results of the 1977 Hungarian Fertility, Family Planning and Birth Control Study*, TCS-77 (Budapest, 1979), pp. 96–97, tables 16.1 and 16.2.

Netherlands: for 1969, *Fertility and Family Planning in Europe Around 1970*, p. 151; table 124; for 1975, Hein G. Moors and others, *Nationaal Onderzoek Vruchtabaarheid en Ouderschapsmotivatie, Erste Resultaten* (National Survey on Fertility and Parenthood Motivation, First Results) (Voorburg, The Hague, Nederlands, Interuniversitair Demografisch Institut, 1976), table 2.5.1.

Norway, 1977: Turid Noack and Lars Østby, "Some results from the Norwegian fertility survey 1977", *The Fifth Scandinavian Demographic Symposium*, p. 222, table 4.

Romania, 1978: data supplied by the Government of Romania.

United Kingdom: for 1967/68, C.M. Langford. *Birth Control Practice and Marital Fertility in Great Britain* (London, London School of Economics, 1976), pp. 7 and 33, table 4.5; for 1976, "Widespread contraceptive use found in Britain; condom popular; two-child families preferred", *Family Planning Perspectives*, vol. 12, No. 2 (March/April 1980), p. 109, table 2.

[a] Percentages calculated on the basis of currently married users aged 15–49 years or under 50 years, unless otherwise specified. Percentages may not add to 100 because of rounding.

[b] Sterilization, pill, injectables, intra-uterine device, condom, diaphragm, and foam and other spermicides.

[c] Including other spermicides, such as jelly and suppositories.

[d] Included with diaphragm etc.

[e] Included with "other" category.

[f] Percentages calculated on the basis of current users among all women aged 15–49 years.

[g] Percentages calculated on the basis of users aged 20–49 years.

[h] Percentages calculated on the basis of users aged 20–39 years.

[i] Percentages calculated on the basis of users aged 20–44 years.

[j] Figures do not add to 100 because women using a combination of methods are shown under each method.

[k] Percentages calculated on the basis of users aged 15–44 years.

[l] Excluding women practising post-partum abstinence.

[m] In all, 14 per cent using foam, 15 per cent using jelly, and 8 per cent using diaphragm. It is not known whether these methods are being used in combination.

[n] In all, 6 per cent using foam, 9 per cent using jelly, and 6 per cent using diaphragm. It is not known whether these methods are being used in combination.

[o] Women using more than one method were counted as users of the more efficient method. In all, 27 per cent of users were using rhythm and 15 per cent withdrawal, but many of these women were also using another method.

[p] Excluding sterilization.

[q] Method "normally" used.

[r] Percentages calculated on the basis of users aged 18–44 years, in first marriage.

[s] Method used in the two months preceding the survey.

[t] Excluding central municipalities of Copenhagen.

[u] Percentages calculated on the basis of users among all women aged 18–49 years.

[v] Percentages calculated on the basis of users among ever-married women aged under 45 years.

[w] Percentages calculated on the basis of current users among all women aged 20–44 years.

[x] Ages 15–39 years.

[y] Percentages calculated on the basis of users from marriage cohorts of 1958 and 1963, in first marriage.

[z] Percentages calculated on the basis of users from marriage cohorts of 1963–1973, in first marriage.

[aa] Percentages calculated on the basis of women aged 18–44 years who had used at least once in the four weeks preceding the survey.

[bb] Percentages calculated on the basis of users in first marriage.

[cc] Including those using withdrawal or douche plus rhythm.

[dd] Excluding Northern Ireland.

[ee] Users in first marriage, married between 1941 and 1965, aged under 35 years at marriage.

[ff] Number given in the sum of the percentage using a spermicide and the percentage using the diaphragm; the same women may be using these methods in combination.

for those countries in which at least two thirds of the married women of reproductive ages were currently using, most women who were not using contraception believed themselves to be infecund, were currently pregnant or wished to become pregnant; in such cases, roughly 10 per cent or fewer of the married women were not using and were exposed to the risk of an unwanted or mistimed pregnancy. The level of use in Denmark declined slightly between 1970 and 1975; the decline was confined to young married women.[30]

Specific contraceptive methods used and trends in method used

In all the developing countries listed in table 25 and figure 2, excluding the Philippines and Peru, a majority of the women who were using contraception were using one of the modern methods: male or female sterilization; pill; injectables; IUD; condom; or female chemical or barrier methods (diaphragm, foam and other spermicides).

The pill is an important method in most developing countries; and in many, it is the most frequently used. Moreover, although one method rarely accounts for as much as one half of total contraceptive use, over half of contraceptors in Indonesia use the pill. The only countries in which the pill accounts for less than 20 per cent of use are Nepal, Pakistan, Peru, the Philippines and Sri Lanka.

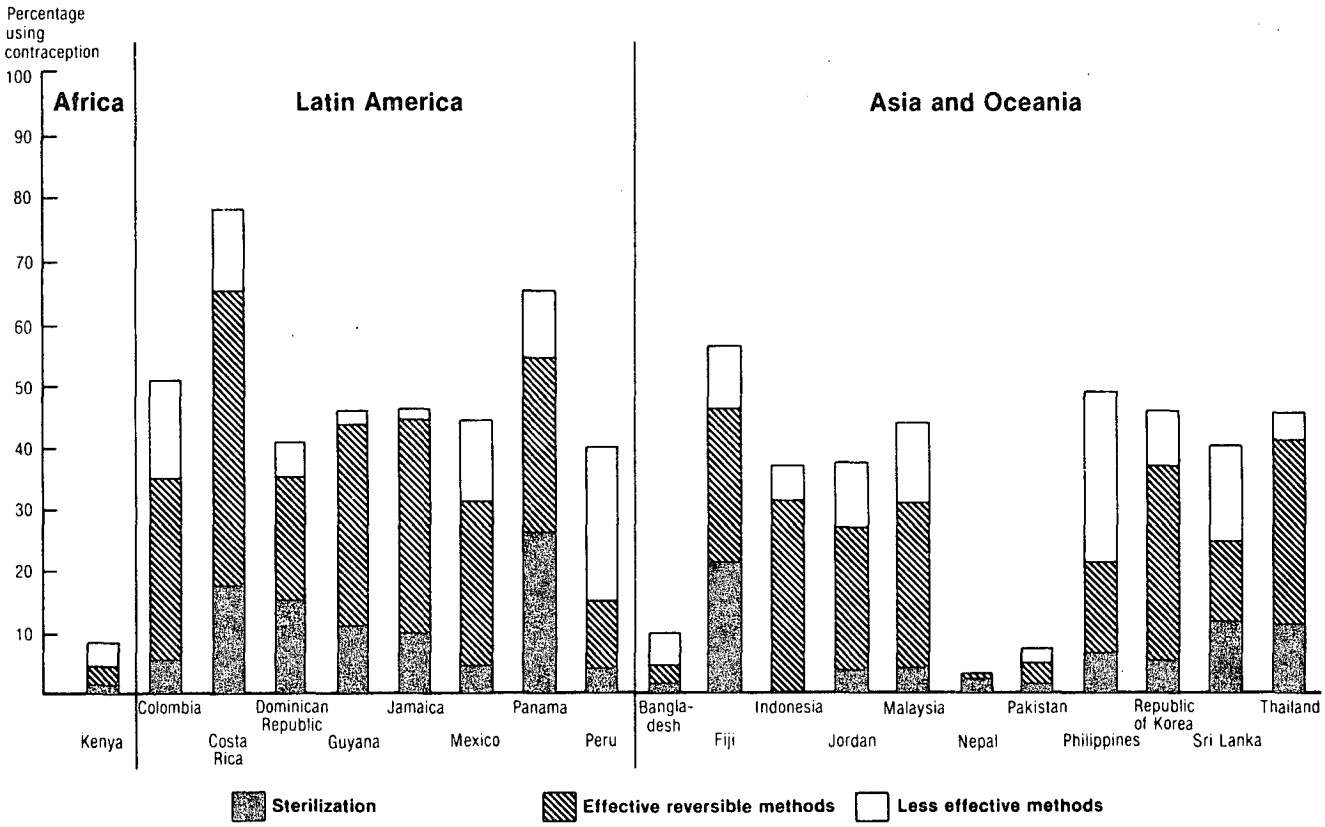
Female sterilization is also a major method in many countries, especially in Panama, where approximately one fourth of the exposed women had been sterilized; but it accounted for less than 10 per cent of use in Bangladesh, Indonesia, Jordan, Nepal and Peru.

Both the pill and female sterilization have tended over time to account for an increasing in share of total contraceptive use in most developing countries for which such information is available. In the Republic of Korea, however, pill use has declined in relation to use of other methods, while female sterilization has increased greatly, following an extension of programme subsidies to cover that method.

The IUD and condom are important methods in many countries; but, in general, they attract fewer users than do the pill and female sterilization. These methods have tended not to grow in relative importance over time, except in the Philippines, though the actual number of users has, in most cases, increased. It is possible that condom usage would appear somewhat higher if men rather than women had been interviewed.

[30] Gert Schmidt, "Use of contraceptives in 1975 among Danish women 18–49 years", *The Fifth Scandinavian Demographic Symposium* (Oslo, The Scandinavian Demographic Society, 1979), p. 248, table 3. Use may have increased again in the last few years. Sales of oral contraceptives, which had declined following liberalization of the abortion law, have recently increased, though not to the earlier level. Christopher Tietze, *Induced Abortion: 1979*, 3rd ed. (New York, The Population Council, 1979), p. 88.

Figure 2. Percentage of exposed women who were currently using contraception, by type of method, selected countries participating in the World Fertility Survey



Male sterilization is infrequently practised in all of the countries of Latin America and most of those in Asia. In the Republic of Korea, roughly 5 per cent of couples were using this method (11 per cent of users in 1978); and although it accounted for most of the use in Nepal, only 2 per cent of married couples were using this method. Injectables and female vaginal methods accounted for less than 10 per cent of all use; and the diaphragm, foam and other similar methods appear to have decreased in relative importance over time.

In Bangladesh, Colombia, Jordan, Malaysia, Pakistan and Sri Lanka, between one half and one fourth of users were applying (at the most recent survey shown) one of the traditional methods—rhythm, withdrawal, abstinence, douche and miscellaneous other methods. Of the latter methods, rhythm and withdrawal were numerically the most important in most countries, and they accounted for 45–50 per cent of all use in Peru and the Philippines. Except in Peru, modern methods were heavily predominant in the Latin American countries.

There was no clear difference between the countries of Latin America and those of Asia in the types of methods most frequently used. Great variability was found among countries within each region; the mix of methods is probably determined by many factors, including relative cost and availability of various methods to potential users, factors greatly influenced by the emphasis of official or other organized family planning programmes, most of which actively promote the use of some combination of methods that are classified here as modern, though a few programmes also encourage the use of other methods.[31]

Within most of the developed countries, the change in the methods used during the recent past has perhaps been more important than changes in the over-all level of use. In several of the countries, particularly France and Hungary, there has been a dramatic move away from coitus interruptus towards modern, more effective methods, especially the pill, but also IUDs. Relatively effective methods accounted for well over half the current use in all the developed countries shown, notably excluding Romania, in which roughly only 10 per cent of those using were applying a modern method; and Czechoslovakia, in which there was little evidence of a decline in the use of traditional methods.[32] Even though the use of withdrawal had declined rapidly in several European countries, this method still accounted for more of total contraceptive use in Czechoslovakia, France, Hungary and Romania than in most of the developing countries. It is reported to account also for 22 per cent of use in Spain.[33] Information about contraceptive sterilization is not available for many of the developed countries. This method has rapidly increased in importance in the United States of America, where, by 1976, it accounted for nearly 30 per cent of all current use and was used by nearly 20 per cent of currently married women aged 15–44. In France, Japan and the Netherlands, it accounted for only 6 per cent of current use. However, the Netherlands sample contains only women in the marriage cohorts of 1963–1973, many of whom have probably not yet had the number of children desired.

One conclusion to be drawn from the foregoing discussion is that the contraceptive methods responsible for the fertility decline now occurring in many developing countries are not exclusively those which produced the earlier decline in fertility in the countries of Europe. Indeed, with a few exceptions — notably Peru and the Philippines — among the countries examined here, most couples who practised contraception were using modern, relatively effective female methods. A large fraction of women in the developing countries reported that they had never heard of the male methods, while there was in most countries a high level of awareness of one or more of the modern methods, no doubt largely because family planning programmes have emphasized these methods. It is possible that knowledge and use of male methods would have appeared more prevalent had husbands been interviewed. At the same time, traditional methods are of considerable importance: they were practised by at least 10 per cent of exposed women in 11 of the 19 countries for which information was available. It may be that the widespread use of the more traditional methods is due, at least in part, to the side-effects that often accompany application of such effective, reversible methods as the pill and IUD, for example, causing women to discontinue their use.[34]

E. Factors other than contraception affecting fertility

Married or cohabiting women may not be at risk of conception for reasons other than pregnancy, infecundity or contraceptive sterilization. Where lengthy breast-feeding is the norm, a large fraction of the women may have been in a state of post-partum amenorrhoea at the time of the survey and would not have considered themselves at risk.

Direct information about post-partum amenorrhoea at the time of the survey is available only for Kenya and the Philippines. In these two countries, over one third and one fifth, respectively, of women whose most recent pregnancy had led to a live birth and who were not currently pregnant were still in post-partum amenorrhoea at the interview.[35]

[31] For example, Catholic-supported services in the Philippines promote the use of rhythm. R. Freedman and B. Berelson, *loc. cit.*, p. 11.

[32] Note that in respect of the 1977 survey, Czechoslovakian women who normally used more than one method are shown more than once in the table.

[33] H. Léridon, "Les facteurs de la fécondité dans les pays développés", p. 25.

[34] For discussions of side-effects of various modern methods covered in this report, see the following Population Reports published by Johns Hopkins University (Baltimore, Maryland): Series A, Oral Contraceptives; Series B, Intrauterine Devices; Series C, Female Sterilization; Series D, Male Sterilization; Series H, Barrier Methods; and Series K, Injectables and Implants; various issues, 1972–1979.

[35] Ministry of Economic Planning and Community Affairs, Central Bureau of Statistics; "Kenya Fertility Survey, major highlights", paper prepared for the World Fertility Survery Regional Meeting for Countries South of the Sahara, Nairobi, 3–5 September 1979, p. 77 (mimeographed); and *Republic of The Philippines Fertility Survey, 1978—First Report*, table 5.2.5.

Although it is reasonable to expect some contraceptive use among women who are in post-partum amenorrhoea, it is likely that many women are not practising either because they believe themselves to be at no risk or for some other reason (such as concern that use of the pill may be harmful to the nursing baby or a judgement that the risk of pregnancy, though not absent, is acceptably low).

The period of breast-feeding, which affects the length of amenorrhoea,[36] varies considerably among countries, being influenced, *inter alia*, by culture and level of infant mortality. Breast-feeding is more nearly universal and is, on the average, more prolonged in the countries of Asia than in the countries of Latin America included here, although Malaysian women, with a relatively short period of breast-feeding, provide an exception. In Costa Rica, Malaysia and Panama, fewer than one half of the women interviewed had breast-fed more than six months in the most recent birth interval. At the other extreme, over 90 per cent of the women in Bangladesh and the Republic of Korea, and from 80 to 85 per cent of those in Indonesia, Kenya, Nepal, Pakistan and Thailand breast-fed their children for as long a period.[37]

Factors other than breast-feeding and the associated period of amenorrhoea may also be important in some countries. Women may be protected from pregnancy for a long period after a birth by the practice of post-partum abstinence. This practice may not be regarded by the people themselves as a method of preventing conception, although it certainly has the effect of increasing birth intervals. In most of the countries discussed here, post-partum amenorrhoea probably endures for a longer period, on average, than does post-partum abstinence; but data concerning this factor are unavailable for most countries. In the Philippines, 9 per cent of women whose last pregnancy had ended in a live birth and who were not currently pregnant were practising post-partum abstinence, but most of those women were probably also in amenorrhoea.[38] In Colombia 4 per cent of "exposed" women were practising abstinence; and in Kenya, 1 per cent of women were protected by post-partum abstinence in addition to those protected by amenorrhoea.[39]

Another factor that is important in some countries is the temporary separation of spouses; information about this is also lacking for most countries. In Kenya, for which statistics on this aspect are available, only 1 per cent of the women were not at risk because of the husband's absence in addition to those removed from risk by the other factors discussed above.[40]

The incidence of induced abortion is not discussed in this report; but it should be borne in mind that abortion, legal or illegal, may represent a widely utilized alternative to contraceptive use. Of the developing countries covered here, induced abortion is clearly most important in the Republic of Korea, where it is readily available in medically supervised circumstances. At the time of the survey in 1974, 30 per cent of ever-married women aged 15–49 reported having had at least one induced abortion and the reported incidence had increased over time; 14 per cent of completed pregnancies reported by ever-married women had been terminated by induced abortion.[41] These figures have not been corrected for underreporting.

F. Differentials in contraceptive use in developing countries

It seems self-evident that motivation to use contraception is determined to a major extent by the number of children already in the family. It might be expected, therefore, that the percentage of women currently using contraception would increase as family size increases.

Table 26 shows the distribution of exposed women by family size, and table 27 and figure 3 show the level of current contraceptive use among exposed women by number of living children. In all countries, the level of contraceptive use was found to increase with family size — in most cases very sharply — among women with from zero to three children. In most countries, there was little further increase with family size in the level of contraceptive use once a moderate family size had been reached; and in over one half of the countries, the level of use among women with large families was slightly lower than among those with a moderate number of children. These variations are evidently influenced by the age of the woman. As discussed later, older women who tend to have large families are less likely to be using contraception than are those in the middle years of the reproductive period.

In no country did contraceptive use increase so sharply and regularly with family size as did the stated desire for no more children (see section H). In most of the countries, among women with small families (0–2 children), the percentage of exposed women using contraception was higher than the percentage who said that they wanted no more children. Thus, contraception in developing countries should not be viewed solely as a practice that couples adopt in order to limit their family size; it is also used for birth-spacing.

[36] It was estimated, on the basis of several studies, that the average length of amenorrhoea increases with the average duration of breast-feeding roughly as follows:

Months of breast-feeding	*Months of amenorrohea*
0	2
3	3
6	4-5
9	6
24+	15

Henri Léridon, "Biostatistics of human reproduction", *Measuring the Effect of Family Planning Programs on Fertility*, C. Chandrasekaran and Albert I. Hermalin, eds., published by the International Union for the Scientific Study of Population for the Development Centre of the Organisation for Economic Co-operation and Development (Dolhain, Belgium, Ordina Editions, 1979), pp. 93-131.

[37] For Bangladesh and Kenya, excluding women who breast-fed their children until the child died.

[38] *Republic of the Philippines Fertility Survey, 1978 — First Report*, tables 6.4.3 and 6.2.5.

[39] Data for Colombia are from unpublished tabulations; for Kenya, Central Bureau of Statistics, *op. cit.* In Kenya, another 1 per cent were protected by abstinence.

[40] Kenya, Central Bureau of Statistics, *op. cit.* Only absences of three or more months duration are counted here.

[41] Republic of Korea, *The Korean National Fertility Survey — First Country Report*, pp. 130–137.

TABLE 26. PERCENTAGE DISTRIBUTION OF EXPOSED WOMEN[a] ACCORDING TO SPECIFIC VARIABLES, SELECTED WORLD FERTILITY SURVEY COUNTRIES

Variable	Group I[b]																		
	Bangladesh	*Colombia*	*Costa Rica*	*Dominican Republic*	*Fiji*	*Guyana*	*Indonesia*	*Jamaica*	*Jordan*	*Malaysia*	*Mexico*	*Nepal*	*Pakistan*	*Panama*	*Peru*	*Philippines*	*Republic of Korea*	*Sri Lanka*	*Thailand*
SAMPLE SIZE	1 645	2 323	2 222	1 378	3 314[c]	2 735	5 638	1 939	2 337	4 487	4 107	4 325	3 334	2 257[d]	3 853	6 684	3 866	4 709	2 569
Percentage distribution by:																			
Number of living children																			
Zero	15.7	6.0	4.3	9.5	9.8	12.2	12.2	12.4	6.6	5.3	5.8	21.8	15.4	4.6	3.3	4.0	4.4	7.6	6.8
One	16.2	13.8	15.9	13.3	12.9	14.3	19.9	18.2	8.5	11.6	12.1	19.3	14.3	11.9	13.0	11.6	12.9	16.4	17.8
Two	15.0	17.5	20.7	14.8	14.9	13.9	18.4	16.8	11.2	14.8	16.1	17.5	13.8	17.5	18.1	15.8	18.7	16.4	18.8
Three	14.1	15.3	15.7	15.1	14.6	13.2	15.1	13.0	11.0	15.1	14.9	15.9	13.5	16.8	17.1	16.1	21.9	15.8	16.4
Four	12.0	11.5	10.9	12.0	13.0	11.4	12.3	9.4	11.5	12.1	13.1	11.4	11.6	14.0	13.6	14.6	19.1	12.8	12.9
Five	10.5	10.1	8.9			9.7	9.0	8.2	10.5	10.9	11.0	6.8	10.4	11.4	12.5	11.1	12.6	10.5	9.7
Six	7.2	7.3	6.4	35.4	34.8	7.7	6.2	6.7	11.4	8.4	8.1	4.0	9.2	7.7	9.2	9.3	6.4	7.1	7.2
Seven or more	9.3	18.5	17.2			17.6	7.0	15.2	29.2	21.8	19.1	3.3	11.8	16.1	13.2	17.6	4.1	13.3	10.5
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of living sons																			
Zero	30.8	19.3	18.9	23.3	21.3	24.9	30.0	26.9	16.3	17.4	18.0	37.6	26.8	16.9	17.5	16.1	16.0	22.4	21.4
One	25.4	26.9	30.7	25.9	27.0	25.4	31.2	27.0	19.0	26.8	26.1	29.3	25.3	21.8	28.4	26.2	30.9	28.4	31.1
Two	19.5	21.6	20.7	20.8	21.3	20.0	19.1	19.5	19.5	23.2	22.7	18.5	20.2	23.1	24.0	23.3	31.5	21.8	22.5
Three	12.8	13.9	12.6	13.5	14.8	12.5	10.9	11.3	16.7	15.6	14.9	9.4	13.4	15.6	15.1	16.3	14.7	14.0	12.6
Four	7.1	8.9	7.5	7.6	8.0	7.5	5.7	7.6	13.5	9.5	9.1	3.6	8.0	9.2	8.2	9.3	5.0	7.8	7.0
Five or more	4.4	9.3	9.5	8.9	7.5	9.8	3.2	7.7	15.0	7.6	9.3	1.5	6.3	7.4	6.9	8.7	1.9	5.6	5.3
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Desire for more children																			
Want more or undecided[e]	36.0	38.7	47.9	47.9	48.9	47.0	60.4	52.2	58.0	53.8	44.2	70.3	57.3	37.4	39.1	45.6	25.9	37.8	38.8
Want no more	64.0	61.3	52.1	52.1	51.1	53.0	39.6	47.8	42.0	46.2	55.8	29.7	42.7	62.6	60.9	54.3	74.1	62.2	61.2
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Type of place of residence																			
Urban	7.8	64.3	50.6	48.5	37.1	36.3	16.2	49.6	70.9	31.5	58.8[f]	2.2	25.6	56.3	65.3	33.6	39.4	18.9	15.3
Rural	92.2	35.7	49.4	51.5	62.6	63.7	83.8	50.4	29.1	68.5	41.2	94.5	74.4	43.7	34.7	66.4	60.6	81.1	84.6
Not stated	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

TABLE 26 (*continued*)

	Group II[g]												
	Bangladesh	*Colombia*	*Guyana*	*Indonesia*	*Jordan*	*Malaysia*	*Nepal*	*Pakistan*	*Panama*	*Peru*	*Republic of Korea*	*Sri Lanka*	*Thailand*
SAMPLE SIZE	4 645	2 323	2 735	5 638	2 337	4 487	4 325	3 334	2 257	3 853	3 866	4 709	2 569
Percentage distribution by:													
Respondent's education (years)													
Zero	76.1	15.2	3.7	56.1	46.3	31.9	94.9	89.0	7.4	28.4	16.7	18.7	17.6
1–3	8.4	37.0	12.9	16.4	6.6	18.1	1.5	2.1	14.8	24.5	10.8	17.3	5.8
4–6	11.7	29.8	47.3	20.6	22.5	36.4	2.1	5.2	38.8	24.1	41.2	28.0	69.0
7–9	2.3	12.1	29.8[h]	3.7	14.3	7.3	0.7	2.0	17.1	8.5	19.1	20.0	2.4
10 or more	1.3	5.7	5.8	3.2	10.4	6.2	0.4	1.7	21.9	14.5	12.2	16.0	5.1
Not stated or other	0.2	0.2	0.5	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.1	0.0	0.1
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Husband's education (years)													
Zero	54.7	14.6	3.1	27.4	19.4	10.9	68.2	56.9	6.2	10.0	7.9	6.6	10.9
1–3	10.7	35.7	10.6	23.4	5.8	16.3	13.0[i]	4.9	15.2	25.6	4.7	14.8	3.7
4–6	16.1	29.7	47.2	34.6	31.1	48.1	6.9	16.2	36.3	30.8	27.1	33.2	67.2
7–9	8.3	11.6	21.4[j]	6.8	19.8	11.9	6.5	9.8	16.4	9.7	25.6	25.6	3.5
10 or more	8.8	8.6	12.6	7.8	23.8	12.5	5.2	12.1	25.8	23.9	34.5	19.7	13.1
Not stated or other	1.3	0.3	5.0	0.0	0.0	0.5	0.1	0.0	0.0	0.0	0.2	0.2	1.7
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Respondent's occupation													
Housework only	90.7	68.0	...[k]	38.6	87.6	55.5	32.6	82.6	60.2	47.9	45.8	61.4	16.1
Professional clerical	0.4	6.4	...	2.0	3.4	3.7	0.0	0.5	17.9	6.9	1.9	4.4	4.0
Service	3.5	7.6	...	12.7[l]	0.3	2.9	0.0	1.3	11.7	4.6	3.3	0.7	1.7
Sales and labour	4.3	14.0	...	5.2[m]	3.5	9.3	3.5	10.1	8.3	20.7	17.2	8.5	17.4
Agriculture	1.1	4.0	...	41.4	5.2	28.5	63.7	5.5	1.9	19.9	31.7	24.9	60.8
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Whether any child died[n]													
No	44.4	67.7	73.9	60.3	64.0	76.5	50.5	47.1	78.5	59.4	77.4	75.1	70.8
Yes	55.6	32.3	26.1	39.7	36.0	23.5	49.5	52.9	21.5	40.6	22.6	24.9	29.2
TOTAL	100.0	100.0	100.1	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Sources: Data taken from World Fertility Survey reports cited in table 21 or tabulated from individual interview tapes.

[a] Excluding women who were currently unmarried, currently pregnant or who believed themselves to be infecund, but including those sterilized for contraceptive purposes. Except as indicated, the age range was 15–49 or under 50 years.

[b] Including developing countries for which a report or data tape was available. The preliminary report available for Kenya did not include the information required for this table.

[c] Excluding women who were practising post-partum abstinence.

[d] Aged 20–49 years.

[e] Including women who did not state whether they wanted more children.

[f] Comprising areas with 2,500 or more inhabitants.

[g] Confined to countries for which a data tape was available.

[h] Including 3.5 per cent of those who had attended secondary school or higher, but year not stated.

[i] Including 8.4 per cent of those who had attended primary school, but year not stated.

[j] Including 4.1 per cent of those who had attended secondary school or higher, but year not stated.

[k] Not yet available.

[l] Sales and service.

[m] Skilled and unskilled.

[n] Based on exposed women with at least one live birth.

TABLE 27. PERCENTAGE OF EXPOSED WOMEN WHO WERE CURRENTLY USING CONTRACEPTION, BY NUMBER OF LIVING CHILDREN, SELECTED WORLD FERTILITY SURVEY COUNTRIES

Major area and country	Total		Number of living children							
	Unstandardized	Standardized[a]	None	One	Two	Three	Four	Five	Six	Seven or more
AFRICA										
Kenya	9	8	2	4	8	10	10	13	12	15
LATIN AMERICA										
Colombia	52	49	24	50	60	57	59	56	47	45
Costa Rica	78	73	39	75	82	83	80	82	78	76
Dominican Republic[b]	42	39	15	30	44	51	50	57	41	41
Guyana	38	36	22	26	37	39	38	46	49	47
Jamaica	45	45	32	34	50	45	52	57	55	51
Mexico	42	39	13	38	49	47	46	41	43	39
Panama	65	61	31	58	70	73	71	67	69	58
Peru	41	38	16	36	49	48	43	38	39	36
EAST ASIA										
Republic of Korea	45	39	16	17	47	54	57	54	49	37
SOUTH ASIA										
Bangladesh	10	10	3	7	8	11	12	13	15	16
Indonesia	37	36	4	27	40	46	43	48	51	54
Jordan	37	32	7	27	37	36	36	43	45	43
Malaysia	42	38	10	37	43	45	47	45	45	46
Nepal	3	4	0	1	2	3	5	9	9	11
Pakistan	7	7	0	2	4	7	9	12	14	16
Philippines	48	42	6	36	49	55	54	52	51	48
Sri Lanka	41	38	4	26	41	48	53	53	55	47
Thailand	45	42	10	38	47	53	58	52	45	43
OCEANIA										
Fiji	56	51	10	39	52	56	66	69	72	75

Sources: Data taken from World Fertility Survey reports cited in table 21 or tabulated from data tapes.

[a] Standardized on the distribution of exposed women in Bangladesh by number of living children.

[b] The percentage using differs slightly from that shown in other tables because of small discrepancies in the source tables and because of rounding errors.

Some of the countries in which the level of use showed little or no tendency to decline at higher family sizes are those in which the over-all level of use was very low—Bangladesh, Kenya, Nepal and Pakistan. In those countries, fewer than 20 per cent of the women with seven or more children were using contraception at the time of the survey.

Although some general differences were found between the countries of Latin America and those of Asia, as shown in the shape of the curves displayed in figure 3, it cannot be said that there is a single pattern peculiar to either group. In most of the Asian countries, even those with a relatively high over-all level of use, few childless women — 10 per cent or fewer, excluding the Republic of Korea — were currently using contraception, while in all the countries of Latin America, more than 10 per cent of the women with no children were using a method. In several of the latter countries, over 30 per cent of the childless women were using.[42]

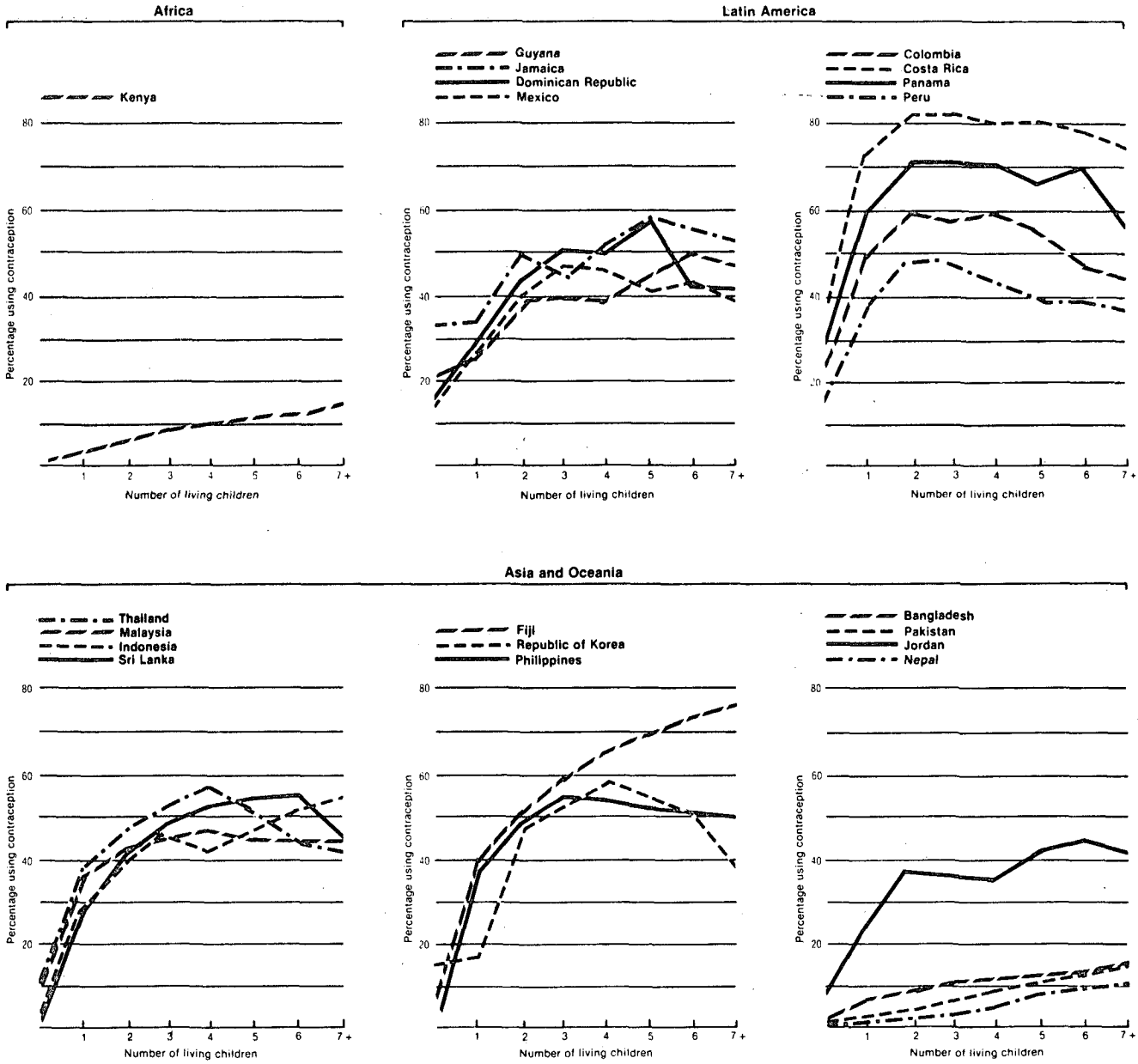
In most countries of Asia, there was a positive association of family size with level of use, at least until the family contained three or four children, while in many countries of Latin America, use was not greater among couples with three or more children than among those with two children.

An interesting difference was found between the two English-speaking countries in or near the Caribbean region and the other countries of Latin America. In Guyana and Jamaica, women with one child appeared to be only slightly more likely to be using contraception than were women with no children; in the other countries use among women with one child was much more frequent than among childless women. The difference was related to cultural differences in marriage patterns. In Guyana, Jamaica and some other countries in or near the Caribbean, visiting unions, which are less stable than either common law or legal unions, are very common, especially among young women. Childless women in visiting unions are much more likely than childless women in other types of unions to be using contraception.[43] Over 40 per cent of childless women in these two countries who were in visiting unions were using con-

[42] Contraceptive use figures for women with no live births (not shown) differed little from those for women with no living children.

[43] *Guyana Fertility Survey, 1975 — Country Report*, vol. I, p. 59; and *Jamaica Fertility Survey, 1975/76, Country Report*, vol. I, p. 74.

Figure 3. Percentage of exposed women who were using contraception, by number of living children, selected countries participating in the World Fertility Survey



traception. This use may represent an attempt to delay childbearing until there is a prospect of forming a more stable family. Conversely, it is common for women to enter more stable unions only after becoming pregnant or bearing a child.

G. Age and contraceptive use

Although the level of current use was found to be fairly high among younger married women in many countries, suggesting rather frequent spacing of births,[44] it was generally highest among women in the middle of the reproductive ages, from 25 to 39 years. Older women were less likely to be using, even when women who believed themselves to be infecund were excluded from the base population.

There are several possible reasons for the typical curvilinear relationship between contraceptive use and age. Older women may be less likely to use contraception because of lack of information or because of adherence to traditional norms which discourage contraceptive use. Young women may be less subject to the influence of tradition, but some may also be poorly informed about contraception. Furthermore, many of them will still wish to have more children. These possibilities may also apply

[44] *See World Population Trends and Policies: 1979 Monitoring Report*, vol. I, *Population Trends*, pp. 62–70.

in respect to the variations by parity noted earlier; parity and age tend to be correlated.

Data contained in table 27 demonstrate that the differences among countries in levels of contraceptive use among married women of reproductive ages, unlike differences in cumulative fertility, can be accounted for only to a minor extent by differences in age or other demographic variables.[45] Demographic variables were found to be related to contraceptive use within each population, but there were typically very large differences among population within each age or family size category.[46]

H. Contraceptive use and desire for more children

Demographic variables, such as age and family size, affect current contraceptive use at least in part through their relationship to a couple's desire for more children. However, the desire to limit family size is not the only reason for using contraception. For example, couples may use contraception in order to ensure adequate spacing between births or because the wife is in poor health and wishes for that reason to avoid pregnancy. The foregoing discussion relating to the comparatively wide use of contraception among women with small families suggests birth-spacing; and in some countries of Latin America, a delay in the initiation of childbearing as some of the reasons for using contraceptives.

In most of the countries surveyed[47] between 50 and 65 per cent of the exposed women said that they did not want more children. Lower percentages were reported in Guyana, Indonesia, Jordan, Malaysia and Pakistan (40–49 per cent) and in Nepal (30 per cent), and a higher percentage (74 per cent) in the Republic of Korea.

Table 28 shows the percentage of exposed women who were using contraception, among those who wanted more children (or were undecided) and among those who wanted no more. It distinguishes use of any method and use of a modern method—pill, injectables, IUD, condom and sterilization, i.e., techniques offered most often by family planning programmes.

Exposed women who want no more children are, as would be expected, more likely than others to be using contraception; and in all countries shown in table 28, at least one half of the current users were women who wanted no more children.

In 16 of the 19 countries, at least 40 per cent of women who said that they did not want more children were not using any method of contraception. In all but one (Costa Rica) of the countries, over one fourth of such women were not using. Statistics presented later show that this gap between a stated desire to stop bearing children and current contraceptive practice is, in most countries, heavily concentrated among women with little or no education.

In countries in which contraception is relatively frequent among women who want no more children, it is also relatively frequent among those who want more children. The correlation among the 18 countries (excluding Bangladesh) between the proportion using among those who wanted more children and the proportion using among those who wanted no more is over 0.8. In other words, where use of contraception is fairly widespread, both birth-spacing and family limitation are commonly the goal.

Use of traditional methods was not confined to women who wanted more children (and who might for this reason be less highly motivated to practise contraception effectively), although it generally comprised a slightly larger proportion of total use among them than among the others (figure 4). Where use of traditional methods was prevalent among women who wanted more children, it was also found among those who did not.

In most of the countries of Latin America, the level of use was substantial among women who wanted more children; it ranged from 25 per cent in the Dominican Republic to 71 per cent in Costa Rica, an indication that deliberate birth-spacing was common. In Asia and Oceania, the level of use among women who wanted more children was generally lower, from zero in Nepal to 38 per cent in Fiji, which suggests that contraception was used more for limiting than for spacing births. Among the exposed women who wanted no more children, the percentage using in the countries of Latin America ranged from 45 (Guyana) to 85 (Costa Rica); in Asia and Oceania, the range was from 8 (Nepal) to 74 (Fiji).

The extent to which lengthy breast-feeding is practised may be an important determinant of demand for contraception for the purpose of spacing births. It is clear, though, that use of contraceptives among women who wanted more children varied among countries closely with the level of use among women who stated that they did not want more, suggesting that many of the factors that limit use among women who want no more children (disapproval or fear of family planning methods, lack of information and/or unavailability of supplies) also limit use among women who want more children. It is expected that at any given moment, the level of use among women who wish to have more children will be lower than the level among women who want no more, if only because, at any particular time, some of the women who want more

[45] For the standardization given in table 27, Bangladesh was used as the model. Most women marry at young ages in Bangladesh, and fertility early in marriage is low in relation to that in many other countries because many recently married women are still in a state of adolescent subfecundity. Primarily for this reason, a relatively high percentage of the exposed women in Bangladesh are childless or have only one or two children; the high level of mortality also contributes to this situation. Pre-martial pregnancy and childbearing in some of the countries of Latin America contribute to the low proportion of exposed women who are childless. The comparatively high proportion of women with small families in Bangladesh is responsible for the fact that, for most countries, the standardized percentage using contraception is lower than the unstandardized percentage.

[46] A similar conclusion is reached using a different technique, in Albert I. Hermalin and W. M. Mason, "A strategy for the comparative analysis of WFS data with illustrative examples" (UN/UNFPA/WFS.II/18), paper prepared for a meeting of the United Nations Working Group on Comparative Analysis, 31 October-2 November 1978.

[47] Excluding Bangladesh and Kenya, for which comparable information was not available at the time of writing. Figures are shown for Bangladesh, although in that country some women were asked, "Do you want another child soon?".

TABLE 28. PERCENTAGE OF EXPOSED WOMEN WHO WERE CURRENTLY USING ANY CONTRACEPTIVE METHOD AND PERCENTAGE USING A MODERN METHOD, BY DESIRE FOR MORE CHILDREN, SELECTED WORLD FERTILITY SURVEY COUNTRIES

Major area and country	Percentage using among those who:			Percentage distribution of exposed women who:				
	Total	Wanted more children or were undecided[a]	Wanted no more children	Total	Wanted more children and were not using contraception[a]	Wanted more children and were using contraception	Wanted no more children and were not using contraception	Wanted no more children and were using contraception
LATIN AMERICA								
Colombia								
Any method	52	45	56	100	21	17	27	34
Modern method	37	32	40	100	26	13	37	25
Costa Rica								
Any method	78	71	84	100	14	34	8	44
Modern method	65	57	71	100	20	27	15	37
Dominican Republic								
Any method	41	25	57	100	36	12	23	29
Modern method	30	15	43	100	41	7	30	22
Guyana								
Any method	38	29	46	100	32	13	29	25
Modern method	29	25	43	100	34	11	31	23
Jamaica								
Any method	46	39	55	100	33	19	22	27
Modern method	43	35	52	100	34	18	23	25
Mexico								
Any method	42	34	48	100	29	15	29	27
Modern method	32	26	37	100	33	11	35	20
Panama								
Any method	65	50	74	100	19	19	16	46
Modern method	55	40	65	100	23	15	22	41
Peru								
Any method	41	33	46	100	26	13	33	28
Modern method	15	11	17	100	35	4	51	10
EAST ASIA								
Republic of Korea								
Any method	46	16	56	100	22	4	33	41
Modern method	35	12	44	100	23	3	42	32
SOUTH ASIA								
Bangladesh[b]								
Any method	10	2	14	100	35	1	55	9
Modern method	6	1	9	100	36	0	59	6
Indonesia								
Any method	37	26	53	100	45	16	18	21
Modern method	32	23	46	100	47	14	21	18
Jordan								
Any method	37	22	59	100	45	13	17	25
Modern method	26	14	42	100	50	8	24	18
Malaysia								
Any method	42	34	52	100	26	18	22	24
Modern method	31	25	37	100	41	13	29	17
Nepal								
Any method	3	0	8	100	70	0	27	3
Modern method	3	0	8	100	70	0	27	3
Pakistan								
Any method	7	1	15	100	56	1	36	6
Modern method	5	1	11	100	57	1	38	5
Philippines								
Any method	48	33	60	100	31	15	22	33
Modern method	21	12	29	100	40	5	39	16
Sri Lanka								
Any method	41	22	54	100	30	8	29	33
Modern method	24	9	34	100	34	3	41	21
Thailand								
Any method	45	29	56	100	28	11	27	34
Modern method	42	26	52	100	29	10	30	32

TABLE 28 (*continued*)

Major area and country	Percentage using among those who:			Percentage distribution of exposed women who:				
	Total	Wanted more children or were undecided[a]	Wanted no more children	Total	Wanted more children and were not using contraception[a]	Wanted more children and were using contraception	Wanted no more children and were not using contraception	Wanted no more children and were using contraception
OCEANIA								
Fiji[c]								
Any method	56	38	74	100	30	18	13	38
Modern method	49	30	66	100	34	15	17	34

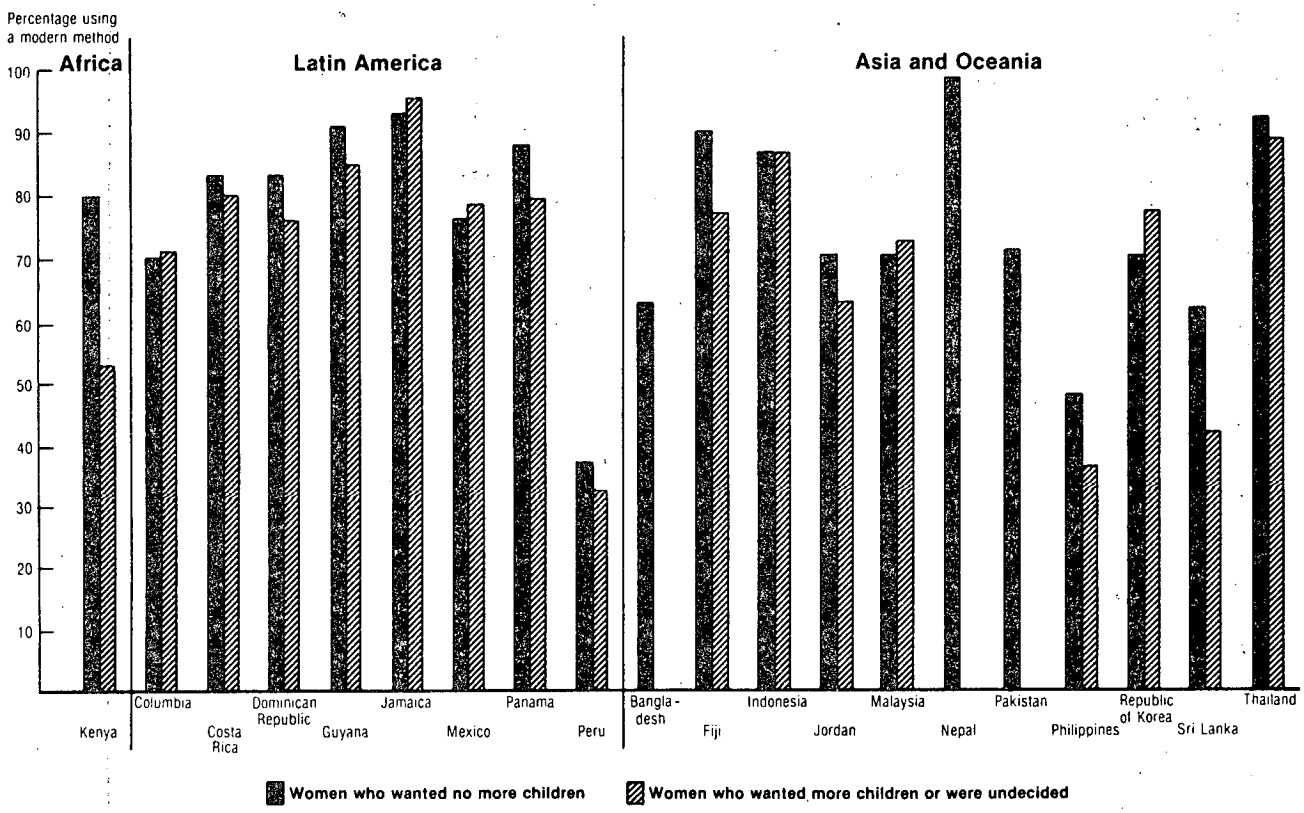
Sources: World Fertility Survey reports cited in table 21 and standard recode tapes.

[a] Wanted more children or were undecided, or desire for more children not stated.

[b] Some women were asked, "Do you want another child soon?".

[c] Base excluding those who were practising post-partum abstinence.

Figure 4. Percentage of current contraceptive users who were using a modern method, by desire for more children, selected countries participating in the World Fertility Survey



NOTE: For Bangladesh, Nepal and Pakistan, percentage of women who wanted more children not shown because of small number of contraceptive users.

children will have already experienced a long enough delay and will be hoping for another pregnancy. The level of use among exposed[48] women who wanted no more children may be regarded as an upper limit to the level of current use that is expected to occur among women who want more children. Thus, the ratio between the level of use among women who did and women who did not want more children provides a rough index of the intensity of use for birth-spacing, considered separately from within-country factors that influence use in both groups.

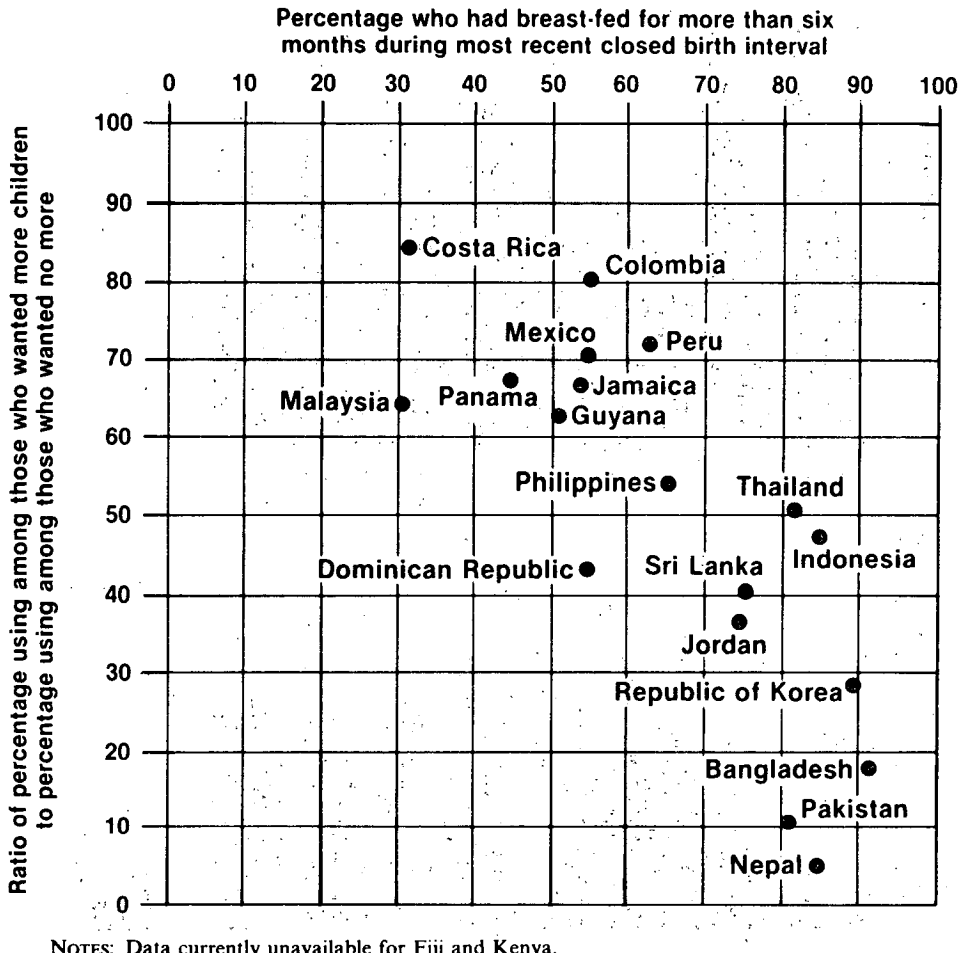
Figure 5 compares this index of intensity of use for spacing births with a rough measure of the practice of extended breast-feeding: the percentage of women who had breast-fed more than six months in the most recent interval between births. It can be seen that, as hypothesized, the practice of extended breast-feeding is associated with relatively low values of the index of intensity of contraceptive use for spacing births.

I. DIFFERENCES IN CONTRACEPTIVE USE ACCORDING TO EDUCATION AND RURAL/URBAN RESIDENCE

Preliminary results of work in progress suggest that in the developing countries, the differences discussed above

[48] Infecund women and women who were already pregnant are excluded from this analysis.

Figure 5. Relative level of contraceptive use among exposed women who wanted more children and among those who did not want more, by percentage of women who had breast-fed for more than six months during the most recent closed birth interval, selected countries participating in the World Fertility Survey



NOTES: Data currently unavailable for Fiji and Kenya.
For Bangladesh, the percentage who had breast-fed until the child died.
For Costa Rica, the Dominican Republic, Mexico, Nepal, Pakistan, Panama and the Republic of Korea, data pertain only to women whose most recent closed birth interval did not exceed five years.

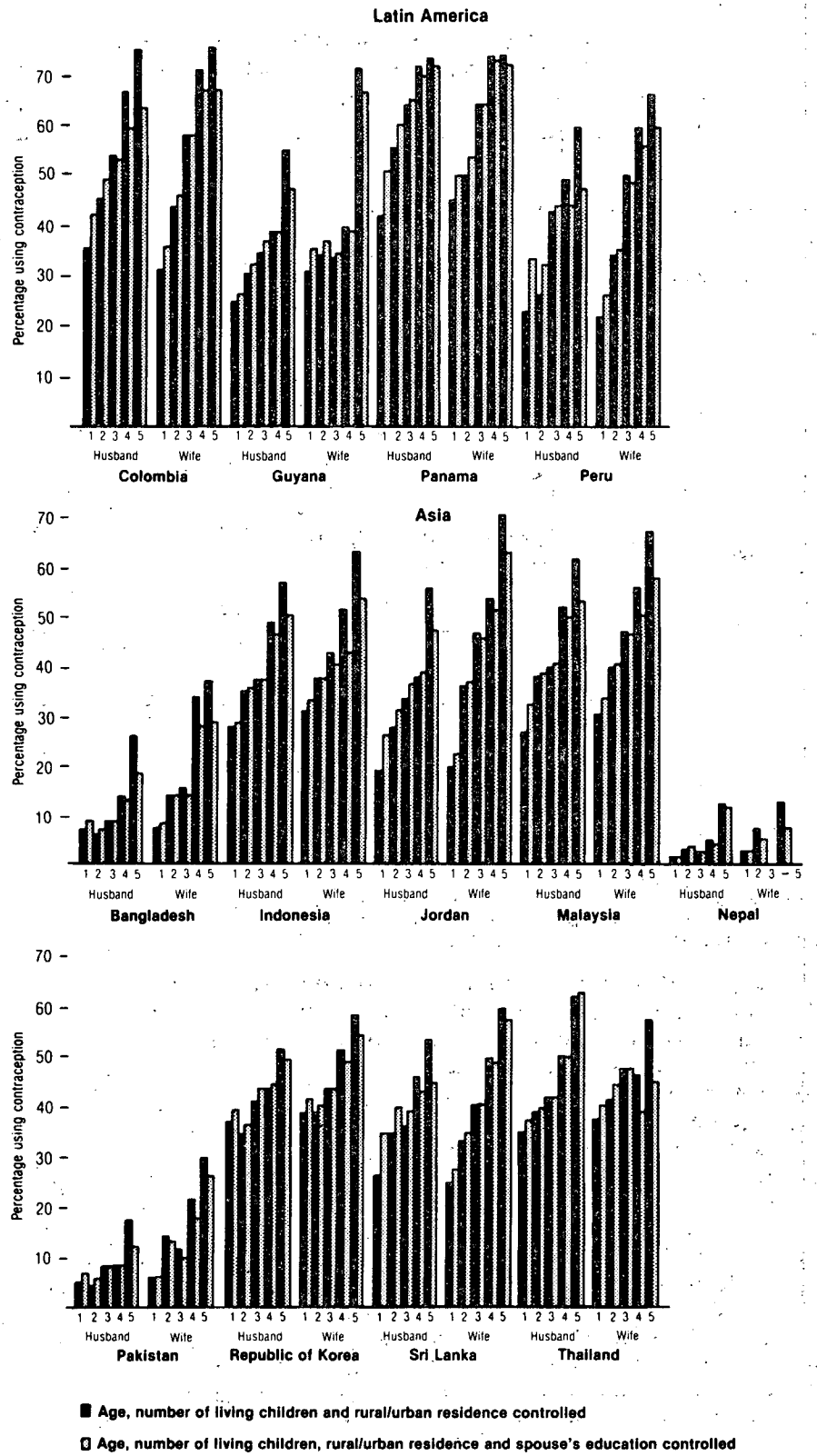
are not the only important variations in the incidence of contraceptive use. Wide differences are also to be found among socio-economic and residence groups. In some countries, regional, ethnic or religious differences also appear to be important with respect to contraceptive use.

For the countries for which World Fertility Survey data tapes were available, it was confirmed that contraceptive use rises with educational attainment. In many of the countries, the difference in use prevalence among exposed women with no education and those with 10 or more years of schooling was found to be 25 or more percentage points. This difference was found after the introduction of statistical controls for the woman's age, effective family size and (rural/urban) place of residence (figure 6). The data show that the wife's education tends to have a greater influence on contraceptive use than does the husband's schooling; that the differentials are consistently weaker in Asia (excluding Jordan) than in Latin America, where education is more widespread on a higher level; and that the size of the educational differential in contraceptive use is generally greater after adjustments have been made for the demographic factors. One factor that explained the differential was knowledge of an outlet for contraceptive information and supplies; such knowledge was more apparent among better educated women.

As concerns rural/urban residence, in each of the countries discussed here (excluding Indonesia), contraceptive use was significantly greater in urban than in rural areas. This was true after the demographic variables were controlled, with the more pronounced gaps occurring in Colombia, Jordan and Peru, for which percentages in rural/urban use prevalence differed by 29, 33 and 37 points, respectively. The woman's age and number of living children had very little effect upon the size of the rural/urban differential, which was established when controls for age and effective family size were introduced. But, significantly, the differentials were considerably smaller when account was taken of the effect of the husband's and the wife's education (figure 7).

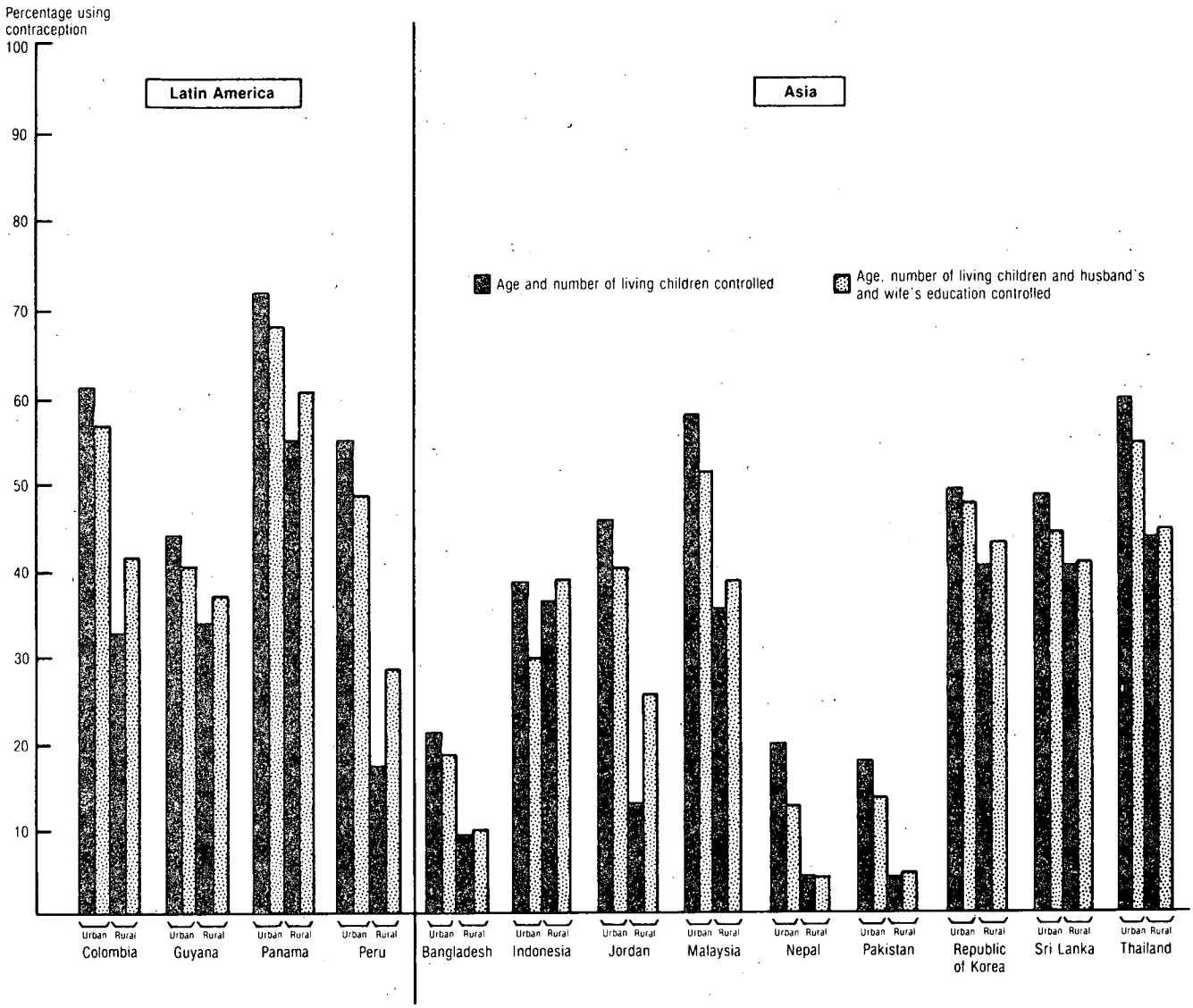
In three countries, Colombia, Jordan and Peru, which had very large differentials before education was controlled, use was higher in urban areas by 15–20 percentage points than it was in rural areas, net of the effects

Figure 6. Percentage of exposed women who were currently using contraception, by educational level of husband and wife, selected countries participating in the World Fertility Survey



NOTE: Years of education completed: 1 = 0 years; 2 = 1–4 years; 3 = 4–6 years; 4 = 7–9 years; 5 = 10+ years.

Figure 7. Percentage of exposed women who were currently using contraception, by urban/rural residence, selected countries participating in the World Fertility Survey



of the educational composition of the population. In the Republic of Korea, the difference after control for education was insignificant at the 0.05 level; and in Guyana and Sri Lanka, the difference was of borderline significance ($0.01 < p < 0.05$). In Indonesia, women in rural areas appear more likely to use contraception than women living in urban areas, when account is taken of the effect of the relative educational attainment of couples in rural versus urban areas (and the demographic variables are controlled); the difference between rural and urban areas was, however, not very large (8 percentage points).

By comparison with the large education differentials examined earlier, the differential by type of place of residence appears to be of moderate size in many, though not all, countries. Some of the surveys did not cover the most remote areas of the country; thus, it is possible that the differentials are really somewhat larger, in some cases, than these data indicate.[49] A simple distinction between rural and urban areas does not, of course, capture the entire effect of size of place of residence, which varies along a continuum.

[49] In Indonesia, the survey covered only Java and Bali, which contain approximately two thirds of the total population, while the survey in Malaysia was confined to Peninsular Malaysia. Several other countries omitted smaller fractions of the total population.

Chapter V

LEVELS AND TRENDS OF NUPTIALITY*

The age at which women marry, the proportion of women within the childbearing ages who are married at any given time, the relative number in each birth cohort who ultimately marry, and changes in these phenomena over time have been among the important determinants of fertility levels and trends. As family size norms decrease and populations become increasingly more desirous of and adept at effectively regulating family size, age at marriage has little bearing on completed fertility, although it may play a modest role in the fluctuations of crude birth rates and general fertility rates. However, in most, if not all, of the developing countries, the effective practice of fertility regulation is not diffuse; and childbearing has not yet become elective for the majority of couples, as it has for those in the developed countries. Thus, in these countries, age at marriage still has an important bearing on completed family size.

In populations of this type, which are found almost exclusively in the developing countries, female celibacy is infrequent, as the value placed on marriage and childbearing is very high and women have access to few other, if any, acceptable roles. Thus, most women enter a legal or other socially acceptable union.

The proportion married among women of reproductive ages is a determinant of aggregate fertility in most developing countries. But in some, childbearing is customary in unions other than those acknowledged by formal marriage. In many developed countries, too, standards have changed since the mid-1960s or later, so that many women, particularly young women, bear children while single; and others form a consensual union, which may or may not be a preliminary step to marriage with the same partner. The union often produces children. Indeed, the new patterns of behaviour with respect to marriage and its dissolution are among the most important demographic changes to have occurred in many developed countries for some time.

Concomitant with the easing of social restrictions against sexual congress outside of legal marriage in some developed countries, there has been a sharp rise in the incidence of separation and divorce, but with frequent remarriage. Divorce has been adopted as a solution to marital difficulties with increased frequency also in some of the developing countries that have not experienced a growing tendency for couples to form consensual and other, less binding unions prior to or in preference to legal marriage.

In the light of the foregoing discussion, it would appear that for many developed countries, legal marriage and factors relevant to its formation are no longer the appropriate framework within which to analyse fertility. For many developing countries also, particularly in Africa and Latin America, other types of unions contribute a large share of aggregate fertility and therefore should be analysed as a part of research on nuptiality.

This report focuses on ages at marriage and proportions married, is intended to shed some light on the prevalence of consensual and other non-legal unions in both developing and developed countries, and discusses remarriage in the countries for which data could be examined. Owing to the unavailability of relevant statistics for a sufficient number of developing countries, the incidence and trends of divorce are not discussed.

A. Developing countries

Africa

The nuptiality data that are available for most countries of Africa are generally of poor quality and do not necessarily reflect conditions in recent years. Furthermore, they are generally insufficient to assess trends. Throughout Africa, there is great variation in marriage customs and traditions; thus, conditions in any one country are probably not representative of the major area or even of a region.

Proportions never married and age at marriage: analysis of census and ad hoc *survey data*

In so far as can be judged from available data, it appears that marriage is nearly universal in Africa and that most women in Africa south of the Sahara marry at a fairly early age (table 29). Among seven countries, the singulate mean age at marriage for the year 1967 and later ranges from 16.6 to 23.4. Measures for the two Northern African countries for which data are accessible are within these margins, being 19.1 and 23.3, respectively, for Morocco (1971) and Tunisia (1975).

The statistics in table 29 show that, at around the time specified, there was no uniformity as to the proportions of women in the countries of Eastern Africa that are represented who married before age 25. In Uganda, the United Republic of Tanzania and Zambia, women clearly married very early; the singulate mean age at marriage for

* Prepared by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat.

TABLE 29. PROPORTIONS NEVER MARRIED AT SPECIFIC AGES AND SINGULATE MEAN AGE AT MARRIAGE ACCORDING TO MOST RECENT CENSUS OR SURVEY, SELECTED COUNTRIES, 1960 OR LATER

Major area, region and country	Year	Males never married in age group: 20–24	25–29 (percentage)	45–49	Singulate mean age at marriage (years)	Females never married in age group: 20–24	25–29 (percentage)	45–49	Singulate mean age at marriage (years)	Difference between male and female patterns in singulate mean age at marriage (years)
AFRICA										
Eastern Africa										
Mauritius	1962	78.2	36.1	5.9	26.2	27.4	11.4	5.2	19.9	6.3
	1972	84.2	44.4	5.4	27.2	46.1	17.4	3.7	22.4	4.8
Réunion	1961	79.9	43.4	11.7	26.9	58.8	34.3	16.9	23.9	3.0
	1967	80.6	39.9	12.0	26.4	57.2	31.3	16.6	23.4	3.0
Rwanda	1970	45.5	10.0	0.8	22.6	18.0	1.8	0.1	20.1	2.5
Uganda	1969	57.4	30.7	12.1	23.9	13.2	6.8	5.8	17.7	6.2
United Republic of Tanzania										
Tanganyika	1967	56.7	24.6	4.4	24.1	9.2	3.2	1.3	17.9	6.2
Zanzibar	1967	60.9	25.1	7.0	24.1	4.3	2.2	0.9	16.6	7.5
Zambia	1969	63.8	21.8	3.1	24.5	9.6	3.8	2.2	18.2	6.3
Zimbabwe[a]										
Asian	1969	80.9	36.4	2.2	26.6	51.6	20.0	2.2	23.1	3.5
Coloured	1969	78.4	29.4	9.4	25.6	50.3	20.5	7.3	22.7	2.9
European	1969	75.5	28.4	5.3	25.7	40.5	12.5	4.2	22.1	3.6
Northern Africa										
Morocco[b]	1960	59.0	22.5	2.5	24.2	7.7	3.0	2.0	17.5	6.7
	1971[c]	67.9	27.5	3.1	25.0	18.3	5.0	2.3	19.1	5.9
Tunisia	1966[d]	82.3	41.2	3.8	27.0	27.0	8.7	1.5	20.9	6.1
	1975	86.2	47.7	3.0	27.9	45.5	14.5	1.6	23.3	4.6
LATIN AMERICA										
Caribbean										
Cuba	1970	63.0	28.5	15.8	23.3	30.2	14.2	10.6	19.4	3.9
Dominican Republic	1960	73.1	43.5	15.3	25.9	34.4	20.0	18.5	19.2	6.7
	1970	75.8	48.6	23.8	26.1	39.2	21.9	17.0	19.7	6.4
Guadeloupe[b]	1961	92.6	67.8	30.4	30.6	75.1	55.4	35.2	26.4	4.2
	1967	94.0	61.3	27.2	29.0	73.5	49.4	32.2	25.4	3.6
Haiti	1971	88.5	55.8	13.8	28.1	61.8	32.8	19.7	22.4	5.7
Jamaica[b]	1960	96.1	82.7	42.9	33.1	88.2	72.0	41.7	29.3	3.8
Martinique[b]	1961	93.6	71.9	31.8	29.8	83.2	60.8	37.6	27.1	2.7
	1967	94.5	63.0	27.4	29.1	81.2	55.2	33.3	26.2	2.9
Puerto Rico[e]	1960[f]	63.1	27.5	9.2	24.6	39.6	15.7	5.5	21.6	3.0
	1970	61.9	26.6	9.7	24.0	45.3	18.7	6.5	22.1	2.0
Middle America										
Costa Rica[b,g]	1963	71.2	36.1	12.0	25.4	45.0	24.8	16.0	21.3	4.1
	1973	70.8	35.0	10.3	25.4	48.7	26.5	14.6	21.7	3.7
El Salvador	1961	66.2	38.8	16.0	25.0	44.3	28.9	26.3	18.9	6.1
	1971	67.3	35.8	14.5	24.8	43.7	25.4	22.3	19.0	5.8
Guatemala	1964	55.9	28.7	11.0	23.8	30.7	17.2	14.6	18.8	5.0
	1973	55.5	25.2	8.2	23.6	34.2	17.8	12.0	19.3	4.3
Honduras[h]	1961	66.9	37.4	14.4	25.1	39.4	24.5	24.1	17.9	7.2
Mexico	1960	59.5	28.1	6.7	24.4	35.8	18.4	8.5	21.3	3.1
	1970	61.2	27.2	6.4	24.4	38.5	17.4	7.1	21.2	3.2
Panama	1970	65.8	34.4	12.0	24.8	33.5	15.1	6.9	20.4	4.4
Temperate South America										
Argentina	1960[i]	84.0	46.3	14.1	26.8	55.6	28.3	13.4	23.1	3.7
	1970	78.8	42.1	12.8	26.4	56.0	27.4	11.0	23.1	3.3
Chile	1960[j]	77.0	41.7	13.5	26.4	57.1	32.4	14.3	23.5	2.9
	1970[k]	73.6	37.4	11.0	25.7	56.1	29.7	13.0	23.4	2.3
Uruguay	1963	81.1	47.1	15.4	26.9	54.1	28.3	13.6	22.8	4.1
	1975	72.6	37.7	14.8	25.4	48.6	24.1	10.6	22.4	3.0
Tropical South America										
Brazil	1970	75.0	37.1	7.0	26.2	50.8	24.8	8.8	23.0	3.2
Colombia	1964	76.2	44.0	14.0	26.5	46.6	27.8	18.6	21.3	5.2
	1973	75.3	42.1	12.0	26.3	51.2	29.1	14.9	22.3	4.0
Ecuador[l]	1962	65.5	33.9	10.1	25.1	39.7	22.3	14.0	20.7	4.4
Guyana	1960	68.3	37.6	17.1	25.1	41.8	27.6	19.8	20.1	5.0
Paraguay	1972	79.7	42.8	11.3	26.5	54.9	31.2	20.0	21.7	4.8

TABLE 29 (*continued*)

Major area, region and country	Year	Males never married in age group: 20–24	25–29 (percentage)	45–49	Singulate mean age at marriage (years)	Females never married in age group: 20–24	25–29 (percentage)	45–49	Singulate mean age at marriage (years)	Difference between male and female patterns in singulate mean age at marriage (years)
Tropical South America (continued)										
Peru	1961[m]	70.0	37.3	10.6	25.7	45.2	25.3	14.1	21.7	4.0
	1972[n]	68.9	34.7	8.5	25.2	44.5	22.3	10.3	21.8	3.4
Venezuela	1961[o,p]	75.8	47.3	20.4	26.1	42.2	27.0	24.8	18.8	7.3
	1971[o]	75.0	41.7	15.3	25.6	50.7	28.1	21.0	20.2	5.4
NORTHERN AMERICA										
Canada	1961	69.5	29.6	10.5	24.8	40.5	15.4	9.5	21.4	3.4
	1966	70.0	27.4	10.1	24.7	44.2	14.9	7.9	21.8	2.9
	1971	67.6	25.6	9.1	24.4	43.5	15.4	7.0	22.0	2.4
	1976	67.7	27.0	8.3	24.4	45.3	16.3	6.2	22.3	2.1
United States of America	1960	53.2	20.8	7.2	23.3	28.4	10.5	6.5	20.3	3.0
	1970	55.5	19.6	6.6	23.5	36.3	12.2	5.4	21.5	2.0
EAST ASIA										
Japan	1960	91.6	46.1	1.4	27.4	68.3	21.7	2.1	25.0	2.4
	1965[q]	90.3	45.7	1.7	27.4	68.1	19.0	3.0	24.8	2.6
	1970	90.0	46.5	1.9	27.5	71.6	18.1	4.0	24.6	2.9
	1975	88.1	48.3	2.5	27.6	69.3	20.9	4.9	24.5	3.1
Other East Asia										
Hong Kong	1961	86.2	56.2	5.1	28.7	48.6	15.5	7.4	21.9	6.8
	1971[r]	92.1	63.5	7.2	30.2	67.6	20.1	3.8	23.8	6.4
Republic of Korea[b,q]	1960	79.2	24.8	0.2	25.3	31.7	2.8	0.1	21.3	4.0
	1966	90.0	38.4	0.2	26.7	51.3	7.7	0.1	22.8	3.9
	1970[q]	92.6	43.4	0.2	27.2	57.2	9.7	0.1	23.3	3.9
	1975	92.9	47.0	0.3	27.4	62.5	11.8	0.2	23.7	3.7
SOUTH ASIA										
Eastern South Asia										
Burma	1973	57.5	25.0	3.6	24.2	35.9	16.6	5.7	21.3	2.9
Indonesia[s]	1971	58.6	18.5	1.8	23.8	18.5	5.0	1.0	19.3	4.5
Malaysia[t]										
Peninsular Malaysia	1970	75.4	32.4	3.1	25.8	43.0	13.8	1.3	22.3	3.5
Sabah	1970	64.9	32.0	5.1	25.3	30.7	9.7	2.8	20.3	5.0
Sarawak	1970	57.7	23.9	4.2	24.1	31.8	12.7	3.4	21.0	3.1
Philippines	1960	65.5	27.1	3.2	25.0	44.3	19.6	7.1	22.2	2.8
	1970	69.3	30.1	3.7	25.4	50.3	21.5	6.7	22.8	2.6
Singapore[u]	1970	88.5	48.0	5.9	27.8	64.6	22.6	3.1	24.3	3.5
Thailand[b]	1960	68.2	25.8	2.4	24.8	38.7	14.1	2.6	22.1	2.7
	1970[v]	65.1	24.9	3.2	24.7	37.9	15.6	3.0	22.0	2.7
Middle South Asia										
India	1961[w,x]	43.9	17.7	3.3	22.0	6.0	1.9	0.5	16.8	5.2
	1971[w,y]	50.3	18.9	2.9	22.7	9.1	2.0	0.4	17.7	5.0
Iran[z]	1966	69.0	26.9	1.5	25.0	13.3	3.8	0.8	18.5	6.5
Nepal	1961	26.9	10.4	1.6	20.1	5.4	1.9	0.6	16.6	3.5
	1971[b]	33.1	12.3	1.6	21.1	7.9	2.6	0.8	17.5	3.6
Pakistan	1961[aa]	51.2	22.0	2.8	23.3	5.9	2.5	1.0	16.7	6.6
	1968[bb]	66.6	32.5	3.7	25.5	18.0	5.6	0.8	19.6	5.9
Sri Lanka	1963	84.8	50.3	7.4	27.9	41.3	17.1	3.9	22.1	5.8
	1971	86.6	53.2	8.0	28.1	53.2	24.6	4.1	23.5	4.6
Western South Asia										
Arab countries										
Iraq	1965	65.0	37.2	6.4	25.7	31.3	14.1	3.1	20.7	5.0
Kuwait	1970[cc]	74.9	41.8	4.7	26.2	21.0	9.1	3.4	19.4	6.8
	1975	75.5	40.2	3.5	26.4	29.0	12.2	3.0	20.5	5.9
Syrian Arab Republic[dd]	1960	72.3	34.1	4.6	30.6	25.6	10.0	2.7	24.8	5.8
	1970[b]	76.0	34.7	2.7	25.9	29.8	11.1	2.5	20.7	5.2
Non-Arab countries										
Cyprus[b]	1960	64.1	26.4	4.1	24.7	43.9	18.0	4.9	22.7	2.0
	1973	82.4	34.6	2.7	25.9	60.6	25.5	5.0	24.2	1.7
Israel[b]	1961	74.3	30.3	3.6	25.7	33.4	9.5	2.5	21.4	4.3
	1972[ee]	75.9	27.6	3.8	25.4	45.7	15.8	2.3	22.8	2.6
Turkey	1960	52.2	16.8	2.5	22.9	14.3	4.7	1.7	19.2	3.7
	1970[y]	41.4	41.4	2.1	23.9	13.0	13.0	1.6	20.3	3.6
	1975[y]	58.8	18.4	1.8	23.6	24.1	6.8	1.7	20.5	3.1

TABLE 29 (*continued*)

Major area, region and country	Year	Males never married in age group: 20–24 (percentage)	25–29 (percentage)	45–49 (percentage)	Singulate mean age at marriage (years)	Females never married in age group: 20–24 (percentage)	25–29 (percentage)	45–49 (percentage)	Singulate mean age at marriage (years)	Difference between male and female patterns in singulate mean age at marriage (years)
EUROPE										
Eastern Europe										
Bulgaria	1965	63.1	19.6	1.7	24.2	25.4	7.3	2.2	20.7	3.5
Czechoslovakia	1961	74.1	25.8	5.4	25.2	32.8	10.0	6.2	21.1	4.1
	1970	66.5	21.9	5.7	24.6	34.9	10.2	5.0	21.4	3.2
German Democratic Republic[b,ff]	1964	59.9	17.9	2.2	23.9	33.3	12.6	7.9	21.2	2.7
	1971	66.6	19.9	2.1	24.7	34.6	9.4	10.6	20.8	3.9
Hungary	1960	70.8	22.9	5.5	24.7	31.4	11.2	7.3	20.8	3.9
	1970	67.8	23.3	4.3	24.8	32.3	10.4	5.5	20.9	3.9
Poland[gg]	1960	72.2	28.7	4.1	25.3	41.1	15.7	9.2	21.9	3.4
	1970	75.6	27.6	4.5[hh]	25.6	46.6	14.1	7.2[x]	21.5	4.1
Romania	1966	67.9	21.1	2.7	24.5	24.1	7.9	4.3	20.2	4.3
Northern Europe										
Denmark[ii]	1960	77.2	32.4	9.7	25.6	45.9	14.6	9.4	21.6	4.0
	1965	73.5	28.5	9.4	25.1	45.4	13.1	7.6	21.8	3.3
	1970	72.8	29.2	9.8	25.1	44.7	13.8	7.0	22.1	3.0
Finland[b]	1960	75.1	36.9	10.0	26.1	54.0	24.1	14.2	22.5	3.6
	1970	71.6	31.0	12.0	25.6	52.0	22.0	12.0	22.0	3.0
Ireland	1961	92.5	67.2	30.5	29.5	78.2	45.1	22.1	25.2	4.3
	1966	89.6	58.5	29.9	27.8	74.8	37.8	20.5	24.5	3.3
	1971	84.6	49.2	28.3	25.8	68.9	31.2	18.2	23.5	2.3
Norway[b]	1960	78.9	40.7	13.4	26.2	49.7	17.9	13.0	21.4	4.8
	1970	71.8	31.4	13.0	24.9	46.2	16.4	8.4	21.9	3.0
Sweden[b]	1960	82.4	41.3	14.5	26.4	57.5	20.7	11.0	22.5	3.9
	1965	80.7	37.9	13.5	26.0	57.4	20.2	8.6	23.0	3.0
	1970	83.1	40.8	13.9	26.2	60.0	23.0	7.8	23.7	2.5
	1975	91.5	56.3	13.5	28.0	76.0	35.0	7.1	25.7	2.3
United Kingdom										
England and Wales	1961	69.0	29.4	9.6	25.1	42.2	15.7	10.5	21.4	3.7
	1966[c]	66.9	25.9	9.3	24.7	41.3	13.4	8.7	21.4	3.3
	1971	63.2	25.7	10.0	24.2	39.7	13.3	7.8	21.4	3.8
Northern Ireland	1961	79.0	44.8	18.6	26.4	61.3	30.5	18.7	22.9	3.5
	1966	74.6	35.7	17.8	25.0	56.6	24.0	16.2	22.4	2.6
Scotland	1961	70.4	30.8	12.4	24.9	48.2	19.1	14.2	21.4	3.5
	1966	67.8	26.8	11.7	24.4	46.0	16.3	12.5	21.4	3.0
	1971	61.6	25.1	11.7	23.7	42.0	14.6	11.4	21.1	2.6
Southern Europe										
Greece[jj]	1961[kk]	89.2	57.4	6.9[ll]	29.3	65.3	34.7	6.2[ll]	25.7	3.6
	1971[f]	87.0	52.6	6.2[ll]	28.4	52.6	25.6	7.1[ll]	23.8	4.6
Italy[b]	1961	90.9	55.2	9.3	28.5	65.6	31.1	13.7	24.2	4.3
	1971	86.6	45.7	11.1	27.2	56.5	23.2	13.8	22.6	4.6
Malta	1967	84.2	37.9	17.6	25.8	67.2	33.4	20.9	24.0	1.8
Portugal	1960	80.9	39.5	11.5	26.4	62.1	32.0	15.9	24.0	2.4
	1970[b]	80.7	30.8	8.2	25.6	60.7	25.0	12.5	23.3	2.3
Spain[mm]	1966[y]	93.0	53.5	7.1	28.4	73.4	34.9	14.6	25.1	3.3
	1970	90.5	46.0	8.8	27.5	68.3	26.7	12.1	23.7	3.8
Yugoslavia[b]	1971	67.7	25.2	3.7	24.9	36.7	12.6	6.3	21.3	3.6
Western Europe										
Austria[b]	1961	81.8	38.8	8.0	26.4	58.0	24.2	12.1	23.3	3.1
	1971	74.2	33.6	7.0	26.0	45.0	18.6	11.6	21.9	4.1
Belgium[b]	1961	70.7	26.6	9.0	24.7	43.5	14.5	9.2	21.9	2.8
	1970	64.5	22.0	8.3	24.2	40.1	11.7	7.7	21.5	2.7
France[b,nn]	1962[k]	83.6	38.1	10.7	26.4	56.0	19.8	9.0	23.3	3.1
	1968[f]	79.2	32.6	10.2	26.0	56.1	18.1	8.7	23.1	2.9
Germany, Federal Republic of[b,ff]	1961	79.4	35.9	4.9	26.2	54.6	20.8	9.4	23.3	2.9
	1970	74.7	32.4	4.6	26.0	41.6	14.2	10.3	21.4	4.6
Luxembourg[b]	1960	81.0	37.3	11.3	25.9	50.4	19.7	12.0	22.4	3.5
	1966	78.0	35.4	9.4	25.7	45.6	15.7	10.8	21.6	4.1
	1970	76.0	32.5	8.2	25.6	44.1	14.6	10.4	21.4	4.2
Netherlands[b]	1960	83.3	36.9	7.7	26.2	59.4	20.5	11.0	22.9	3.3
Switzerland[b]	1960	86.1	46.2	11.9	27.0	65.3	28.4	15.3	23.6	3.4
	1970	81.3	37.1	9.7	26.0	54.8	21.9	12.2	22.6	3.4

TABLE 29 (*continued*)

Major area, region and country	Year	Males never married in age group: 20–24 (percentage)	25–29 (percentage)	45–49 (percentage)	Singulate mean age at marriage (years)	Females never married in age group: 20–24 (percentage)	25–29 (percentage)	45–49 (percentage)	Singulate mean age at marriage (years)	Difference between male and female patterns in singulate mean age at marriage (years)
OCEANIA										
Australia-New Zealand										
Australia[oo]	1961	72.8	33.2	10.0	25.5	39.5	12.4	7.4	21.3	4.2
	1966	70.0	29.3	9.5	25.0	40.3	12.2	5.9	21.6	3.4
	1971	63.9	25.7	9.0	24.4	35.8	11.6	4.9	21.5	2.9
	1976	66.7	25.5	8.8	24.4	40.1	13.1	4.6	22.0	2.4
New Zealand[pp]	1961	73.0	29.7	9.2	25.3	40.5	12.5	8.3	21.3	4.0
	1966	68.4	26.8	8.8	24.7	38.9	11.8	6.7	21.4	3.3
	1971	62.9	22.2	8.5	24.0	35.5	10.9	5.5	21.3	2.7
Micronesia-Polynesia										
Polynesia										
Fiji	1966	65.3	25.2	4.2	24.6	31.7	10.9	3.2	21.1	3.5
	1976	64.9	24.9	3.0	24.7	36.6	13.1	3.1	21.7	3.0

Sources: Most recent census or survey, or most recent and previous censuses or surveys, unless otherwise specified. For Canada in 1976 and Kuwait in 1975, data taken from files of the United Nations Statistical Office.

[a] Formerly called Southern Rhodesia.

[b] *De jure* population.

[c] Data based on a 10 per cent sample of census returns.

[d] Excluding adjustment for underenumeration estimated at 4.0 per cent.

[e] *De jure* population, but including armed forces stationed in the area.

[f] Data based on a 25 per cent sample of census returns.

[g] Excluding adjustment for underenumeration estimated at 3.2 per cent.

[h] Enumerated population, excluding adjustments for underenumeration estimated at 5.3 per cent for both sexes.

[i] Excluding adjustment for underenumeration estimated at 4.4 per cent for both sexes.

[j] Excluding adjustment for underenumeration estimated at 5.4 per cent for both sexes.

[k] Data based on a 5 per cent sample of census returns.

[l] Excluding adjustment for underenumeration of nomadic Indian tribes and areas omitted in the original count.

[m] Excluding adjustment for underenumeration. Adjusted total is 10,420,357 for both sexes.

[n] Excluding adjustment for underenumeration and allowance of 39,800 for Indian jungle population.

[o] Excluding Indian jungle population estimated at 31,800 in 1961.

[p] Excluding adjustment for underenumeration estimated at 5.8 per cent for both sexes.

[q] Excluding foreign diplomatic personnel, alien armed forces and aliens employed by armed forces and their dependants.

[r] Excluding transients afloat.

[s] Excluding West Irian.

[t] Excluding transients afloat and persons residing outside the country.

[u] Excluding transients afloat and non-locally domiciled military and civilian services personnel and their dependants, numbering 4,565 and 47,959, respectively, at 1970 census.

[v] Excluding adjustment for underenumeration estimated at 2.01 per cent.

[w] Including data for the Indian-held part of Jammu and Kashmir, the final status of which has not yet been determined.

[x] Excluding part of North East Frontier Agency and Sikkim.

[y] Data based on a 1 per cent sample of census returns.

[z] For settled population only; excluding unsettled population (numbering 244,141 for both sexes) and nomadic tribes (numbering 426,146 for both sexes).

[aa] Excluding data for Jammu and Kashmir, the final status of which has not yet been determined, Junagardh, Manavadar, Gilgit and Baltistan. Also excluding data for Frontier Regions of West Pakistan, 111,369 foreigners and probably also a considerable number of nomads.

[bb] Excluding the population of rural tribal areas of D. I. Khan and Peshawar Divisions.

[cc] Including 754 Kuwaiti nationals residing outside the country.

[dd] For Syrian population only.

[ee] Including data for East Jerusalem and Israeli residents and certain military and civilian personnel and their dependants stationed in the area.

[ff] The data that relate to the Federal Republic of Germany and the German Democratic Republic include the relevant data relating to Berlin, for which separate data have not been supplied. This is without prejudice to any question of status which may be involved.

[gg] Excluding civilian aliens within the country and including civilian nationals temporarily outside the country.

[hh] Ages 40–49.

[ii] Excluding Faeroe Islands and Greenland.

[jj] Excluding armed forces stationed outside the country but including alien armed forces stationed in the area.

[kk] Data based on a 2 per cent sample of census returns.

[ll] For ages 45–54.

[mm] Including Ceuta and Melilla.

[nn] Excluding diplomatic personnel outside the country and including members of alien armed forces not living in military camps and foreign diplomatic personnel not living in embassies or consulates.

[oo] Excluding armed forces stationed outside the country, numbering 48,106 in May 1959.

[pp] Excluding diplomatic personnel and armed forces stationed outside the country, the latter numbering 1,936 at the 1966 census; also excluding alien armed forces within the country.

women in these countries around 1967–1970 varied only from 16.6 to 18.2 years. In Réunion, at about that time, women evidently married much later; the singulate mean for the year 1967 was 23.4 years. The same is true with respect to Mauritius, where age at entrance into first marriage appears to have been advanced over the period 1962–1976. A similar trend is noteworthy in Morocco and in Tunisia.

Except for Réunion, in the countries for which data permit observation of change over time, there appears to have been a fairly marked advancement in age at marriage for females, but only a slight delay in marriage among males. Thus, in Mauritius, a gap of 6.3 years in age at marriage between males and females in 1962 narrowed to 4.8 years in 1972. An advancement by 2.5 years in age at marriage for females in Mauritius may be attributed, at

least in part, to the substantial increase in the number of women attending school during the intercensal period. An important rise in the age of females at marriage also appears to have taken place in Tunisia.[1] Analysis of results of the 1966 and 1975 censuses showed that the average age at which Tunisian women married rose from 20.9 to 23.3 in the intercensal interval. The change was no doubt aided by government policies effected in 1967, which favoured lower fertility and the advancement of women and included legislation affecting the minimum age of women at marriage. Of course, the singulate mean age at marriage does not tell precisely the age at which women marry. The data on mean age at first marriage show a fluctuating trend in Mauritius, with a downward movement from 1970 onward, while Réunion appears to have realized a slight advancement in age at first marriage in the early 1970s. However, in both countries, women marry for the first time at relatively advanced ages. In Egypt, the median age at first marriage is much lower and, following a slight rise during the 1960s, appears to have declined.

As for the proportions never married, in both Mauritius and Tunisia, at the most recent census, about 46 per cent of the women in age group 20–24 were still unmarried. It will be noted that, in some countries, the relative number of women who had not married by age 49 increased, while in others there were slight declines. In Mauritius (1972) and Tunisia (1975), the proportions who remained single in age group 45–49 were small, 3.7 and 1.6 per cent, respectively.

Compared with the situation at the previous census, in each of these countries, there appears to have been a rising tendency for women to postpone marriage. In Mauritius, the changes in the proportions of never-married young women in age groups 15–19 and 20–24 are especially remarkable, particularly those in age group 20–24; the proportions in those groups increased by about 22 and 68 per cent, respectively, during the 10-year period. An advancement in the age at which Tunisian women marry is also noticeable as the proportions single in age groups 15–19 and 20–24 increased by 10 and 68 per cent, respectively, during the decade. A sharp rise is also notable for Morocco between 1960 and 1971: the proportion of single women in age group 20–24 increased from 7.9 to 18.3 per cent.

It may also be seen from table 29 that, in the countries of Africa represented, men marry at considerably older ages than do females, except in Rwanda, where the differences in singulate mean age at marriage between males and females is only 2.5 years. Not only is it seen that the men marry later; but, in most countries, relatively more of them are still single at ages 45–49 years than is the case with women.

Results of surveys conducted by the Cairo Demographic Centre in strata of two cities in Africa also revealed wide differences in age of females at marriage. The median ages at marriage in population strata at Kimtambo (Zaire) and for a sample at Tororo (Uganda) were, respectively, 22.0 and 18.7 years.[2] These data obviously are not indicative of the average age at which women in the whole of Zaire and Uganda marry, as they relate to cities or to a stratum within a city. However, they are useful in that, in the absence of more representative measures for these countries, they do afford some insight. In each case, it may be assumed that the median age at which women in the country as a whole marry is somewhat lower than the figures quoted above, mainly because rural women tend to marry earlier than do their urban counterparts.

Preliminary results from a survey conducted in Kenya in 1978, as a part of the World Fertility Survey, provide some information on Kenyan marriage patterns. Among women who were in age groups 20–24, 25–29 and 30–34 at the time of the survey, the median ages at first marriage were, respectively, 18.1, 17.5 and 17.1.[3] These figures do tend to suggest a slight advancement in age at first marriage among the younger women. When it is considered that some never-married women aged 20–24, for example, will eventually marry, the median for that cohort will be even higher. But the same is true with respect to the two older cohorts, so that interpretation of trends from such data can be done only with much caution.[4]

Latin America

In most countries of other regions, except possibly in sub-Saharan Africa, the type of union that is overwhelmingly most common is the legal marriage, the commencement and termination of which may be easily and clearly demarked. In Latin America, however, sexual partnerships assume a greater variety of forms—legal marriages, trial marriages, consensual unions, visiting unions or some variation of these—and, apart from legal marriages, the differences between them are, at certain stages, rather nebulous. However, because all of these union types are very common and because one often leads to another without the introduction of any formality, the marital status of a great many women in these countries may not be clearly definable nor accurately reported nor reported identically by both partners. For example, women in consensual unions may either report their status accurately or say that they are "married", whereas the men have a tendency to report themselves as being single.

Although two types of unions, legal and consensual marriages, are recognized in most countries of Latin

[1] Robert J. Lapham, "Family planning and fertility in Tunisia", *Demography*, vol. 7, No. 2 (May 1970), pp. 241–253; Jacques Vallin, "La nuptialité en Tunisie", *Population* (Paris), vol. 26, special issue (March 1971), pp. 250–266.

[2] M. Sivamurthy and K. S. Seetharam, "Age at first marriage in selected areas of four Arab and African cities", *Family and Marriage in Some African and Asiatic Countries*, S. A. Huzayyin and G. T. Acsadi, eds., Cairo Demographic Centre Research Monograph Series No. 6 (Cairo, 1976), p. 297.

[3] Ministry of Economic Planning and Community Affairs, Central Bureau of Statistics, "Kenya Fertility Survey: major highlights", paper prepared for the World Fertility Survey Regional Meeting for Countries South of the Sahara, Nairobi, 3–5 September 1979, p. 20 (mimeographed).

[4] *Ibid.*

America, not all the countries provide for the collection of information on consensual unions at the census enumeration; and, because there is no legal formality, the unions are not registered. In none of them are data available on visiting unions or trial marriages, except when obtained through sample surveys. However, consensual unions imply stability of partnerships, just as do legal marriages, and the couple also shares living quarters and rears children. Although women in the less stable, visiting unions do not share a common residence with their partners, they do bear and rear children.

One shortcoming of the data arises from the fact that women in consensual unions may on one occasion report their status as consensually married or simply as "married"; and later, when the relationship has been terminated by separation or death of the partner, report themselves as single, causing a distortion of both the age patterns of nuptiality and the changes over time. These data deficiencies sorely complicate analysis and interpretation of nuptiality conditions in Latin America.

Age at marriage and proportions never married: analysis of census and ad hoc *survey data*

As determined by the singulate mean age at first marriage, women in Latin America appear to marry somewhat late, especially if compared with the timing of first marriages among women in Middle South Asia and among some in other Asian regions. Indeed, in so far as the data permit observations, it may be said that the values for women in the Caribbean region and in Temperate South America are, on the whole, the highest to be found in the less developed regions. Around the period 1970–1975, the singulate mean age at marriage of women in these countries ranged from 19.4 in Cuba (1970) to 22.4 in Chile (1970). For some years prior to 1970, values ranging from 25.4 to 29.3 years can be observed in table 29 for several Caribbean countries. Within the Caribbean region, the age of women at first marriage appears to be most advanced in Jamaica, though the data are unfortunately quite old, and lowest in Cuba and the Dominican Republic. However, that legal marriage occurs, on the average, at more advanced ages in many countries of this region does not mean that women do not cohabit earlier or that they bear their first child so late. Age at first entrance into a sexual union is much lower, at least in the countries for which data are available. It is possible that women enter legal unions at an advanced age because of time already spent in visiting unions or other types of partnerships, or because they marry only after a birth. This situation was confirmed by results of field investigations in Jamaica (1972) and in Trinidad and Tobago (1958), which revealed the average age of women at entry into initial union as follows: in a visiting union, age 20.6 years in Jamaica and 20.1 in Trinidad and Tobago; in consensual unions and legal marriages, 21.0 and 21.5, and 23.9 and 23.2, respectively, for the two countries.[5] This finding suggests a pattern of marital history in which, for many women, movement is from a visiting union to either of the other two, although in many cases, the second type of union is consensual and legal marriage is the final of three steps.[6]

Among eight countries in Latin America, the median age of women at first marriage in 1975 varied within the moderate range of from 20.6 to 22.6 years. A 1960 figure for Jamaica indicated very late marriage to be common among women in that country. The major area as a whole has been marked by relative stability in the age of women at first marriage, especially during the 1970s, although slight advancements appear to have occurred in Cuba and Panama.

The information provided in table 29 suggests that, throughout Latin America, but especially in parts of the Caribbean and Middle America, relatively large proportions of women fail to marry before attaining ages 45–49 years.

At younger ages also, it is found that, for many countries, the proportion of women who have never married is comparatively high; among those aged 20–24 years, the values are from 61.8 to 88.2 for four Caribbean countries (1960–1971) and from 49 to 56 per cent in Tropical South America. In 14 of the countries for which the figures could be calculated for at least two dates, no general trend is discernible; in eight, the proportions never married among women aged 20–24 years increased, but in six the trend was towards larger proportions having married by those ages. Movements in the singulate mean age of females at marriage complement the changes in proportions never married at the younger ages. It is emphasized, however, that in view of the tendency of women formerly in consensual marriages to report themselves as such while in the union, but to state that they are single (have never married) once the union has been dissolved, not much credence can be given to the data on proportions never married at specified ages.

As is generally common, males in Latin America marry at older ages than do females. However, the differences among countries in respect of the relative numbers of males and females that remain single at ages 45–49 are not uniform. The significance of this finding is uncertain: the measures are derived from proportions single but, as already indicated, erroneous reporting of marital status is commonly attributable to women formerly in consensual unions; and, in addition, some consensually married men give their marital status as single.

Age at marriage and marital stability: results from the World Fertility Survey

Nuptiality statistics for eight countries of Latin America are available from surveys conducted as a part of the World Fertility Survey. For all of them, except Guyana and Jamaica, mean age at first marriage could be gauged with strong confidence on the basis of a single survey; differences by age groups must be viewed with some care, as the cohorts, especially the younger groups,

[5] George W. Roberts and Sonja A. Sinclair, *Women in Jamaica: Patterns of Reproduction and Family* (Millwood, New York, KTO Press, 1978), pp. 24–26.

[6] *Ibid.*, pp. 33–38.

are truncated and subsequent first marriages of women in the cohorts would raise the cohorts' mean age at first marriage. However, women in these countries appear to enter unions rather early and the truncation effect upon the cohorts aged 25–29 years and over may not be very significant. Table 30 provides data that permit a comparison of mean age at first marriage of women aged 25–29 and 40–44 years at the time of the survey with the relative number of women who married before reaching age 25. On the basis of these data, it would appear that, over the period of 10–30 years to which the figures relate, none of these countries experienced a genuine change in age at first marriage. The slight movement suggested by the measures for Jamaica and Panama must be acknowledged with reservations, owing to the problems involved in defining marital status and to possible errors in the reporting both of current age and of age at marriage. In any case, the data cannot give evidence of more recent changes, as the women in the younger cohort had married, roughly, from 8 to 10 years, on the average, before the survey.

There are differences among these countries in the frequency with which marriages are dissolved and the causes for this step, and in the incidence of remarriage. Results of the surveys taken in Guyana and Jamaica do not provide information on causes of marital dissolution, but it can be seen from table 30 that, in these two countries, from 50 to over 80 per cent, respectively, of first marriages were dissolved. The lower figure for Guyana may be attributable to the fact that, of the two ethnic groups that constitute the population, consensual and visiting unions are considerably more common in one than in the other. In both countries, when a union is dissolved, usually another is readily formed. The proportions of first marriages that had been dissolved were considerably lower in the remaining six countries, particularly those in Asia, excluding Indonesia. A very similar picture is seen for the relative numbers of ever-married women who had been married more than once. And there is some evidence that this frequency is related to traditions with respect to consensual and visiting unions; these union types are probably a counterpart of a high remarriage rate.

In the countries for which data are available, a far greater proportion of first marriages were terminated by separation rather than by divorce or widowhood (table 31). That situation was found because: (*a*) mortality was comparatively low; and (*b*) a very large proportion of the marriages were consensual and termination was necessarily effected merely by separation. The wide prevalence of Catholicism is no doubt a factor in the infrequent occurrence of divorce.

Asia

In Asia, the unavailability of data of good quality seriously impairs knowledge of prevailing nuptiality conditions. The population census is the most substantial source of data, though some recent statistics are available from the World Fertility Survey.

Age at marriage and proportion never married: analysis of census and ad hoc *survey data*

The singulate mean age of women at marriage varies widely among these countries, reflecting, among other things, the differences among them in culture and in such development indicators as the level of female education. Evidently, women of East Asia and Eastern South Asia marry at more advanced ages than do those elsewhere in Asia (table 29).

TABLE 30. MEAN AGE OF WOMEN IN SPECIFIED AGE GROUPS AT MARRIAGE, PERCENTAGE OF MARRIAGES DISSOLVED AND PERCENTAGE OF REMARRIAGES, SELECTED WORLD FERTILITY SURVEY COUNTRIES

Major area and country	Year	Mean age at first marriage for women in age group[a]		Marital formation		Marital stability		Percentage of ever-married women who had been married more than once
		25–29	40–44	Percentage of women in age group 20–24 still single	Mean age at first marriage[b]	Percentage of first marriages dissolved	Percentage of women remarried	
LATIN AMERICA								
Colombia	1976	18.8	19.0	44	18.9	24.9	54.5	14
Guyana	1975	17.7	17.2	...	...	50.4	88.5	35
Jamaica	1975/76	17.4	18.3	...	...	81.6	92.5	68
Panama	1976	19.1	18.4	35	18.7	35.3	70.3	25
Peru	1977	18.9	19.0	48	18.9	20.3	61.0	11
EAST ASIA								
Republic of Korea	1974	21.6	18.6	55	19.9	10.3	40.2	4
SOUTH ASIA								
Bangladesh[c]	1976	12.9	12.1	5	12.5[d]	21.2	58.0	13
Indonesia	1976	16.2	15.6	20	15.8	35.6	76.6	32
Jordan	1972	...	...	27	...	7.4	47.7	4
Pakistan	1975	17.5	16.2	22	16.9	9.8	43.4	4
Sri Lanka	1975	19.4	18.2	61	18.7	13.1	33.8	4
Thailand	1977	19.2	18.9	41	19.2	17.7	64.7	12

[a] Restricted to women who had first married (legally or in common law) before age 25, except in Bangladesh.

[b] Restricted to women aged 25 years or over who had first married (legally or in common law) before the age of 25, except in Bangladesh.

[c] For Bangladesh only; restricted to women who had married before age 20.

[d] For Bangladesh only; restricted to women aged 20 years or over who had first married before the age of 20.

TABLE 31. PERCENTAGE OF MARRIAGES DISSOLVED, BY CAUSE, AND PERCENTAGE OF WOMEN REMARRIED, SELECTED WORLD FERTILITY SURVEY COUNTRIES

Major area and country	Year	Percentage of women whose first marriage was dissolved by			Percentage of women who had remarried
		Widowhood	Divorce	Separation	
LATIN AMERICA					
Colombia	1976	21.4	0.1	78.5	54.5
Guyana	1975	...	...	...	88.5
Jamaica	1975/76	...	...	...	92.5
Panama	1976	7.5	10.5	82.5	70.3
Peru	1977	23.9	2.6	73.5	61.0
EAST ASIA					
Republic of Korea	1974	62.5	29.5	8.0	40.2
SOUTH ASIA					
Bangladesh	1976	47.2	47.0	5.8	58.0
Indonesia	1976	20.4	73.4	5.9	76.6
Jordan	1972	52.6	39.4	7.9	47.7
Pakistan	1975	61.1	21.6	17.3	43.4
Sri Lanka	1975	51.0	9.8	39.0	33.8
Thailand	1977	31.9	20.9	47.2	64.7

In Eastern South Asia, the singulate mean age at first marriage varied from 19.3 in Indonesia (1970) and 20.3 in Sabah (1970) to 24.3 in Singapore (1970). In Middle South Asia, values are, on the whole, lowest, from 17.5 to 19.6, except in Sri Lanka, for which a singulate mean of 23.5 was calculated from 1971 census returns. In both Hong Kong and the Republic of Korea, in East Asia, a trend towards later age at marriage appears to have been under way for some time. Some movement in this direction has occurred also in the countries of Middle South Asia, especially Pakistan, for which the singulate means advanced from 16.7 to 19.6 during the period 1961–1968. No change appears to have been registered in the Philippines and Thailand.

Little can be said of trends in the Arab countries of Western South Asia, as data are available for only two countries; singulate means of 24.8 and 20.7 for 1960 and 1970, respectively, suggest that in the Syrian Arab Republic, women may have begun to marry earlier, whereas in Kuwait, there has been a slight change in the opposite direction. However, each of the non-Arab countries of the region has experienced an advancement in the age at which women marry. Throughout the region, marriage is virtually universal; in none of the countries represented in the table does the proportion never married aged 45–49 at the most recent census exceed 6.7 per cent; and in most, the relative number is under 4 per cent.

These findings contrast with conditions in Japan, an economically more developed country, where the singulate mean has remained at about age 25 for the past decade and a half (table 29). This stability is confirmed more or less by the median age of Japanese women at marriage, which varied only between 23.7 and 24.3 years from 1960 to 1977.

In Asia also, men marry at later ages than is customary for women. However, where trends could be examined, the gap in singulate mean age at marriage of the two sexes appears to have been narrowing, mainly because the age at marriage of females has risen more rapidly than that of males.

The difference has increased in Japan, and increasingly fewer proportions of males aged 20–24 years have married, while the relative number of females in this category has fluctuated upward.

Although nuptiality conditions in China are poorly documented, it is reported that females are not considered to be of marriageable age until they reach 23 years.[7]

Age at marriage and marital stability: results from the World Fertility Survey

Available evidence leads to the conclusion that, on the whole, women in Asia enter their first marriage at an earlier age than is common in Latin America. Among the countries for which data are available, the mean age of females at first marriage varied from 12.5 in Bangladesh to 19.9 in the Republic of Korea. (The discrepancy between these data and the singulate means is due to the differences in methodology; the latter is based entirely on the population single at each age, whereas the means based on World Fertility Survey data were derived from data on the actual age at which respondents reported that they married.) The data suggest that, with few exceptions, women in these countries are marrying at a later age than previously. The trend is strongest in the Republic of Korea, a country that is experiencing a revolution of rising age at marriage, increasing contraceptive practice and declining fertility. Advances in age at marriage may be deduced from the data for Indonesia, Malaysia,

[7] See Chen Muhua, "Birth planning in China", *Family Planning Perspectives*, vol. 11, No. 6 (November/December 1979), pp. 348–354. The legal age at marriage is given in the introduction by Pi-chao Chen, who translated the article.

Pakistan, the Republic of Korea and Sri Lanka, where women aged 25–29 years married, on the average, later in life than did the sample as a whole; the means for the samples are slightly above those for women aged 40–44 years. Women in Bangladesh have historically married extremely early (only 5 per cent were single at ages 20–24), and results of the survey reveal little change. A change in the age at first marriage, if any, would be discernible from the differences in mean age at first marriage for the two cohorts for which figures are provided in table 30. It is fairly safe to conclude that the changes occurring in age at marriage are a part of the demographic revolution that now characterizes many Asian countries. On the other hand, it can be seen in these data that where cultural patterns sustain high fertility, health conditions permitting, they also foster early age at marriage.

Among the women in these national samples, the majority of first marriages remained intact. Dissolution, due mainly to divorce, was greatest in Indonesia, where 36 per cent of first marriages had been terminated. Prevalence of divorce was next highest in Bangladesh (21.2 per cent) and Thailand (17.7). Except in Indonesia and Thailand, most marriages had been dissolved by the death of a spouse. Among most Thai women (47.2 per cent) whose first marriage had been terminated, the cause was attributed to separation. That factor also accounted for the disruption of 39.0 per cent of first marriages in Sri Lanka. However, the relatively high rate of termination by divorce reflects not only social instability but the moderate level of male mortality.

Among the women whose first marriage had been terminated, high proportions had remarried. Thus, when the percentages of dissolved marriages and of remarriages are considered together, it is seen that in those countries, very few once-married women spend large portions of their reproductive life outside of marriage.

The age of women at marriage and the proportions that ultimately marry prior to the end of their reproductive life have historically been among the more important variables capable of influencing fertility. In the populations in which desired family size is small and women are capable of achieving that size through effective use of contraceptives, age at marriage has little bearing on completed fertility, although it may play a modest role in the fluctuations of crude birth and general fertility rates. Conversely, where the effective practice of fertility regulation is not yet diffuse, age at first marriage can be a determining factor in completed family size. In the populations of the latter type, which today are found almost exclusively in the developing countries, female celibacy is infrequent, as the value placed upon marriage and childbearing is very high and women have access to few other, if any, acceptable roles.[8]

[8] Marriage in this context refers to a legal or other socially accepted arrangement.

B. Developed countries

In recent years, a number of developed countries have been experiencing a revolution with respect to the incidence and timing of legal first marriages. The causes of this revolution are as yet unclear. However, it seems reasonable to hypothesize that responsible factors include the youth revolution; changes in the role and status of women; and, not the least important, the radical changes that have occurred in the efficiency of contraceptives, the easier access to them and the far wider incidence of their use. The consequences include alterations of the relative personal satisfactions derived from marriage and family building; the availability to women and men of alternatives to marriage bonds that, if not socially approved, at least do not incur social ostracism; and the option that couples now have of cohabiting freely with considerably less susceptibility to an unwanted pregnancy.[9] Although these changes clearly are not to be found on any appreciable scale in every developed country, they are becoming increasingly apparent in growing numbers of them, especially in Northern and Western Europe.[10]

Proportions married

There are wide differences among the more developed countries in the proportions ever married at relatively early ages. In the developed countries for which data are provided in table 29, the censuses of around 1970 and later years recorded from 50 to 76 per cent of women aged 20–24 years as never having been married, a datum of some significance in the light of the fact that, in those countries, that group has long been one of the two age groups of peak fertility. Proportions of never-married women within these ages were, on the whole, lowest in Northern America, Eastern Europe and Oceania, with values ranging from 24.1 (Romania) to 46.6 (Poland), although low values were recorded also for England and Wales (39.7) and Scotland (42.0). The highest percentages were reported for Northern and Southern Europe (excluding Yugoslavia) and for Japan, with a range from 44.7 (Denmark) to 76.0 (Sweden).

Far greater proportions of males had not married at ages 20–24 than was the case for females. Of course, men typically marry at a later age. At ages 25–29, however, from about 60 to 75 per cent had married, except in Greece, Ireland, Italy, Japan, Spain and Sweden. In all countries, except Canada, Japan and Sweden, later

[9] For a more thorough discussion, see George T. Acsádi and Gwendolyn Johnson-Acsádi, "Recent trends and determinants of fertility in developed countries", *Social, Economic, and Health Aspects of Low Fertility*, Arthur A. Campbell, ed., Department of Health, Education and Welfare, Public Health Service, National Institutes of Health publication No. 80-100 (Washington, D.C., Government Printing Office, 1980), pp. 1–29; Louis Roussel and Patrick Festy, *Recent Trends in Attitudes and Behaviour Affecting the Family in Council of Europe Member States*, Council of Europe Population Studies No. 4 (Strasbourg, 1979), pp. 20–27; and Council of Europe, *Recent Demographic Development in Member States of the Council of Europe*, Country Reports, Cahed 42 (79) rev. (Strasbourg, 1979).

[10] L. Roussel and P. Festy, *op. cit.*, pp. 42–43; and E. M. Bernhardt and B. Holmbeck, "Fertility trends in Sweden", *Yearbook of Population Research in Finland, 1973–1974*, J. Lindgren, ed., vol. XIII (Helsinki, 1974).

censuses enumerated higher proportions of ever-married males aged 25–29 years than were found in earlier censuses. In Japan and Sweden, there appears to have been a tendency for fewer men of these ages to have married. The picture for Canada is unclear, but a downward trend appears to have been slightly reversed.

Among the developed countries, it is only in Sweden that there is a substantial increasing trend of some duration in the proportions never married among women aged 20–24 years; the relative numbers were 57.5, 60.0 and 76.0 in 1960, 1970 and 1975, respectively. A more recent intercensal increase is notable for Canada, for the period 1971–1976 (43.5 and 45.3); and Australia, in 1971–1976 (35.8 and 40.1). Year-end figures for Denmark (1970 and 1975) and the Federal Republic of Germany (1970–1975) show that in those countries also, the change has been upward, from 45.4 to 62.4 in the former and from 41.6 to 46.7 in the latter.[11] Clearly, it is necessary to await the returns of post-1970 censuses or reports from population registers for supporting evidence of marital status changes considered to have occurred during the 1970s. Wherever post-1970 data can be observed, the evidence points to a spread of the phenomenon of delayed female marriages.

Incidence of marriage

Because of their susceptibility to the influence of the sex, age and marital status composition of the population, crude marriage rates are poor indicators of nuptiality trends. They usually do not vary markedly within short periods of time, unless there are very marked changes in the size of the cohorts of youth that represent the pool of marriageable persons. Recently, rising divorce rates and high rates of remarriage make it even more difficult to interpret the crude rates. Certainly, international comparability of crude marriage rates has been additionally affected. Moreover, the increased incidence of remarriage has lessened the influence of delayed first marriages on the annual crude rates. The crude marriage rates are useful, nevertheless, in that, even for the developed countries, they are frequently the only summary measures of nuptiality that are available on an annual basis.

Many countries of Western Europe are experiencing a decline in the incidence of marriage (tables 32 and 33). The phenomenon is widespread and is associated with other significant changes that are taking place in the family. Among the 15 members of the Council of Europe, for example, only Cyprus, Greece and Turkey failed to report declining nuptiality in 1978; and in two of these countries, the incidence of marriage was reported as stable.[12] England and Wales experienced a declining trend during the 1970s; but it appears to have terminated, at least temporarily, in 1977. Apart from this, it may be said that, during the 1970s, the annual number of legally contracted marriages per 1,000 population steadily declined in most countries of Northern and Western Europe. An erratic downward movement characterizes the rates for parts of Southern Europe and a slight rise occurred in the German Democratic Republic and Romania, with stability prevailing elsewhere in Eastern Europe. Among the developed countries outside of Europe, the picture is also mixed; declines occurred in Canada, Japan and countries of Oceania; but in the Soviet Union and the United States of America, the slightly higher rates recorded in the late 1960s persisted. This situation contrasts with trends in the developing countries included in the tables, nearly all of which recorded increases in the crude marriage rate. However, as stated above, these changes may have been caused by changes in population composition. But, as in England and Wales and in the United States, this situation may also be due to the high and rising remarriage rates which may have masked any drop in the incidence of first marriage that the crude marriage rate might otherwise have reflected.[13]

Age at marriage

In countries in the more developed regions, females tend to marry at a later age, although not uniformly so, than is common among women living in the less developed regions. Around 1970, the singulate mean age of females at marriage varied from slightly below 21 years in most countries of Eastern Europe to 25.7 in Sweden; but for most countries, the mean was between 21 and 22 years of age (table 29). It is of interest that this differential between developed and developing countries is not evident in the case of males. With a few exceptions, men in the less developed regions marry at least as late as and in many countries much later than do those in developed countries. Indeed, among countries with data for a year around 1970, the statistics in table 29 show that, in 25 per cent of the developing countries, the singulate mean age of males at marriage is 27 or more years; but this is true for only 5 out of 28, or 17 per cent, of the developed countries.

In the currently developed countries, the secular trend in mean age of females at first marriage had been one of the precipitous downward movement, at least from around 1900 to the end of the 1960s. It is well known that late marriage was a facet of the multiphasic response to high fertility in those countries.[14]

Information available from censuses or population registers around 1975 and later tend to confirm that a reversal of this secular trend in the age of females at marriage is at last under way. The singulate means provided in table 29 reveal this reversal in only one or two countries, but these measures do not relate to dates sufficiently recent to enable observation of the phenomenon. For nearly all of the countries, the singulate means,

[11] *Ibid.*

[12] Council of Europe, *Recent Demographic Development in the Member States of the Council of Europe*. Marriage rates were not provided for Turkey.

[13] "Population trends in 1978", editorial, *Population Trends*, No. 18 (Winter 1979), p. 4; *Marrying, Divorcing and Living Together in the United States Today*, Population Bulletin series, vol. 32, No. 5 (Washington, D.C., Population Reference Bureau, 1977), pp. 4–5.

[14] Kingsley Davis, "The theory of change and response in modern demographic history", *Population Index*, vol. 29, No. 4 (October 1963), pp. 345–366.

TABLE 32. CRUDE MARRIAGE RATES, DEVELOPED COUNTRIES AND SELECTED DEVELOPING COUNTRIES WITH RELATIVELY GOOD STATISTICS, 1960–1978

(Annual number of marriages per 1,000 mid-year population)

Major area, region and country	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*	*1969*	*1970*	*1971*	*1972*	*1973*	*1974*	*1975*	*1976*	*1977*	*1978*
AFRICA																			
Eastern Africa																			
Mauritius[a,b]	4.8	5.3	5.7	5.0	5.5	5.4	5.5	5.1	5.1	4.9	5.6	5.3	6.2	6.6	8.0	8.0	9.5	9.6	11.7
Réunion	7.9	7.3	6.4	6.9	7.1	7.7	7.0	6.6	6.5	6.8	6.8	6.3	6.6	6.6	...	...	...	...	...
Northern Africa																			
Tunisia	6.3	6.6	6.2	7.3	7.0	5.6	5.7	5.9	6.7	6.7	6.7	7.2	8.5	8.0	8.3	8.5	8.4	...	...
LATIN AMERICA																			
Caribbean																			
Jamaica[a]	6.0	5.5	5.0	4.8	4.8	4.5	4.2	4.3	4.5	4.7	4.8	4.4	4.6	4.5	4.5	5.0	4.4	...	...
Puerto Rico	8.6	8.9	9.0	9.2	9.2	10.4	9.8	10.0	10.1	10.8	10.7	11.6	11.7	11.5	11.0	10.5	...	...	...
Trinidad and Tobago[a]	7.2	6.8	6.3	6.0	6.6	6.0	5.6	5.4	5.6	6.0	6.3	6.5	7.0	6.6	6.6	7.0	...	...	...
Middle America																			
Costa Rica	7.2	6.7	5.9	5.9	5.6	5.7	5.6	5.6	5.9	5.9	6.4	6.4	7.0	7.0	7.4	...	7.3	...	...
El Salvador[a]	3.8	3.5	3.6	3.7	3.9	3.5	3.3	3.3	3.3	3.3	3.3	3.7	3.8	4.0	4.2	4.2	4.4	4.2	...
Guatemala	4.2	3.9	3.5	3.5	3.4	3.3	3.5	3.5	3.3	3.5	3.4	3.8	3.9	4.0	4.3	4.0	4.6	...	...
Mexico[c,d]	6.9	6.6	6.6	6.7	7.0	7.1	7.2	7.1	7.3	7.3	7.0	7.2	7.8	8.1	8.0	6.9	6.9	6.5	6.6
Panama[e]	3.4	3.4	3.3	3.6	3.7	3.8	3.9	4.0	4.1	4.9	5.1	5.1	4.9	4.7	4.7	4.8	4.3	5.1	5.1
Temperate South America																			
Chile[a]	7.4	7.4	6.9	7.0	7.1	7.6	7.6	7.4	7.2	7.3	7.6	8.9	8.8	8.4	...	...	7.3	...	...
Uruguay	7.8	8.4	7.7	7.6	7.5	7.7	7.6	7.9	7.7	8.4	8.2	8.1	7.6	7.6	9.2	8.8	...	...	...
NORTHERN AMERICA																			
Canada	7.3	7.0	7.0	6.9	7.1	7.4	7.8	8.1	8.3	8.6	8.8	8.9	9.2	9.0	8.9	8.7	8.4	8.1	7.9
United States of America	8.5	8.5	8.5	8.8	9.0	9.3	9.5	9.8	10.4	10.7	10.6	10.6	11.0	10.9	10.5	10.0	9.9	10.1	10.3
EAST ASIA																			
Japan[f]	9.3	9.5	9.8	9.8	10.0	9.8	9.6	9.6	9.5	9.3	10.0	10.5	10.4	10.0	9.2	8.5	7.8	7.3	...
SOUTH ASIA																			
Eastern South Asia																			
Singapore[a,g,h]	3.7[i]	3.6	3.6	4.0	4.3	4.9	5.6	6.2	6.3	6.6	7.4	7.4	8.5	11.6	12.0	10.4	9.4	...	...
Western South Asia																			
Non-Arab countries																			
Cyprus[j]	...	6.9	6.3	7.7	3.9	7.8	6.0	7.3	4.7	7.3	7.3	8.1	5.2	8.8	5.3	10.2[k]	7.3	9.7	9.7
Israel	7.9	7.3	7.4	7.7	7.8	7.9	7.9	7.4	8.5	9.1	9.1	9.4	9.5	9.0	9.6	9.4	8.3	8.1	8.3
EUROPE																			
Eastern Europe																			
Bulgaria[l]	8.8	8.4	8.1	8.2	8.1	8.0	8.2	8.7	8.9	8.7	8.6	8.2	8.2	8.6	8.5	8.6	8.4	8.5	...
Czechoslovakia	7.8	7.7	7.8	7.9	7.9	7.9	8.1	8.4	8.6	8.7	8.8	9.0	9.3	9.7	9.6	9.5	9.3	9.1	8.9
German Democratic Republic[m]	9.7	9.9	9.7	8.6	8.0	7.6	7.1	6.9	7.0	7.3	7.7	7.6	7.8	8.1	8.2	8.4	8.6	8.8	8.4
Hungary	8.9	8.3	8.1	8.4	8.7	8.8	9.2	9.4	9.3	9.3	9.3	9.1	9.4	9.7	9.5	9.8	9.5	9.1	8.6
Poland	8.3	7.9	7.5	7.2	7.4	6.4	7.2	7.5	8.0	8.4	8.6	8.9	9.3	9.4	9.5	9.7	9.5	9.5	9.3
Romania	10.7	9.7	9.9	9.3	9.0	8.6	8.9	8.0	7.5	7.0	7.2	7.3	7.6	8.2	8.3	8.9	9.1	...	...

Northern Europe																			
Denmark[n]	7.8	7.9	8.1	8.2	8.4	8.8	8.6	8.5	8.1	8.0	7.4	6.6	6.2	6.1	6.6	6.3	6.1	6.2	5.6
Finland[o]	7.4	7.7	7.6	7.4	7.6	7.9	8.4	9.0	8.7	8.8	8.8	8.2	7.6	7.5	7.4	6.7	6.8	6.7	6.3
Ireland[a]	5.5	5.4	5.5	5.5	5.6	5.9	5.8	6.1	6.5	6.9	7.0	7.3	7.4	7.5	7.4	6.8	6.5	6.1	...
Norway[p]	6.6	6.7	6.6	6.6	6.8	6.5	7.4	7.7	7.7	7.7	7.6	7.6	7.3	7.1	6.9	6.5	6.3	5.5	5.7
Sweden	6.7	7.0	7.1	7.0	7.6	7.8	7.8	7.2	6.6	6.1	5.4	4.9	4.9	4.7	5.5	5.4	5.4	4.9	4.6
United Kingdom	7.5	7.5	7.5	7.5	7.6	7.8	8.0	8.0	8.4	8.2	8.5	8.3	8.6	8.1	7.8	7.7	7.3	7.3	...
Southern Europe																			
Albania	7.8	11.3	7.5	7.5	7.2	7.5	6.8	8.6	7.8	7.4	6.8	7.0	...	...	...	...	...	...	...
Greece	7.0	8.4	8.4	9.2	8.9	9.4	8.3	9.4	7.5	8.3	7.7	8.3	6.8	8.3	7.6	8.5	6.9	8.0	7.9
Italy	7.7	7.9	8.0	8.2	8.1	7.7	7.4	7.2	7.1	7.2	7.4	7.5	7.7	7.7	7.3	6.7	6.3	6.1	6.1
Malta[q]	5.9	5.9	5.7	6.2	6.4	6.2	6.1	6.3	6.9	6.8	7.3	8.3	9.2	10.4	10.8	8.5	8.9	9.2	8.8
Portugal	7.8	8.8	7.9	7.9	8.1	8.3	8.5	8.7	8.5	8.8	9.1	9.4	8.8	9.6	9.3	10.9	10.5	9.4	8.3
Spain[r]	7.8	7.8	7.6	7.6	7.4	7.1	7.1	7.1	7.0	7.2	7.4	7.5	7.6	7.8	7.7	7.7	7.1	7.0	7.0
Yugoslavia	9.1	9.1	8.6	8.3	8.7	9.0	8.6	8.5	8.5	8.6	9.0	8.9	9.0	8.8	8.6	8.4	8.2	8.3	7.5
Western Europe																			
Austria[s]	8.3	8.5	8.4	8.2	8.0	7.8	7.7	7.7	7.6	7.4	7.1	6.4	7.7	6.6	6.5	6.2	6.1	6.0	5.9
Belgium[t]	7.2	6.8	6.7	6.7	7.0	7.1	7.2	7.2	7.3	7.5	7.6	7.6	7.7	7.6	7.5	7.3	7.2	7.0	6.8
France[u]	7.0	6.8	6.7	7.1	7.2	7.1	6.9	7.0	7.1	7.6	7.8	7.9	8.1	7.7	7.5	7.3	7.1	6.9	6.6
German Federal Republic of[m]	9.4	9.4	9.3	8.8	8.7	8.3	8.1	8.1	7.4	7.3	7.3	7.0	6.7	6.4	6.1	6.3	5.9	5.8	5.4
Luxembourg[v]	7.1	7.0	6.7	6.6	6.6	6.6	6.6	6.4	6.5	6.6	6.4	6.5	6.6	5.9	6.2	6.8	6.3	6.2	6.0
Netherlands	7.8	8.0	7.9	8.0	8.5	8.8	9.0	9.1	9.2	9.1	9.5	9.3	8.8	8.0	8.1	7.3	7.0	6.7	6.4
Switzerland[a]	7.8	7.7	7.8	7.6	7.5	7.6	7.4	7.5	7.5	7.5	7.5	7.1	6.7	6.3	6.0	5.5	5.1	5.2	5.2
OCEANIA																			
Australia-New Zealand																			
Australia[a,w]	7.3	7.3	7.4	7.4	7.7	8.2	8.3	8.5	8.9	9.2	9.3	9.1	8.6	8.4	8.1	7.6	7.9	7.5	7.2
New Zealand	8.0	8.0	7.9	7.8	8.0	8.3	8.6	8.6	8.7	9.0	9.2	9.5	9.3	8.9	8.4	8.0	7.8	7.2	7.2
Micronesia-Polynesia																			
Polynesia																			
Fiji	8.0	6.7	6.3	6.5	7.5	7.5	6.8	7.3	6.8	7.9	7.8	7.9	8.3	8.3	8.7	8.8	9.4	5.1	...
USSR	12.1	11.0	10.0	9.1	8.5	8.7	8.9	9.0	8.9	9.4	9.7	10.0	9.4	10.1	10.3	10.7	10.1	10.7	...

Sources: For Cyprus, 1976–1978, Council of Europe, *Recent Demographic Developments in the Member States of the Council of Europe*, Country Reports prepared by Members of the Committee for Population Studies, Cahed 42 (79) rev. (Strasbourg, 1979). For other data, *Demographic Yearbook—Special Issue: Historical Supplement* (United Nations publication, Sales No. E/F.79.XIII.8).

[a] Data tabulated by year of registration rather than by year of occurrence.

[b] Excluding dependencies.

[c] For 1969–1972, excluding marriage of residents living outside the country.

[d] For 1972 and 1973, including marriages celebrated in familiar Mexicans.

[e] Excluding the Canal Zone; also excluding tribal Indian population, numbering 62,187 in 1960.

[f] Including data for Okinawa prefecture, formerly referred to as the Ryukyu Islands. Data for Japanese nationals in Japan only.

[g] Excluding transients afloat and non-locally domiciled military and civilian services personnel and their dependants, numbering 3,466 and 2,799 at the 1957 census, and 4,565 and 47,959 at the 1970 census, respectively.

[h] Kandyan marriages are completely registered; registration of Muslim and other marriages is complete.

[i] Prior to 15 September 1961, data are for civil, Christian and Muslim ritual marriages, excluding other marriages that are solemnized according to religious and customary rites.

[j] Excluding aliens temporarily in the area.

[k] Fluctuations in figures reflect prejudice against leap-year marriages.

[l] Including marriages of Bulgarian nationals outside the country, but excluding those of aliens in the country.

[m] The data that relate to the Federal Republic of Germany and the German Democratic Republic include the relevant data relating to Berlin, for which separate data have not been supplied. This is without prejudice to any question of status which may be involved.

[n] Excluding Faeroe Islands and Greenland.

[o] Data refer only to marriages in which the bride was domiciled in Finland.

[p] Data relate to marriages in which the groom was domiciled in Norway.

[q] Including marriages among armed forces stationed outside the country.

[r] Excluding Ceuta and Melilla.

[s] Excluding aliens temporarily in the area.

[t] Including marriages among armed forces stationed outside the country and alien armed forces in the area unless performed by local foreign authority.

[u] Including armed forces stationed outside the country.

[v] Beginning in 1968, data are for *de jure* population.

[w] Marriages prior to 1967 exclude full-blooded aborigines, estimated at 39,319 in June 1954, 40,081 in June 1961 and 49,036 in June 1966.

TABLE 33. INDICES OF CRUDE MARRIAGE RATES, DEVELOPED COUNTRIES AND SELECTED DEVELOPING COUNTRIES WITH RELATIVELY GOOD STATISTICS, 1960-1977
(*1960 = 100*)

Major area, region and country	*1960*	*1961*	*1962*	*1963*	*1964*	*1965*	*1966*	*1967*	*1968*	*1969*	*1970*	*1971*	*1972*	*1973*	*1974*	*1975*	*1976*	*1977*
AFRICA																		
Eastern Africa																		
Mauritius	100.0	108.9	118.3	103.3	114.6	112.0	114.3	106.5	105.3	101.4	115.7	110.2	127.4	137.3	165.8	166.6	197.2	. . .
Réunion	100.0	95.0	81.8	88.2	90.1	97.4	88.9	83.9	82.4	85.8	85.7	79.4	83.9	84.4	. . .	. . .	. . .	. . .
Northern Africa																		
Tunisia	100.0	104.4	99.3	116.8	116.6	111.2	88.8	91.2	93.4	106.9	106.9	106.9	114.9	135.7	128.1	131.7	135.7	135.0
LATIN AMERICA																		
Caribbean																		
Jamaica	100.0	91.7	84.4	80.1	80.6	76.4	70.1	72.0	75.2	79.2	80.3	74.0	76.5	75.9	75.5	83.8	74.3	. . .
Puerto Rico	100.0	103.9	105.6	107.3	107.5	122.0	114.2	117.1	118.5	126.7	124.8	134.9	136.7	135.4	128.9	122.7	. . .	. . .
Trinidad and Tobago	100.0	94.4	87.3	85.2	91.1	83.3	78.0	75.4	77.6	84.0	86.9	91.0	97.2	92.1	91.2	97.2	. . .	. . .
Middle America																		
Costa Rica	100.0	93.3	81.6	81.7	77.2	79.7	78.1	77.8	81.6	81.2	88.5	88.0	97.4	96.6	102.9	. . .	101.4	. . .
El Salvador	100.0	92.7	94.9	97.0	101.7	92.3	86.2	86.0	85.7	85.9	87.2	95.7	100.6	104.2	111.1	108.8	114.2	109.5
Guatemala	100.0	92.4	83.2	84.7	82.4	78.8	82.9	83.6	79.0	83.0	82.7	90.2	92.7	96.9	102.0	96.5	109.4	. . .
Mexico	100.0	95.6	96.3	97.4	102.8	103.6	105.2	103.8	105.8	107.1	102.6	105.2	113.9	117.5	116.7	101.3	100.0	. . .
Panama	100.0	99.7	96.9	108.1	109.7	113.1	115.9	119.5	122.6	144.2	151.2	150.2	144.6	138.6	140.2	142.8	128.3	151.9
Temperate South America																		
Chile	100.0	100.3	95.8	94.9	96.1	103.6	103.5	100.0	98.4	98.8	103.8	120.5	119.5	114.6	. . .	. . .	98.6	. . .
Uruguay	100.0	107.9	99.7	97.4	96.2	99.5	97.2	102.0	99.5	107.8	105.6	104.5	97.5	98.2	117.8	112.9	. . .	. . .
NORTHERN AMERICA																		
Canada	100.0	96.6	95.5	95.0	98.2	101.6	106.6	111.5	113.6	118.7	121.4	121.8	126.2	123.9	122.0	119.5	115.4	112.1
United States of America	100.0	99.9	100.3	103.7	106.6	109.9	112.2	115.3	122.6	125.9	125.1	125.8	129.5	128.6	124.4	118.0	117.4	118.8
EAST ASIA																		
Japan	100.0	101.8	105.2	105.2	106.9	105.0	102.4	102.8	102.0	100.0	107.2	112.3	111.8	106.7	98.4	91.5	83.3	77.4
SOUTH ASIA																		
Eastern South Asia																		
Singapore	100.0	97.7	99.0	108.0	116.7	132.8	151.9	169.0	170.7	179.9	201.1	201.7	230.8	316.2	326.9	283.0	256.7	. . .
Western South Asia																		
Non-Arab countries																		
Cyprus	. . .	100.0	92.5	112.7	57.2	113.6	87.8	106.9	68.2	106.3	105.9	118.6	75.4	128.1	77.5	149.0	102.0	. . .
Israel	100.0	92.8	94.3	97.9	98.7	100.6	99.9	94.7	107.5	115.2	116.2	120.0	120.3	113.8	122.2	107.7	105.3	109.8
EUROPE																		
Eastern Europe																		
Bulgaria	100.0	95.9	92.1	93.8	92.9	91.7	93.1	99.5	101.3	99.6	98.3	93.2	93.6	98.3	97.0	98.1	95.6	97.1
Czechoslovakia	100.0	98.5	100.1	101.9	101.2	101.8	104.3	107.6	109.9	111.6	113.4	115.9	119.9	124.6	122.8	122.5	119.5	117.4
German Democratic Republic	100.0	101.8	99.7	89.0	82.3	78.0	73.3	70.6	72.1	75.4	78.8	78.5	80.6	83.3	84.4	86.8	88.6	90.5
Hungary	100.0	93.4	91.1	94.3	97.5	99.5	103.2	106.1	105.0	104.6	105.3	102.4	105.9	109.8	107.5	111.0	106.9	102.7
Poland	100.0	95.4	91.1	86.8	90.2	77.5	86.8	90.7	97.5	101.4	104.4	107.7	112.7	114.3	115.0	117.9	115.2	115.3
Romania	100.0	90.5	92.0	86.6	85.4	83.4	83.3	74.4	69.4	65.1	66.8	68.3	70.8	76.1	77.7	82.5	85.0	. . .

Northern Europe																		
Denmark	100.0	100.7	103.0	105.1	107.0	111.8	110.2	108.6	103.5	102.2	94.2	84.3	79.4	78.3	83.9	80.2	78.5	79.6
Finland	100.0	103.5	102.9	99.5	102.4	107.1	112.7	120.9	117.4	119.4	119.3	110.8	103.1	100.9	99.3	90.3	91.4	89.9
Ireland	100.0	99.7	101.2	100.0	103.2	108.0	106.7	112.0	118.9	126.3	128.6	133.2	135.6	137.0	135.4	124.7	118.4	112.0
Norway	100.0	101.3	100.2	99.5	102.5	98.4	111.7	116.6	116.7	116.5	114.7	114.5	110.1	107.6	103.9	97.9	95.5	83.9
Sweden	100.0	104.0	106.4	104.9	113.8	115.6	116.7	107.2	98.6	90.5	80.3	73.5	73.4	70.1	82.0	80.3	81.2	72.8
United Kingdom	100.0	100.1	99.4	99.7	101.3	103.6	106.7	106.6	111.9	108.7	113.1	109.9	113.8	107.9	103.7	102.4	96.7	. . .
Southern Europe																		
Albania	100.0	144.2	95.9	95.6	91.8	95.4	86.6	109.7	100.4	94.2	86.5	89.4	. . .	. . .	. . .	. . .	. . .	. . .
Greece	100.0	120.9	119.8	131.8	127.9	135.2	119.1	134.2	107.1	118.4	109.8	118.9	96.9	118.3	108.7	121.0	99.2	114.6
Italy	100.0	101.9	103.5	106.3	104.8	99.4	95.2	93.5	91.4	93.4	95.4	97.0	99.7	99.4	94.4	86.8	82.0	79.6
Malta	100.0	100.2	96.2	104.0	107.4	104.8	103.5	107.0	117.0	114.3	123.3	140.0	155.3	175.3	183.3	144.0	150.7	157.4
Portugal	100.0	111.7	100.3	100.2	102.8	105.8	108.6	111.2	108.1	112.3	116.7	120.6	112.4	123.0	118.8	139.4	133.7	. . .
Spain	100.0	99.6	98.0	97.3	94.6	91.5	91.5	91.7	90.3	92.2	94.5	95.7	98.1	100.0	98.5	99.3	91.7	89.3
Yugoslavia	100.0	99.3	94.6	90.8	95.2	98.2	94.8	93.8	93.2	94.5	98.2	97.9	98.1	95.9	93.8	92.3	90.1	90.6
Western Europe																		
Austria	100.0	102.0	101.0	98.2	96.3	94.4	92.4	92.3	91.7	88.9	85.5	77.6	92.3	79.1	78.7	74.5	73.4	72.3
Belgium	100.0	95.1	94.0	94.0	97.2	98.8	100.9	100.3	101.9	105.3	106.2	106.3	106.9	105.6	105.1	102.2	100.9	98.2
France	100.0	97.4	96.3	101.4	102.7	101.4	98.7	99.6	102.0	108.1	110.7	113.2	115.0	109.8	107.4	104.7	101.0	99.0
Germany, Federal Republic of	100.0	100.2	99.0	93.7	92.3	88.6	86.3	85.8	78.5	78.0	77.8	74.9	71.5	67.7	64.6	66.5	63.4	62.0
Luxembourg	100.0	97.7	94.2	92.5	93.0	92.5	92.7	90.4	91.9	92.4	89.3	91.7	93.1	83.5	97.1	95.0	88.6	87.7
Netherlands	100.0	102.5	101.7	102.7	109.4	113.7	115.8	117.7	119.0	117.6	122.2	119.6	113.6	103.2	104.3	94.4	90.8	86.7
Switzerland	100.0	98.9	100.9	97.9	96.8	97.8	95.2	96.3	96.1	97.4	96.1	91.5	87.0	81.8	77.1	70.9	65.2	66.7
OCEANIA																		
Australia-New Zealand																		
Australia	100.0	99.0	100.3	100.7	104.9	111.9	112.8	115.4	120.6	124.9	126.4	123.9	117.8	114.7	110.9	102.8	107.7	101.6
New Zealand	100.0	100.7	98.9	98.4	100.5	103.6	107.6	108.2	109.7	112.8	115.8	119.5	116.1	111.5	105.7	100.2	97.9	. . .
Micronesia-Polynesia																		
Polynesia																		
Fiji	100.0	84.5	78.9	81.0	94.2	93.4	85.8	91.7	85.0	98.6	98.2	98.5	104.0	104.2	109.2	110.2	118.4	63.4
USSR	100.0	91.2	82.9	75.4	70.4	72.0	74.0	74.8	73.7	77.4	80.6	83.1	78.1	83.4	85.6	88.6	83.7	88.7

which reflect behaviour over some years past, are declining or stable. The exception is Sweden, where advancement of age of women at first marriage apparently began some time ago, as there is a steady rise in the singulate mean from 22.5 years in 1960 to 25.7 in 1975.

Information on median age at first marriage provides a clearer picture of recent changes. The statistics given in table 30 confirm that, in most of the developed countries, women have been marrying at increasingly advanced ages. Although the movement is slow, with an average change of only a few months annually (which in a minority of cases may be statistically insignificant), the trend is unmistakably one of marriage at increasingly later ages. This tendency for women to marry at increasingly older ages is somewhat evident in some of the Eastern European countries but not in the German Democratic Republic, for which the measures are stable, and barely so, if at all, in Czechoslovakia. In the early 1970s, the countries of this region introduced measures to make marriage more attractive and child rearing less burdensome; and these policies may have moderated a tendency for women to marry later. There are exceptions, too, in some countries of Southern Europe; but elsewhere in the developed regions, the trend appears to be towards an increasingly higher age of women at first marriage.

In conclusion, it may be said that both the decline in crude marriage rates and the stability of period measures of median age of women at first marriage, notable in all European countries except those of Eastern Europe and in Sweden, in which there is clearly a rise, point to a deceleration of the decline in age at marriage in some young cohorts and to a possible advancement in others. This view is supported by Roussel and Festy,[15] who examined the marital behaviour of the 1930/31, 1940/41 and 1950/51 birth cohorts in several Western European countries, as well as by others.[16]

Cohabitation among the unmarried

Perhaps the most striking phenomenon of nuptiality in the developed countries over the past decade has been the rapid spread, especially among young people, of the practice of consensual marriage. Both the frequency of marriage and age at marriage have been influenced in some countries by these changing sexual norms. Surveys conducted in Denmark (1975), France (1977) and Sweden (1975), and among Swiss nationals married at Geneva (1974 and 1975), revealed that very large proportions of couples cohabited or lived together prior to legal marriage.[17] Indeed, among Swedish women aged 20–24 years, a larger percentage was cohabiting (unmarried) than was legally married, 28.6 and 21.5, respectively. Furthermore, 37 per cent of women in this age group who had at least one child were in a consensual union.[18]

In France, the percentages of women in this age group who were cohabiting and legally married were reported to be 12 and 49 per cent, respectively. Further, 60.7 per cent of the Swiss nationals married at Geneva in 1974 had lived together prior to formal marriage. Whether this pattern has emerged in other developed countries has not been established, owing to lack of data. It is claimed that such behaviour on the part of young couples has not achieved anything like normalcy in European countries, excluding some Scandinavian countries and one or two in Western Europe.[19] Easy access to a variety of contraceptives and efficiency at birth control, including abortion, are now a part of Western culture. Childbearing is elective. Moreover, there is greatly increased social and individual acceptance of childbearing outside legal marriage. Hence, pre-marital pregnancy tends to necessitate marriage to a far lesser extent than formerly, and this fact tends to advance the age at marriage. But the high and rising frequency of cohabitation prior to marriage or consensual marriage also advances the age at formal marriage. The practice among Swedish couples of living together for about two years prior to formal marriage is reported to have increased the age of women at first marriage by two years over the past decade.[20] Indeed, if the proportion in consensual unions are added to that in legal marriages, it will be seen from the 1975 census that only 50 per cent of Swedish women aged 20–24 were unmarried when that status is defined as not legally married and not in a consensual union. The proportion enumerated as never married among women in that age group amounted to 76 per cent at the 1975 census.

The Council of Europe reported in 1979 that in Iceland, consensual marriage, which had always been common, was on the increase; and that the Norwegian Fertility Survey in 1977 had revealed 5 per cent of all women aged 18–45 years and 12 per cent of those aged 20–24 to be living in consensual unions.[21] About one quarter of the women aged 20–29 years who are living in a union were reported in a 1973 survey to be cohabitants.[22]

In fact, after an analysis of marital status in Denmark, Spøhr wrote that, "in recent years cohabitation has become a widespread phenomenon in Denmark. So widespread that the value of registered information about the marital status of the population has become doubtful."[23] Nor is this phenomenon confined to the developed countries of Europe. In the United States of America, about 20 per cent more unmarried couples were living together in 1970 than in 1960 and 83 per cent more in 1977 than in 1970.[24]

The current structure of vital statistics reports and definitions of "married" in the population censuses of most countries do not permit an adequate assessment of

[15] *Op. cit.*, pp. 10–13.

[16] See, for example, E. M. Bernhardt and B. Holmbeck, *op. cit.*

[17] For data and summary discussions, see L. Roussel and P. Festy, *op. cit.*, pp. 27–29 and 43; Erland Hofsten. "Consensual unions and their recent increase in Sweden", *Statistisk Tidskrift*, vol. 16, No. 1 (1978) pp. 24–32; and J. Trost, "Married and unmarried cohabitation; the case of Sweden, with some comparisons", *Journal of Marriage and the Family*, vol. 37, No. 3 (August 1975), pp. 677–682.

[18] E. Hofsten, *loc. cit.*, p. 30; L. Roussel and P. Festy, *op. cit.*, p. 28.

[19] L. Roussel and P. Festy, *op. cit.*, p. 28.

[20] Council of Europe, *op. cit.*, p. 32.

[21] *Op. cit.*, pp. 19 and 20.

[22] H. Spøhr, "Problems of marital status", *Fertility Decline in the Nordic Countries* (Copenhagen, The Scandinavian Demographic Society, 1978), p. 124.

[23] *Ibid.*, p. 117.

[24] *Marrying, Divorcing and Living Together in the United States Today*, p. 33.

TABLE 34. FIRST-MARRIAGE RATES AND REMARRIAGE RATES, SELECTED COUNTRIES OF EUROPE, SINCE 1960

Region and country	Year	First-marriage rates (per 1,000 never-married population aged 15 and over)		Remarriage rates (per 1,000 widowed and divorced population aged 15 and over)	
		Groom	Bride	Groom	Bride
EASTERN EUROPE					
German Democratic Republic	1960	...	...	...	...
	1965	...	...	...	...
	1970[a]	83.58	86.85	76.65	10.18
	1975[a]	82.07	90.80	74.14	14.93
	1976[a]	81.55	91.01	73.98	15.63
Hungary	1960	...	...	...	...
	1965[b]	83.50	108.19	93.94	21.63
	1970	80.76	107.98	86.17	20.64
	1975	88.97	124.17	72.02	19.68
NORTHERN EUROPE					
Denmark	1960	...	...	...	...
	1965[b]	70.31	87.29	41.87	15.79
	1971	52.23	64.87	36.78	15.72
	1974	45.86	58.96	43.61	20.96
Finland	1960	60.98	61.84	48.23	11.15
	1965	58.47	62.02	48.01	10.58
	1970	65.98	72.06	43.69	10.19
	1975	47.20	53.15	31.96	9.11
Sweden	1960	48.45	57.32	33.23	14.76
	1965	55.51	67.29	30.60	12.82
	1970	37.47	48.11	23.76	9.81
	1975	33.30	42.98	29.63	13.13
	1976	33.33	42.81	29.60	13.40
	1977	29.21	37.40	27.52	12.50
United Kingdom					
England and Wales	1961[c]	76.5	83.0	...	...
	1966	78.9	89.3	...	...
	1970	86.3	100.4	64.69	16.84
	1975	69.4	84.6	84.00	24.81
	1976	63.1	77.7	80.17	24.23
	1977	61.8	76.5	...	...
Scotland	1960	70.76[c]	72.48[c]	29.28[d]	8.53[d]
	1965	77.44[c]	73.04[c]	32.50[d]	9.42[d]
	1970	78.89[c]	82.60[c]	42.73[d]	11.80[c]
	1975	65.50[c]	75.99[c]	56.07[d]	16.39[c]
	1976	60.81[c]	70.95	55.97	16.80[c]
	1977	63.85[c]	68.96	57.06[d]	16.99[c]
SOUTHERN EUROPE					
Portugal	1966	75.51	69.71	25.97	4.36
	1972	92.17	83.62	27.25	4.18
	1973	102.53	92.69	29.82	4.49
WESTERN EUROPE					
Austria	1960				
	1967	67.43	81.18	53.26	10.24
	1970	63.59	68.58	50.34	10.13
	1975	51.83	57.64	44.89	9.53
France	1960				
	1967	58.16	72.79	29.00	8.26
	1970	64.21	78.99	29.70	8.82
	1973	66.48	82.94	31.57	8.80
Germany, Federal Republic of	1960	81.66	84.57	64.48	11.34
	1965	75.58	84.80	68.01	11.60
	1970	69.80	79.96	60.03	11.48
	1975	53.27	63.87	51.69	11.60
	1976	48.11	57.76	51.62	11.97
Netherlands	1960				
	1967	77.62	92.36	41.44	11.08
	1970	82.50	100.02	47.12	13.49
	1975	61.86	77.99	42.30	11.58

[a] Aged 18 years and over.
[b] For 1966.
[c] Aged 16 years and over.
[d] Aged 20 years and over.

the extent to which married life is begun consensually or legally or whether a change is under way. It is hoped that an analysis of marital histories obtained as a part of the World Fertility Survey or in other, future surveys will improve the knowledge of this phenomenon.

Marriages by order of marriage

Most of the countries for which data are available have experienced decreasing first-marriage rates for some time. Table 34 gives first-marriage rates and remarriage rates for brides and grooms in selected countries since 1960. These figures point to a decline in first-marriage rates for both brides and grooms in all of the countries represented, except France, Hungary and Portugal, and excluding brides in the German Democratic Republic. In Scotland also, the trend was moderately reversed in 1977 compared with 1976. But in the other three countries the rising frequency of first marriages is of much longer duration.

Age-specific first-marriage rates and age-specific remarriage rates for females in selected countries are given in table 35; the corresponding index numbers are shown in table 36. Tables 37 and 38 give similar statistics for males. The data show that when age and marital status are controlled, the incidence of marriage declined consistently in all age cohorts from 1965 onward in Austria, the Federal Republic of Germany and Sweden, and beginning in 1970, in Finland. In France, however, the decline persisted in age groups 15–19 and 45–49 but in 1975, was reversed among women aged 20–29 years. Yet another pattern is seen among Hungarian women: the incidence of first marriage dropped continuously from 1965 to 1975 among females in age groups 25–29 and 45–49, decreased after 1970 among women in age group 20–24 and rose throughout the period 1965–1975 among those aged 15–19 years.

The age patterns of male first-marriage rates in most of these countries are very similar to those of females. Noteworthy exceptions are the rates for young Frenchmen aged 15–19 and 25–29 years. During the years 1965–1975, these men entered first marriage with increasingly greater frequency. In Hungary, a post-1970 decline in the rates of first marriage is notable among men over 19 years of age.

It is reported that England and Wales also witnessed a decline in first-marriage rates during the years 1970 to 1977.[25] Among members of both sexes who were under age 23, the decrease was marked, although declines were also registered for those aged 25–29 years. It has been

[25] "Population trends in 1978", *Population Trends*, No. 18 (Winter 1979), p. 4.

TABLE 35. FIRST-MARRIAGE RATES AND REMARRIAGE RATES, BY AGE GROUP OF BRIDE, SELECTED COUNTRIES OF EUROPE, SINCE 1960

Country	Year	*First-marriage rates, by age group of bride (per 1,000 never-married women)*					*Remarriage rates, by age group of bride (per 1,000 widowed and divorced women)*				
		15 and over	*15–19*	*20–24*	*25–29*	*45–49*	*15 and over*	*15–19*	*20–24*	*25–29*	*45–49*
Austria	1960	...	...	...	...	...	...	...	...	...	...
	1965[a]	81.18	64.62	187.21	153.13	38.40	10.24	135.23	196.76	146.70	18.60
	1970	68.58	58.83	204.28	109.89	11.05	10.13	161.76	168.77	137.50	19.64
	1975	57.64	49.38	155.71	105.52	10.01	9.53	145.63	150.49	127.44	18.73
Finland	1960	61.84	41.08	169.02	122.89	10.44	11.15	333.33	273.07	151.73	18.41
	1965	62.02	47.01	163.95	133.14	10.44	10.58	240.74	224.45	140.71	19.38
	1970	72.06	45.26	189.12	133.16	8.92	10.19	89.55	190.17	135.90	18.02
	1975	53.15	30.22	127.30	107.59	6.34	9.11	68.97	132.35	97.26	11.32
France	1960	...	...	...	...	...	...	...	...	...	...
	1965[a]	72.79	39.13	225.90	151.12	13.69	8.26	120.19	189.87	150.23	23.60
	1970	78.99	38.51	214.13	149.08	12.88	8.82	159.08	197.98	144.96	22.66
	1975[b]	82.94	42.21	217.47	155.64	11.79	8.80	210.94	197.44	149.16	24.13
Germany, Federal Republic of	1960	84.57[c]	43.69[d]	196.16	188.96	12.92	11.34[c]	...	316.72	219.20	15.49
	1965	84.80	52.69	212.04	187.85	13.97	11.60	152.17	331.45	253.40	19.64
	1970	79.96	61.85	226.36	162.17	13.05	11.48	139.31	269.45	202.25	22.68
	1975	63.87	48.25	172.24	126.42	11.20	11.60	229.09	201.31	155.44	23.71
	1976	57.76	41.27	151.51	119.62	10.65	11.97	261.18	197.73	157.24	23.91
Hungary	1960	...	...	...	...	...	...	...	...	...	...
	1965[e]	108.19	90.16	276.75	162.21	19.94	21.63	...	380.57	235.07	31.18
	1970	107.98	88.68	277.41	160.79	17.62	20.64	550.16	327.00	232.20	25.30
	1975	124.17	112.29	264.02	146.17	11.25	19.68	435.20	317.96	188.79	28.06
Sweden	1960	57.32	28.87	180.45	177.78	11.92	14.73	357.14	268.69	224.96	28.29
	1965	67.29	38.66	191.89	177.96	12.72	12.82	105.56	252.59	188.57	24.79
	1970	48.11	16.96	121.55	118.49	9.33	9.81	157.89	145.62	116.86	18.57
	1975	42.98	11.34	88.03	106.03	10.57	13.31	111.11	134.82	107.78	21.36
	1976	42.81	11.06	84.81	104.94	10.01	13.40	142.86	126.84	102.09	23.23
	1977	37.40	9.90	70.40	91.70	8.10	12.50	166.70	119.70	95.30	21.20

[a] For 1967.
[b] For 1972.
[c] Aged 16 years and over.
[d] Aged 16–19 years.
[e] For 1966.

estimated that, if current levels of remarriage persist, almost one out of every five men and women born around 1950 would enter a second marriage before reaching their fiftieth birthday.[26]

The United States has witnessed a continued decline in female and male first-marriage rates since 1960 or earlier, and the decline has been most pronounced among young women in their early twenties.[27] The rate for women dropped 26 per cent during the years 1968–1976 alone; for men, the decrease amounted to 28 per cent.[28] The decline occurred at each age within the 18–29 bracket among both males and females, with negative changes of 42.9, 50.2 and 47.3 per cent among the women aged, respectively, 20, 21 and 22 years.[29]

These changes in first-marriage rates are clear evidence, in the absences of direct statistical proof, that the age at which women in these countries first marry has been advancing, though the movement has not as yet been reflected in the census returns on the proportions of people who remain single at specified ages (however, it will necessarily be seen in data from censuses taken in and around 1980). The fact that crude marriage rates reveal relatively little of this is not surprising since, in some countries remarriage rates are very high, if declining, among certain age groups of both sexes (see tables 35–38). In addition to the countries represented in these tables, very high rates of remarriage have been recorded over the past decade in the United States: 31 per cent of the marriages contracted in 1976 were the bride's second marriage; the comparable figure for grooms was 32.7. In 1969, the respective figures were 23.1 and 23.2.[30]

Men remarry far more frequently than do women; and in the countries for which data are available, the trend is, with few exceptions, downward for both sexes. In addition to the countries mentioned above, a decline in remarriage also has been occurring among both sexes in Canada.[31] Just as the incidence of first marriage is increasing in France and Portugal, so are the rates of

[26] Richard Leete, "New directions in family life", *Population Trends*, No. 15 (Spring 1979), p. 9.

[27] *Marrying, Divorcing, and Living Together in the United States Today*, p. 6.

[28] United States of America, National Center for Health Statistics, *First Marriages, United States, 1968–1976*, Vital and Health Statistics, series 21, No. 35 (Rockville, Maryland, September 1979), pp. 7–8.

[29] *Ibid.*, p. 11.

[30] *Ibid.*, p. 2.

[31] Statistics Canada, 1971 Census of Canada, *Profile Studies—Marital Status and Nuptiality in Canada*, Vol. V (Part 1), Ottawa, May 1978, pp. 53–54.

TABLE 36. INDEX NUMBERS FOR FIRST-MARRIAGE RATES AND REMARRIAGE RATES, BY AGE GROUP OF BRIDE, SELECTED COUNTRIES OF EUROPE, SINCE 1960

Country	Year	*First-marriage rates, by age group of bride (per 1,000 never-married women)*					*Remarriage rates, by age group of bride (per 1,000 widowed and divorced women)*				
		15 and over	*15–19*	*20–24*	*25–29*	*45–49*	*15 and over*	*15–19*	*20–24*	*25–29*	*45–49*
Austria	1960	...	...	...	...	...	...	...	...	...	...
	1965[a]	100	100	100	100	100	100	100	100	100	100
	1970	84	91	109	72	29	99	120	86	94	106
	1975	71	76	83	69	26	93	108	76	87	101
Finland	1960	100	100	100	100	100	100	100	100	100	100
	1965	100	114	97	108	100	95	72	82	93	105
	1970	117	110	112	108	85	91	27	70	90	98
	1975	86	74	75	88	61	82	21	48	64	61
France	1960	...	...	...	...	...	...	...	...	...	...
	1965	100	100	100	100	100	100	100	100	100	100
	1970	109	98	95	99	94	107	132	104	96	96
	1975	114	108	96	103	86	107	176	104	99	102
Germany, Federal Republic of	1960	100	100	100	100	100	100	...	100	100	100
	1965	100	121	108	99	108	102	100	105	116	127
	1970	95	142	115	86	101	101	92	85	92	146
	1975	76	110	88	67	87	102	151	64	71	153
	1976	68	94	77	63	82	106	172	62	72	154
Hungary	1960	...	...	...	...	...	...	...	...	...	...
	1965	100	100	100	100	100	100	...	100	100	100
	1970	100	98	100	99	88	95	100	86	99	81
	1975	115	125	95	90	56	91	126	84	80	90
Sweden	1960	100	100	100	100	100	100	100	100	100	100
	1965	117	134	106	100	107	87	30	94	84	88
	1970	84	59	67	67	78	67	44	54	52	66
	1975	75	39	49	60	89	90	31	50	48	76
	1976	75	38	47	59	84	91	40	47	45	82
	1977	65	34	39	52	68	85	47	45	42	75

[a] For 1967.

TABLE 37. FIRST-MARRIAGE RATES AND REMARRIAGE RATES, BY AGE GROUP OF GROOM, SELECTED COUNTRIES OF EUROPE, SINCE 1960

Country	Year	First-marriage rates, by age group of groom (per 1,000 never-married men)					Remarriage rates, by age group of groom (per 1,000 widowed and divorced men)				
		15 and over	15–19	20–24	25–29	45–49	15 and over	15–19	20–24	25–29	45–49
Austria	1960										
	1965[a]	67.43	9.14	115.01	150.90	25.50	53.26	166.67	207.35	202.70	97.64
	1970	63.59	7.87	118.28	132.14	18.70	50.34	142.86	154.91	186.90	91.06
	1975	51.83	8.61	98.21	124.52	12.77	44.89	250.00	143.90	160.73	63.81
Finland	1960	60.98	10.80	113.91	145.31	17.53	48.23	—— 413.46 ——		242.78	71.55
	1965	58.47	13.35	128.02	153.34	15.79	48.01	76.92	281.02	225.13	72.75
	1970	65.98	12.02	135.87	160.45	11.42	43.69	200.00	256.98	212.11	63.84
	1975	47.20	6.65	86.72	110.34	8.17	31.96	. . .	126.33	115.27	31.46
France	1960	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
	1965[a]	58.16	5.95	139.94	150.58	14.11	29.00	444.44	215.09	207.93	57.40
	1970	64.21	6.58	144.28	157.24	11.38	29.70	285.71	267.76	225.46	52.98
	1975[b]	66.48	6.98	146.90	156.70	11.49	31.57	. . .	248.20	211.76	54.26
Germany, Federal Republic of	1960	81.66[c]	4.44[d]	113.37	209.70	35.20	64.48[c]	. . .	366.86	412.47	165.42
	1965	75.58	4.27	110.31	162.91	25.02	68.01	10.67	597.93	404.07	176.51
	1970	69.80	8.26	124.37	151.75	17.36	60.03	6.47	245.14	272.42	123.42
	1975	53.27	9.13	99.16	119.20	10.45	51.69	. . .	155.22	167.63	77.05
	1976	48.11	7.63	86.48	112.42	10.28	51.62	. .	156.52	166.30	71.16
Hungary	1960	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
	1965[c]	83.50	11.94	167.06	234.68	27.60	93.94	. . .	543.50	479.00	152.89
	1970	80.76	12.62	171.16	228.85	20.79	86.17	38.61	377.04	396.08	123.09
	1975	88.97	22.93	166.31	202.26	12.83	72.02	516.13	401.92	306.93	86.68
Sweden	1960	48.45	3.86	96.69	164.02	13.57	33.23[f]	. . .	289.00	265.10	64.37
	1965	55.51	6.08	111.31	185.11	13.03	30.60[f]	. . .	238.10	227.42	53.50
	1970	37.47	2.22	65.79	105.77	7.88	23.76[f]	. . .	149.66	130.70	42.25
	1975	33.30	1.51	42.00	91.50	7.56	29.63[f]	. . .	13.28	112.17	42.70
	1976	33.33	1.50	39.80	89.89	8.45	29.60	200.00	97.48	101.59	42.50
	1977	29.21	1.31	33.37	76.44	8.12	27.52	285.71	113.78	92.10	38.84

[a] For 1967.
[b] For 1972.
[c] Aged 16 years and over.
[d] Aged 16–19 years.
[e] For 1966.
[f] Aged 20 years and over.

TABLE 38. INDEX NUMBERS FOR FIRST-MARRIAGE RATES AND REMARRIAGE RATES, BY AGE GROUP OF GROOM, SELECTED COUNTRIES OF EUROPE, SINCE 1960

Country	Year	First-marriage rates, by age group of groom (per 1,000 never-married men)					Remarriage rates, by age group of groom (per 1,000 widowed and divorced men)				
		15 and over	15–19	20–24	25–29	45–49	15 and over	15–19	20–24	25–29	45–49
Austria	1960	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
	1965	100	100	100	100	100	100	100	100	100	100
	1970	94	86	103	88	73	95	86	75	92	93
	1975	77	94	85	83	50	84	150	69	79	65
Finland	1960	100	100	100	100	100	100	. . .	. . .	100	100
	1965	104	124	89	106	90	100	100	100	93	102
	1970	108	111	119	110	65	91	260	91	87	89
	1975	77	62	76	76	47	66	. . .	45	47	44
France	1960	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .
	1965	100	100	100	100	100	100	100	100	100	100
	1970	110	111	103	104	81	102	64	124	108	92
	1975	114	117	105	104	81	109	. . .	115	102	95
Germany, Federal Republic of	1960	100	100	100	100	100	100	. . .	100	100	100
	1965	93	96	97	78	71	105	100	163	98	107
	1970	85	186	110	72	49	93	61	67	66	75
	1975	65	206	87	57	30	80	. . .	42	41	47
	1976	59	172	76	54	29	80	. . .	43	40	43

TABLE 38 (*continued*)

Country	Year	First-marriage rates, by age group of groom (per 1,000 never-married men)					Remarriage rates, by age group of groom (per 1,000 widowed and divorced men)				
		15 and over	15–19	20–24	25–29	45–49	15 and over	15–19	20–24	25–29	45–49
Hungary	1960	...	...	...	...	...	...	...	...	...	...
	1965	100	100	100	100	100	100	...	100	100	100
	1970	97	106	102	98	75	92	100	69	83	81
	1975	107	192	100	86	46	77	...	74	64	57
Sweden	1960	100	100	100	100	100	100	...	100	100	100
	1965	115	158	115	113	96	92	...	82	86	83
	1970	77	58	68	64	58	72	...	52	49	66
	1975	69	39	43	56	56	89	...	39	42	66
	1976	69	39	41	55	62	89	100	34	38	66
	1977	60	34	35	47	60	83	143	39	35	60

remarriage. But in Hungary, which also had rising rates of first marriage, a decrease in rates of remarriage that is sharper among men than among women is clearly under way.

In summary, it must be said that marriage patterns and trends in the developed countries are highly complex. That a change involving far more than the postponement of marriage is under way is hardly debatable. Something akin to a revolution of attitudes and behaviour with respect to marriage and the family now characterize many of the developed countries. Women are marrying at a later age, but the entry into formal marriage is being preceded increasingly by a period of consensual marriage into which women enter at ages below the median age at which they entered legal marriage only a few years ago. Surely this trend is reflected in the report that in Sweden in 1975, 18 per cent of the women aged 18–19 years were in a union and 87 per cent of those were in a consensual marriage.[32] Thus, it is hardly correct to say simply that age at marriage is being advanced when, in fact, age at first union formation has continued the secular decline. It is that the institution of marriage and attitudes towards it are changing and that the institutional framework has been altered.

With freedom from involuntary parenthood owing to improved contraceptive technology and relaxed laws relating to abortion, there is less need for marriage forced by pre-marital pregnancies; indeed, with the changing mores, in a few countries, motherhood without formal marriage does not carry a stigma. Childbearing in consensual unions is becoming increasingly common. Just as formal marriage appears to be less popular, so is childbearing. Both seem to have been given impetus by the women's movement, which was very strong in the early 1970s. But that movement was preceded by one in which youth rebelled and a great number rejected life in their parental home, so that, for many parents, the rewards of childbearing were lost. All of this points to a change in the family itself as the central factor in the recent alteration of marrying trends.

[32] E. Hofsten, *loc. cit.*, pp. 28–29.

Chapter VI

MORTALITY*

After many years of relative neglect, attention within the demographic community is again being focused on mortality and the role of mortality in demographic, economic and social processes. Concern about recent mortality levels and changes has been most acute in the developing countries. Life expectancy at birth is currently only around 55 years for the less developed regions as a whole and considerably less for certain countries. In comparison, life expectancy in the more developed regions is estimated to be over 70 years at birth and as high as 75 years for individual countries.

Mortality data are generally most scarce and unreliable for those populations, all in the less developed regions, which have the highest mortality and where concern is therefore the greatest. The large differentials between developing and developed countries, both in availability and quality of data as well as in actual mortality levels, necessitate different types of analyses and therefore separate treatment.

A. Developing countries

Patterns of mortality can be measured on a regular basis only in countries with high-quality vital registration systems or continuous ongoing surveys. The lack of such mechanisms in many less developed countries continues to hinder monitoring of mortality trends. Even in countries with reliable data-collection systems, specific measures of mortality, such as life expectancy at birth, often can be calculated only on a decennial basis because the information on the age structure of the population necessary for calculation of age-specific rates is unavailable except during census years.

A recent United Nations study[1] brings together recent information on mortality patterns in the developing (and developed) countries. Much of the information in this study is summarized in the 1979 Monitoring Report;[2] therefore, only a brief description is presented here of relatively current (1970 or later) mortality levels in countries for which reliable estimates have been made as well as of the most recent trends in 23 developing countries with complete death registration systems. Moreover, considerably expanded sections are presented below on age and sex patterns of mortality and chapter XI presents a discussion of mortality differentials.

Recent levels and trends of mortality in selected developing countries

Because of problems of timeliness and data quality, it is not possible to present annual estimates of levels and trends of mortality during the 1970s for all the developing countries. Therefore, the following subsections present the most current estimates (1970 or later) of mortality (crude death rate, life expectancy at birth and infant mortality rate) only for those developing countries for which relatively reliable figures are available to the United Nations. Also, for a smaller set of countries with nearly complete death statistics, estimates of mortality trends are given. Levels and trends of mortality in these countries may not be indicative of those in countries for which reliable figures were not available. In fact, even among a few of the countries for which data are presented here, agreement is not universal as to the current mortality situation.

Recent levels of mortality

Table 39 presents the crude death rate, life expectancy at birth and infant mortality rate for developing countries with relatively reliable estimates. Although there is considerable overlap among the regions, countries with the lowest mortality are generally found in Latin America and East Asia, while those with the highest mortality are found in South Asia and Africa. Not presented in table 39 but of considerable importance because of its very large population are the data for China. Those data are still of unknown reliability. However, life expectancy at birth has recently been estimated as 68 years.[3]

With a few exceptions, the gap between mortality levels in the developing and developed countries remains large.[4] In the mid-1970s, 26 of 31 developed countries had life expectancies at birth of 70 years or more, whereas only 4 of the 56 developing countries had similarly high life expectancies. With respect to infant mortality, 27 of the 31 developed countries, but only 11 of the 56 developing countries, had infant mortality rates under 30 per 1,000 live births. As concerns the crude death rate, both the lowest and highest rates fall in the less developed regions. This finding is to be expected because the crude death rate reflects not only mortality but the underlying age struc-

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* Prepared by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat.

[1] *Levels and Trends of Mortality Since 1950* (United Nations publication, Sales No. E.81.XIII.3).

[2] *World Population Trends and Policies — 1979 Monitoring Report*, vol. I, *Population Trends* (United Nations publication, Sales No. E.79.XIII.4).

[3] *Levels and Trends of Mortality Since 1950.*

[4] For data on developed countries, see tables 45 and 47 in section B.

TABLE 39. CRUDE DEATH RATES, LIFE EXPECTANCY AT BIRTH AND INFANT MORTALITY RATES, SELECTED DEVELOPING COUNTRIES WITH RELATIVELY RELIABLE ESTIMATES, MOST RECENT AVAILABLE DATA SINCE 1970

Major area, region and country	*Period*	*Crude death rates (per 1 000 population)*	*Period*	*Life expectancy at birth*	*Period*	*Infant mortality rates (per 1 000 live births)*
AFRICA						
Eastern Africa						
Ethiopia	1964-1970	20-26	1964-1970	36-44	1964-1970	155-200
Kenya	1977	14	1977	53	1977	83
Malawi	1971-1972	27-28	...	...	...	...
Mauritius	1978	7[a]	1971-1973	63	1978	34[a]
Réunion	1977	6	...	...	1977	18[a]
United Republic of Tanzania	1973	16-18	1973	45-49	1973	120-130
Middle Africa						
United Republic of Cameroon	1976	20	1976	44	1976	157
Northern Africa						
Algeria	1977	14	1977	55	1977	127
Egypt	1978	11[a]	...	...	1975	90
Morocco	1972	15	1972	51	1972	162
Sudan	1973	19	1968-1973	45	1968-1973	141
Tunisia	1978	8[a]	...	...	...	...
Southern Africa						
South Africa	1970	13	1965-1970	57	1970	93-101
Western Africa						
Ghana	1970	17	1970	49	1970	115
Nigeria	1970-1973	21	1970-1973	41	...	...
Senegal	1970-1971	20-22	...	...	...	...
LATIN AMERICA						
Caribbean						
Cuba	1978	6[a]	1970	70	1977	25
Dominican Republic	1965-1970	13	1965-1970	55	1965-1970	96
Guadeloupe	1978	6[a]	...	...	1978	21
Haiti	1965-1970	19	1965-1970	46	1965-1970	150
Jamaica	1978	6[a]	1970	67	1976	20[a]
Martinique	1978	7[a]	...	...	1977	19[a]
Puerto Rico	1978	6	1971-1973	72	1977	20
Trinidad and Tobago	1978	6	1975	67	1978	29[a]
Middle America						
Costa Rica	1977	4	1972-1974	69	1977	28
El Salvador	1970-1972	12	1969-1971	57	1969-1971	105
Guatemala	1975	13	1970-1972	53	1976	76
Honduras	1973-1975	15	1973-1975	52	1973-1975	127
Mexico	1978	6[a]	1969-1971	61	1972-1974	70
Temperate South America						
Argentina	1977	9	1969-1970	66	1977	45
Chile	1975	7[a]	1969-1971	62	1975	61
Uruguay	1976	10	1975	69	1976	46
Tropical South America						
Bolivia	1976	20	1975	47	1975	168
Brazil	1974-1975	9	1974-1975	60	1974-1975	84
Colombia	1973	9	1973	59	1973	77
Ecuador	1965-1970	14	1965-1970	61	1965-1970	115
Guyana	1978	7[a]	...	...	...	...
Peru	1975	13	1969-1971	55	1969-1971	141
Venezuela	1977	6	1971	65	1975-1977	45
EAST ASIA						
Other East Asia						
Hong Kong	1978	5[a]	1976	73	1978	12[a]
Republic of Korea	1971-1975	8	1971-1975	63	1971-1975	38
SOUTH ASIA						
Eastern South Asia						
Indonesia	1975	16	1975	46	1975	114
Malaysia						
Peninsular Malaysia	1976	6	...	...	1977	32
Philippines	1970	11	1969-1971	61	1969-1971	62
Singapore	1978	5[a]	1969-1971	69	1978	12[a]
Thailand	1974-1975	8-10	1969-1971	59	1969-1971	62

TABLE 39 (*continued*)

Major area, region and country	*Period*	*Crude death rates (per 1 000 population)*	*Period*	*Life expectancy at birth*	*Period*	*Infant mortality rates (per 1 000 live births)*
Middle South Asia						
Afghanistan	1972-1973	28-32	1972-1973	35-39	1972-1973	217-235
Bangladesh	1974	20	1969-1974	46	1969-1974	153
India	1970-1972	16	1970-1972	47	1970-1972	122
Iran	1973-1976	12	1973-1976	57	1973-1976	125
Nepal	1975	21	1974-1976	43	1974-1976	133
Pakistan	1972	18	...	...	1971	142
Sri Lanka	1978	7	1970-1972	65	1974	53
Western South Asia						
Arab countries						
Kuwait	1977	5	1974-1976	68	1977	39
Non-Arab countries						
Israel	1978	7	1971-1973	72	1977	18
Turkey	1975	12	1974-1975	57	1974-1975	125

Source: Compiled from various sources by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat.

[a] Provisional.

ture of the population. The youthful population of the developing countries interacts with age-specific death rates to depress the crude death rates so that, for example, Mexico has a lower crude death rate than the United Kingdom of Great Britain and Northern Ireland, even though the Mexican infant mortality rate is higher and life expectancy at birth is lower.

What is most evident from this compilation of mortality figures is the wide disparity of mortality levels not only between developing and developed countries but among the developing countries. As the Governments of all countries desire high levels of health and low levels of mortality for their populations, these disparities reflect at least in part the differential success of countries in implementing mortality reduction policies as well as the still incomplete understanding of the interactions between health and mortality patterns with the various individual, community and environmental factors that affect them.

Recent trends of mortality

Trends of mortality are described for 23 developing countries having populations of 300,000 or more and death registrations systems with 90 per cent or better coverage as indicated in publications of the United Nations Statistical Office.[5] Of these 23 countries, 3 are in Africa, 14 are in Latin America and 6 are in Asia. The countries are, in general, not typical of their regions, as with few exceptions they are countries of relatively low mortality. Therefore, the results of this analysis may not be generalizable to the less developed regions as a whole. Two age-specific mortality measures are considered. The first is the infant mortality rate. The second is the geometric mean of five-year age-specific death rates for ages 15–74. This second measure is an index of adult mortality.[6] Measures have been calculated for dates around 1950, 1965, 1970 and 1975, as well as for the most recent date for which the requisite data are available. The measures are based solely on registration data, without adjustments for coverage errors. Even among these countries, however, there is still some under registration of deaths, especially among infants; and because the interest here is in trends, not levels, the measures have been converted to index numbers with a base value of 100.0 for the date closest to 1950. Tables 40 and 41 present, respectively, the indices of infant and adult mortality along with the average annual percentage changes. It is important to note that although the index of infant mortality is generally available for very recent time periods, this is not always true for the index of adult mortality. This situation is found because infant mortality rates are calculated solely from vital registration data, whereas calculation of the index of adult mortality requires knowledge of the underlying population age structure, information that is usually only available from a census. For many countries, the most recent census was taken during the 1970 round so the data are currently about 10 years old.

From table 40 it can be seen that infant mortality in nearly all the countries studied has been steadily declining since 1950 and, in general, is declining more rapidly now than previously. Nevertheless, in about one half of these

[5] For quality codes, see *Demographic Yearbook 1978* (United Nations publication, Sales No. E/F.79.XIII.1), table 18, pp. 316–320. The data are taken from *Demographic Yearbook — Special Issue: Historical Supplement* (United Nations publication, Sales No. E/F.70.XIII.8).

[6] The use of the geometric mean of age-specific death rates as a concise measure of mortality was first suggested by Schoen. The measure has many desirable features, including ease of calculation and homogeneity (to degree one), that is, a change of p per cent in each death rate will be summarized as a change of p per cent in the measure itself. See R. Schoen, "The geometric mean of the age-specific death rates as a summary index of mortality", *Demography*, vol. 7, No. 3 (August 1970), pp. 317–324.

TABLE 40. INDEX OF INFANT MORTALITY AND AVERAGE ANNUAL PERCENTAGE CHANGE, SELECTED DEVELOPING COUNTRIES WITH RELATIVELY COMPLETE DEATH REGISTRATION

Major area, region and country	Index					Average annual percentage change[a]			
	1949–1951	1964–1966	1969–1971	1974–1976	Most recent	1949–1951— 1964–1966	1964–1966— 1969–1971	1969–1971— 1974–1976	1974–1976— most recent
AFRICA									
Eastern Africa									
Mauritius	100	74	71	54	40 (1979)	−2.0	−0.7	−5.6	−6.7
Réunion	100	47	32	16	10 (1979)	−4.9	−7.5	−12.9	−11.4
Northern Africa									
Egypt	100	90	86	77[b]	64 (1977)	−0.7	−1.0	−2.7	−5.9
LATIN AMERICA									
Caribbean									
Cuba	100[c]	100	108	68	58 (1978)	0.0	+1.5	−8.7	−1.9
Guadeloupe	100	59	59	45[b]	30 (1978)	−3.4	0.0	−6.7	−9.2
Jamaica	100	46	39	31	20 (1978)	−5.0	−3.5	−4.2	−13.8
Martinique	100[d]	55	48	43[b]	22 (1978)	−4.0	−2.7	−2.3	−15.9
Puerto Rico	100	66	43	31	30 (1977)	−2.7	−8.0	−6.2	−2.4
Trinidad and Tobago	100	48	44	33	30 (1978)	−4.8	−1.6	−5.8	−2.6
Middle America									
Costa Rica	100	87	68	40	31 (1977)	−0.9	−4.7	−10.3	−11.8
El Salvador	100	77	71	65	59 (1978)	−1.7	−1.5	−1.6	−3.1
Guatemala	100	88	85	76	68 (1978)	−0.9	−0.7	−2.2	−4.0
Mexico	100	63	67	51	60 (1978)	−3.0	+1.2	−5.3	+5.6
Temperate South America									
Argentina	100	82	49[e]	...	...	−1.2	−2.6	...	...
Chile	100	76	56	42	28 (1978)	−1.7	−5.9	−5.8	−12.7
Uruguay	100	81	88	84	81 (1976)	−1.4	+1.7	−0.8	−4.2
Tropical South America									
Guyana	100	60	51	...	...	−3.3	−3.1	...	...
EAST ASIA									
Other East Asia									
Hong Kong	100	25	20	15	13 (1979)	−0.9	−4.5	−4.6	−7.2
SOUTH ASIA									
Eastern South Asia									
Malaysia[f]	100	53	44	34	32 (1977)	−4.1	−3.5	−4.8	−3.1
Singapore	100	36	26	18	17 (1978)	−6.6	−5.8	−6.9	−2.4
Middle South Asia									
Sri Lanka	100	65	54[g]	...	50 (1976)	−2.7	−2.7	−1.4[a]	...
Western South Asia									
Arab countries									
Kuwait	...	100	86	91	91 (1977)	...	−2.9	+1.0	0.0
Non-Arab countries									
Israel	100	57	51	47	32 (1978)	−3.6	−2.3	−1.7	−9.5

Sources: Based on registered infant mortality rates presented in *Demographic Yearbook—Special Issue: Historical Supplement* (United Nations publication, Sales No. E/F.79.XIII.8), table 1; and *Population and Vital Statistics Report: Data Available as of 1 April 1980*, Statistical Papers, series A, vol. XXXII, No. 2 (ST/ESA/STAT/SER.A/132).

[a] If the index for a given country pertains to years other than those indicated in the index column headings (these years are given in footnotes), the percentage change relates to the period bracketed by those years.

[b] 1974.

[c] 1949.

[d] 1949/50.

[e] 1970.

[f] Data only for Peninsular Malaysia.

[g] 1972.

countries, there is a slight irregularity in the curve, around the period 1965–1970, indicating a temporary slowing (or in a few cases, an actual retrogression) of the pace of infant mortality decline, followed by a resumption of the earlier more rapid decline. Simple unweighted averages of the average annual percentage changes of infant mortality between periods adequately demonstrate this pattern of mortality change. The "typical" country experienced an infant mortality decline of 3.1 per cent per annum from 1949–1951 to 1964–1966, 2.6 per cent from 1964–1966 to 1969–1971, 4.7 per cent from 1969–1971 to 1974–1976 and 6.1 per cent from 1974–1976 to the most recent available date.

Whether similar patterns of mortality decline are occurring during the adult years is less clear because of the sparseness of the data. However, as is shown in table 41, over-all declines in adult mortality have occurred in every country but Kuwait; and the data for Kuwait may largely reflect the improving system for registration of deaths. And in each of the seven countries in which available data allowed a computation of the pace of adult mortality decline at three points in time, an irregularity similar to that of infant mortality occurred during the late 1960s or early 1970s. Taking simple averages, as was done for infant mortality, adult mortality declined 3.6 per cent per annum from 1950 to 1965, 0.9 per cent from 1965 to 1970,

TABLE 41. INDEX OF ADULT MORTALITY AND AVERAGE ANNUAL PERCENTAGE CHANGE, SELECTED DEVELOPING COUNTRIES WITH RELATIVELY COMPLETE DEATH REGISTRATION

Major area, region and country	Index					Average annual percentage change[a]			
	1950	1965	1970	1975	Most recent	1950–1965	1965–1970	1970–1975	1975–most recent
AFRICA									
Eastern Africa									
Mauritius	100	48	46	50	48 (1977)	−5.5	−1.0	+1.6	−1.2
Réunion	100	84[b]	78[c]	...	...	−1.7	−2.4	..	...
Northern Africa									
Egypt	...	...	...	...	...	...	...	...	...
LATIN AMERICA									
Caribbean									
Cuba	...	100	92	...	...	...	−1.6	...	...
Guadeloupe	100	59[b]	69[c]	...	...	−5.1	+5.0	...	...
Jamaica	100	57	55	...	...	−3.6	−0.8	...	...
Martinique	100[d]	69	64[c]	...	...	−3.3	−4.1	...	...
Puerto Rico	100	50	51	...	...	−4.5	+0.3	...	...
Trinidad and Tobago	100	53	53	47	...	−4.1	−0.2	−2.4	...
Middle America									
Costa Rica	100	58[b]	...	48[e]	...	−3.8	−2.1	...	...
El Salvador	100	72[f]	56[g]	...	...	−3.0	−2.4	...	...
Guatemala	...	100[b]	96[h]	...	...	...	−0.6	...	...
Mexico	100	63	62	55	...	−3.0	−0.4	−2.6	...
Temperate South America									
Argentina	100[i]	89[j]	...	...	86 (1977)	−1.9	−0.3	...	...
Chile	100[k]	...	63[g]	...	52 (1976)	...	−2.4	−3.8	...
Uruguay	...	100[l]	95[m]	90	...	...	−1.5	−0.5	...
Tropical South America									
Guyana	100[k]	73[i]	53[h]	...	...	−3.9	−3.1	...	...
EAST ASIA									
Other East Asia									
Hong Kong	100[f]	76	89	70	68 (1977)	−6.5	+3.2	−4.8	−1.5
SOUTH ASIA									
Eastern South Asia									
Malaysia[n]	100[o]	58[j]	52[h]	52	50 (1976)	−5.9	−2.6	+0.1	−4.3
Singapore	100[o]	69[c]	68	61	58 (1977)	−3.6	−0.8	−1.9	−2.4
Middle South Asia									
Sri Lanka	100[p]	89[l]	84[m]	...	...	−1.4	−1.2	...	...
Western South Asia									
Arab countries									
Kuwait	...	...	100	106	102 (1976)	...	...	+2.6	−4.1
Non-Arab countries									
Israel	100[p]	95	98	93	84 (1977)	−0.5	+0.7	−1.1	−4.6

Source: Based on age-specific death rates given in *Demographic Yearbook—Special Issue: Historical Supplement* (United Nations publication, Sales No. E/F.79.XIII.8), table 10.

[a] If the index for a given country pertains to years other than those indicated in the index column headings (these years are given in footnotes), the percentage change relates to the period bracketed by those years.

[b] 1964.
[c] 1967.
[d] 1954.
[e] 1973.
[f] 1961.
[g] 1971.
[h] 1970.
[i] 1960.
[j] 1966.
[k] 1952.
[l] 1963.
[m] 1968.
[n] Data only for Peninsular Malaysia.
[o] 1957.
[p] 1955.

1.3 per cent from 1970 to 1975 and 3.0 per cent from 1975 to the most recent available date.

It seems not to have been uncommon, therefore, both among infants and adults, for there to have been a small slowing of the pace of mortality decline during the period 1965–1970. However, that slowing was, in most cases, temporary; and the pace of mortality decline increased again sometime during the 1970s. It must be emphasized, however, that the countries studied here are a select group that have already attained quite low levels of mortality and the paths of mortality decline presented here may not be representative of the larger group of developing countries. Without the requisite registration or survey data, the extent of mortality change during the 1970s in most developing countries remains speculative.

Mortality patterns by age and sex

As part of a United Nations project to produce a new set of model life tables, 36 male and female life tables for 22 developing countries were constructed and analyses

made of their age and sex patterns of mortality.[7] Table 42 shows the life expectancy at birth and at age 10 in these countries. Although the countries are not fully representative of the less developed regions, they do provide a reliable set of life tables from which observed age and sex patterns of mortality are likely to represent actual patterns rather than errors in the data. Four distinct age patterns and three patterns of sex differentials were identified, conforming approximately to geocultural boundaries.

[7] All available data on levels and age/sex patterns of mortality in countries of the less developed regions were evaluated and analysed. For countries with high-quality death and population data and for countries with poorer data but for which reliable adjustments could be made, life-tables were constructed. These life tables serve as the base life tables for the model life-table project.

TABLE 42. LIFE TABLES CONSTRUCTED FOR THE UNITED NATIONS MODEL LIFE-TABLE PROJECT

Major area, region and country	Period	Male life expectancy at: Birth	Male life expectancy at: Age 10	Female life expectancy at: Birth	Female life expectancy at: Age 10
AFRICA					
Northern Africa					
Tunisia	1968-1969	52.7	56.4	52.5	56.7
LATIN AMERICA					
Caribbean					
Trinidad and Tobago	1920-1922	37.6	40.1	40.1	42.6
	1945-1947	53.0	50.2	55.8	52.4
	1959-1961	62.4	57.0	66.6	60.5
Middle America					
Costa Rica	1962-1964	60.9	59.7	63.7	61.6
	1972-1974	67.5	62.6	71.2	65.7
El Salvador	1970-1972	54.9	57.7	60.1	62.4
Guatemala	1963-1965	46.8	50.5	48.0	51.6
Honduras	1960-1962	40.6	46.7	44.1	49.4
	1973-1975	50.1	52.9	54.3	56.3
Mexico	1969-1971	58.8	57.5	62.9	61.2
Temperate South America					
Chile	1951-1953	51.6	52.0	55.6	55.7
	1959-1961	54.7	54.7	60.1	59.8
	1969-1971	58.9	55.4	64.9	61.1
Tropical South America					
Colombia	1963-1965	57.7	55.6	59.7	58.3
Guyana	1959-1961	59.5	55.1	63.7	58.8
Peru	1969-1971	53.3	58.8	57.3	62.5
EAST ASIA					
Other East Asia					
Hong Kong	1960-1962	63.7	57.8	71.1	65.2
	1970-1972	67.6	59.7	75.2	66.9
	1976	69.6	61.1	76.6	67.9
Republic of Korea	1971-1975	59.3	52.8	66.1	60.0
SOUTH ASIA					
Eastern South Asia					
Philippines	1969-1971	58.7	56.4	64.0	61.0
Singapore	1969-1971	65.9	57.9	72.2	64.0
Thailand	1969-1971	56.5	54.4	60.8	57.9
Middle South Asia					
Bangladesh (Matlab)	1974 and 1976[a]	52.6	56.1	52.8	56.4
India	1970-1972	49.1	53.3	46.2	51.9
Iran	1973-1976	57.2	59.5	56.6	60.8
Sri Lanka	1945-1947	44.8	48.5	43.1	46.8
	1952-1954	58.4	58.6	57.3	57.4
	1962-1964	62.1	59.7	62.6	59.9
	1970-1972	63.8	59.4	66.7	62.2
Western South Asia					
Arab countries					
Kuwait	1974-1976	65.9	60.2	70.3	64.4
Non-Arab countries					
Israel					
Jewish population	1948-1949	65.1	60.5	67.6	62.2
	1960-1962	70.8	63.4	72.6	64.9
	1971-1973	70.5	62.4	73.5	65.0
Non-Jewish population	1971-1973	66.6	60.4	69.9	63.2

[a] Average.

Age patterns of mortality

The four age patterns have been tentatively labelled: the "Latin American pattern"; the "Far Eastern pattern"; the "South Asian pattern"; and the "Chilean pattern".[8] Preliminary mortality models have been developed for each of these patterns. Figures 8 and 9 present graphically these four age patterns of mortality by presenting the ratio q_x/q_x^s as a function of age x, where q_x is the mortality rate at age x for the given model and q_x^s is the mortality rate at age x in the Coale and Demeny[9] life table for the West region with the same life expectancy at age 10. The graphs show the ratios for life expectancies at birth of 40, 55 and 70 years.

The first model, the "Latin American pattern", is based on the life tables of Colombia, Costa Rica, El Salvador, Guatemala, Honduras, Mexico and Peru, as well as some Asian countries, the Philippines, Sri Lanka and Thailand, which were shown by statistical and graphic procedures to have similar patterns of mortality. Compared with historical Western European experience, as described by the Coale-Demeny West region, this pattern shows high mortality during the infant and childhood years, high mortality again during young adult years and relatively low mortality during the older years. These deviations are rather small when mortality is high but increase as mortality declines, presumably reflecting the growing importance relating to Western European experience of diarrhoeal and parasitic diseases during childhood and accidental deaths (mainly motor vehicle) during the prime ages, and the relatively low levels of cardio-vascular diseases at the older ages.[10]

Because the model life-table project included only countries for which data could be reliably evaluated and if necessary corrected, mortality data from the two largest and most populous countries in South America, namely, Brazil and Argentina, were excluded from the sample. This exclusion is unfortunate as these two countries comprise over 40 per cent of the population of Latin America. Life tables are available for Brazil, based on intercensal survival analysis and indirect questions on early-age mortality; and for Argentina, based on civil registration and census data.[11] Death registration in Argentina is generally considered to be reliable for the adult ages but is of unknown completeness for deaths at the earliest ages.[12] Analysis of the data for Brazil show its age pattern of mortality to be similar to that of the Latin American model. The pattern for the life table for Argentine females also closely follows the Latin American pattern; however, the male life table does not. The latter pattern is very close to that of Chile (described below), with relatively low mortality at the younger ages (except during infancy) and somewhat higher mortality at the later years. Further research is necessary to determine why Argentine males should follow the Chilean pattern while the females follow the general Latin American patterns.

As concerns the second age pattern of mortality, the "Far Eastern pattern", Goldman recently noted the existence of a distinctive pattern of mortality in selected "Far Eastern" populations.[13] This pattern is characterized by high male death rates at older ages in relation to their death rates at younger ages and very high sex ratios of mortality at the older ages. She found some evidence that this pattern may be related to a high incidence of tuberculosis in the past which is still evident among adult males in these populations. Research by the United Nations Secretariat has duplicated Goldman's findings for these populations and also has found a similar pattern of high adult mortality in relation to mortality at younger ages in Guyana and in Trinidad and Tobago. However, in these latter two populations, females also show relatively high mortality at the adult ages so that the large sex differentials in mortality at these ages do not appear. A recent life table constructed for Peninsular Malaysia also shows this latter characteristic.[14] The term "Far Eastern pattern" is generalized here to include age patterns characterized by high death rates at older ages in relation to those at younger ages, irrespective of sex differentials. Among populations so far identified as having this pattern are the male populations of Guyana, Hong Kong, Peninsular Malaysia, the Republic of Korea, Singapore, and Trinidad and Tobago; and the female populations of Guyana, Malaysia, Singapore, and Trinidad and Tobago.

A third pattern delineated is the "South Asian pattern" of mortality. This pattern shows, in relation to the West region tables, very high death rates under age 15 and at the oldest ages, with correspondingly lower mortality for the prime age groups. Reliable life tables for the Matlab-Thana area of Bangladesh, India, Iran and Tunisia all show this pattern. Similar patterns appear in less reliable life tables constructed for Bangladesh, Nepal, Pakistan

[8] The labelling used for these patterns does not relate to the geographical divisions established by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat.

[9] Ansley J. Coale and Paul Demeny, *Regional Model Life Tables and Stable Populations* (Princeton, New Jersey, Princeton University Press, 1966).

[10] The relatively low level of mortality at the older ages is a point of some controversy, as the figures may possibly reflect errors in the data rather than a true mortality experience. Nevertheless, there is evidence that the low death rates from cardio-vascular diseases in Latin America may be a significant factor. For results from a study of a number of cities in Latin America, see Ruth Rice Puffer and G. Wynne Griffith, *Patterns of Urban Mortality*, Pan American Health Organization Scientific Report No. 151 (Washington, D.C., 1967), pp. 44–51; and for an analysis of causes of death responsible for the "cross-over effect" in age patterns of mortality, C. B. Nam, N. L. Weatherby and K. A. Ockay, "Causes of death which contribute to the mortality crossover effect", *Social Biology*, vol. 25, No. 4 (Winter 1978), pp. 306–314.

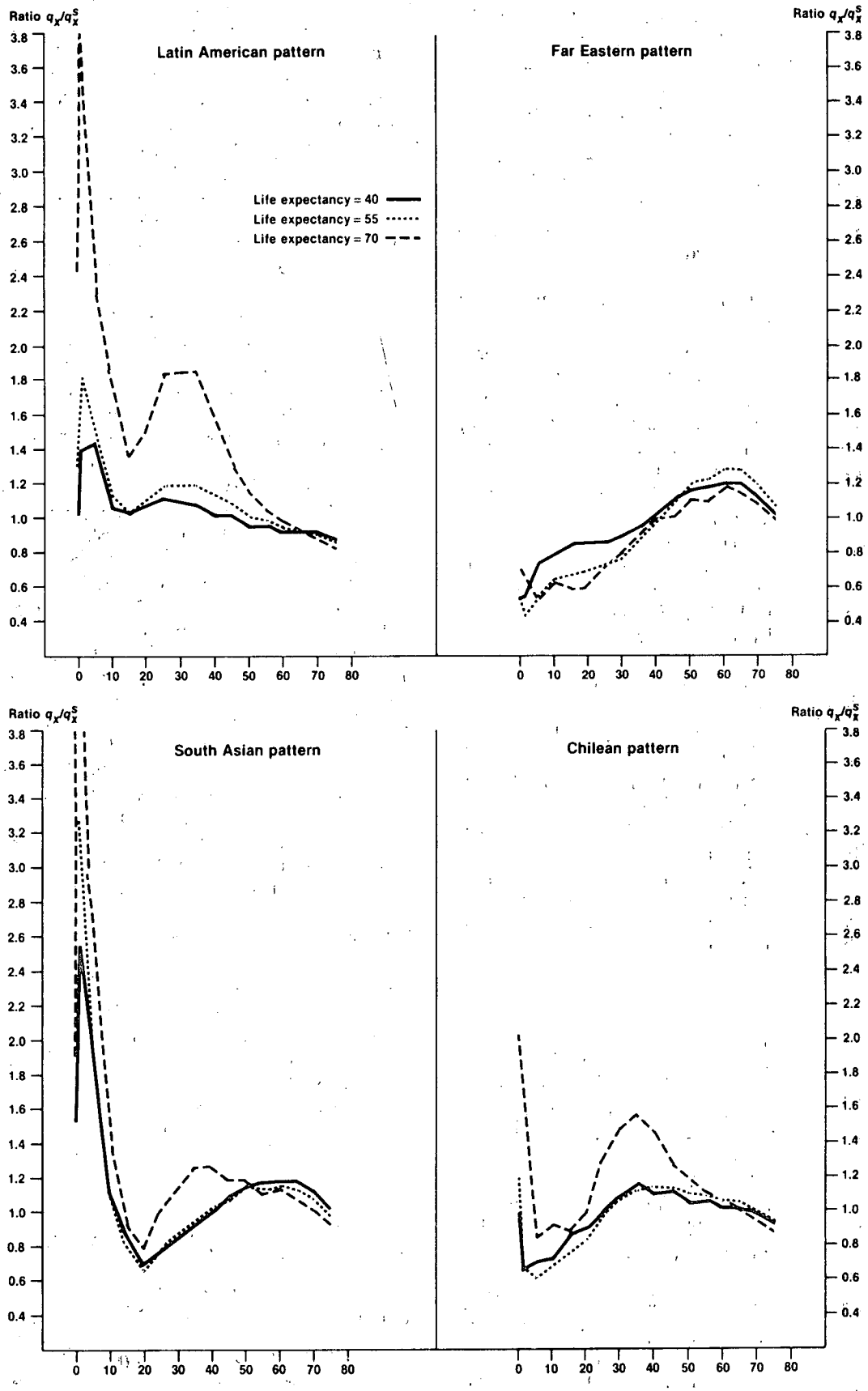
[11] For Brazil, see Valeria da Motta Leite, "Brasil: estudo da mortalidade por sexo e grupos de idade durante o periodo 1950–1970", *Revista Brasileira de Estadistica*; vol. 34, No. 135 (July–September 1973), pp. 435–464. For the Argentine life tables, see Antonio Ortega, *Tablas completas de mortalidad para la República Argentina, 1959–1961* (Santiago, Chile, 1967).

[12] *Population and Vital Statistics Report: Data Available as of 1 April 1980*, Statistical Papers, Series A, vol. XXXII, No. 2 (ST/ESA/STAT/SER.A/132), pp. 8–9.

[13] Noreen Goldman, "Far Eastern patterns of mortality", *Population Studies*, vol. XXXIV, No. 1 (March 1980), pp. 5–17.

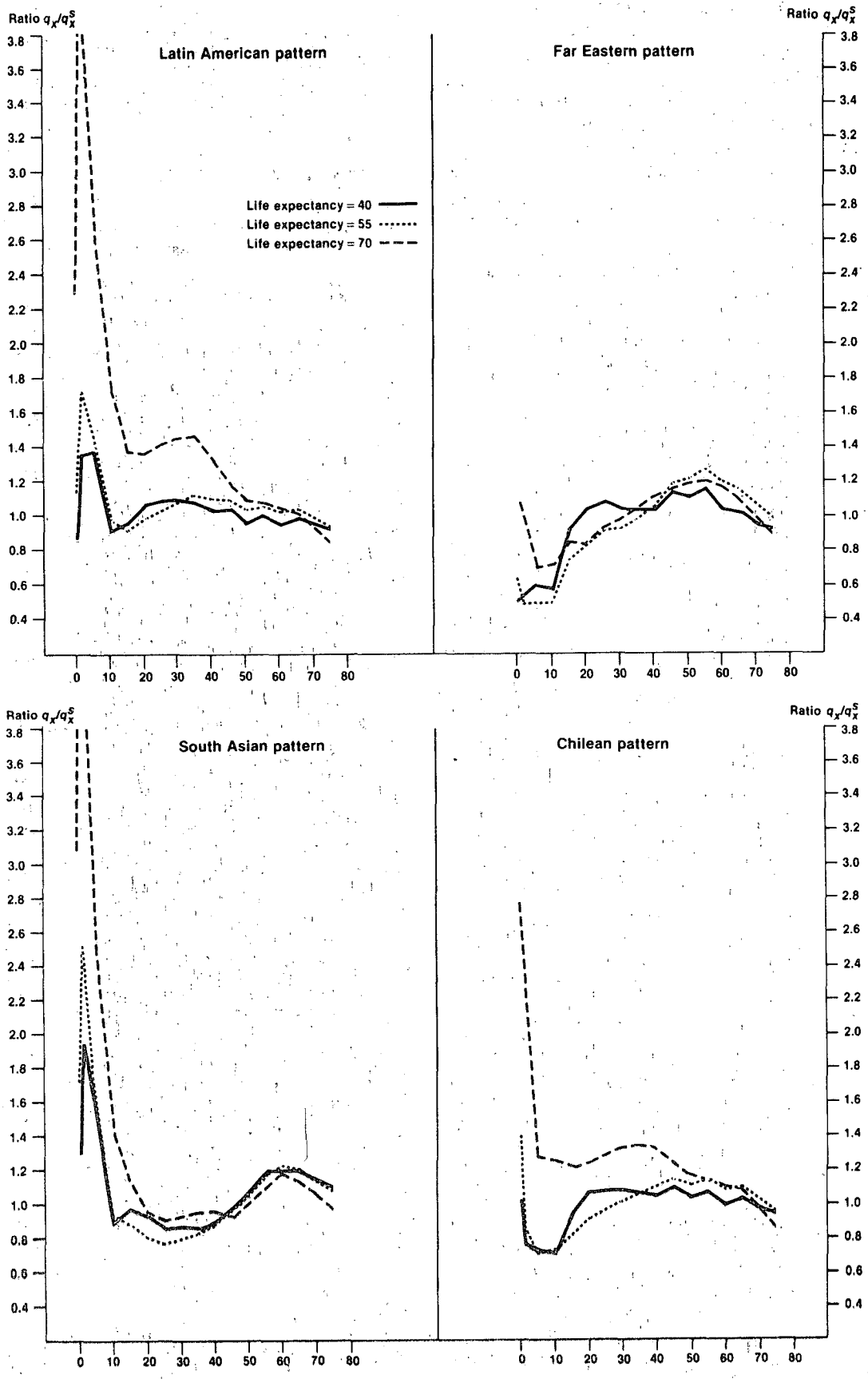
[14] United States of America, Department of Commerce, Bureau of the Census, *Country Demographic Profiles: Malaysia*, by G. S. Finch and A. Sweetser (Washington, D.C., 1979), p. 8, table 5.

Figure 8. Deviations of patterns of developing countries from Coale-Demeny West region: males



NOTE: The labelling of the patterns does not relate to the geographical divisions established by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat; see text for listing of the countries included in each pattern.

Figure 9. Deviations of patterns of developing countries from Coale-Demeny West region: females



NOTE: The labelling of the patterns does not relate to the geographical divisions established by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat; see text for listing of the countries included in each pattern.

and Turkey.[15] Life tables constructed for China and Indonesia also show such a pattern, except for remarkably low mortality under age 5 years.[16] Data on cause of death are nearly non-existent for these populations but it can be surmised that the South Asian pattern is related to high incidences of infectious, parasitic and diarrhoeal diseases at the younger ages and high mortality from diarrhoeal and respiratory diseases at the oldest ages.[17] It is interesting to note that the deviations in these life tables are very similar to those of the Coale-Demeny South region, except that the South region deviations are somewhat less extreme.

The fourth pattern of mortality presented in figures 8 and 9 has been labelled the "Chilean pattern". The Chilean pattern was estimated from Chilean life tables for the periods 1949–1951, 1959–1961 and 1969–1971. It has some similarities to the Far Eastern pattern except for an extremely high infant mortality rate, due presumably to deaths from respiratory diseases.[18] This pattern was unique in the sample of reliable life tables but is included because it may appear in areas where accurate evidence of age patterns of mortality is not yet available.

It appears that the above-mentioned patterns account for many of the variations of mortality in the developing countries of Latin America, Asia and possibly Northern Africa. Age patterns of mortality in sub-Saharan Africa remain unknown, however, due to the extreme unreliability of the limited data available. A recent United Nations report on mortality[19] briefly examines patterns in seven selected sub-Saharan countries (Kenya, Madagascar, Mauritius, Réunion, South Africa (Coloured population only), the United Republic of Cameroon and the Upper Volta) and concludes that the results of the comparisons are disappointing as concerns discovering a single age pattern of mortality for sub-Saharan Africa. If the seven countries analysed are representative, the data for Africa show a wide variety of mortality patterns, some of which are similar to the models of Coale and Demeny, while others are not. The patterns under and over age 10 may resemble different Coale-Demeny models, but given the unreliability of the data at hand, statements about the age patterns of mortality in this region must remain tentative.[20]

Sex differentials in mortality

At all levels of mortality and in all regions of the world, summary indices of mortality, such as life expectancy at birth, nearly universally show lower levels of mortality for females than for males. Exceptions that do occur have generally been for countries at high levels of mortality; and when mortality has declined, female mortality has generally improved more rapidly than male mortality, leading to a reversal of the differential and attainment of lower female mortality. Even when life expectancy at birth for females has been lower than that of males, analysis of death rates by age has often shown higher male mortality at nearly all ages, with exceptions occurring only during the early childhood years or during the childbearing years. This section examines sex differentials in life expectancy at birth and at age 10 in the group of reliable life tables constructed for the model life-table project and then discusses differentials by age in a larger set of countries for which data are available.

Figures 10 and 11, respectively, present plots of male life expectancy at birth against female life expectancy at birth and male life expectancy at age 10 against female life expectancy at age 10. The best fitting orthogonal regression line among the points is also shown.[21] Three symbols are used to represent, respectively, countries of Latin America, East Asia (including Singapore) and South Asia (excluding Singapore). The orthogonal regression line clearly separates the data regionally into these three groups. In general, the countries of South Asia fall below the line, indicating smaller sex differentials; the countries of Latin America are above the line, indicating relatively larger sex differentials; and the countries of east Asia also are above the line, but further displaced than the Latin American countries, indicating the largest sex differentials. That sex differentials should cluster geographically implies a role for geocultural factors in the determination of expected years of life and indicates that sex differentials in mortality may be related to the differential positions of the two sexes in their respective cultures as well as to biological and genetic variations in the aging process and length of life.

[15] Life tables for these countries appear in United States of America, Department of Commerce, Bureau of the Census, *Country Demographic Profiles: Pakistan*, by F. B. Hobbs (Washington, D.C., 1980), p. 11, table 5; Farhat Yusuf, "Abridged life tables for Pakistan and its provinces, 1962–1964", *Contributed Papers, Sydney Conference of the International Union for the Scientific Study of Population*, 21–25 August 1967, pp. 533–541; United States, Department of Commerce, Bureau of the Census, *Country Demographic Profiles: Nepal*, by R. G. Kramer (Washington, D.C., 1980), p. 8, table 5; and Republic of Turkey and Hacettepe University, *Vital Statistics from the Turkish Demographic Survey 1966–67* (Ankara, 1970), p. 121, table 24.

[16] For the Indonesian life tables, see United States of America, Department of Commerce, Bureau of the Census, *Levels and Trends of Mortality in Indonesia, 1961 to 1971*, by Larry Heligman, International Research Document No. 2 (Washington, D.C., 1975), pp. 3–4, tables B and C. The data for China are unpublished.

[17] Although reliability of cause of death data in this region is very low, data are tabulated and analysed regularly as part of the Cholera Research Laboratory project in Matlab and as part of the Model Registration Project in rural India. The Matlab project finds high death rates from dysentery and respiratory diseases (including tuberculosis) among the adult population. In the India project, among those aged 55 and over, diseases of the "cough group" (including bronchopneumonia, pneumonia, respiratory tuberculosis and bronchitis) plus diseases from the diarrhoeal group accounted for about two thirds of all deaths. See Cholera Research Laboratory, *Demographic Surveillance System-Matlab*, vol. 5, *Vital Events, Migration and Marriages 1976*, Scientific Report No. 13 (Dacca, 1978), p. 8; and India, Ministry of Home Affairs, Office of the Registrar General, *Model Registration, Survey of Causes of Death: Report for 1971*, series 3, No. 5 (New Delhi, n.d.), pp. 11–14.

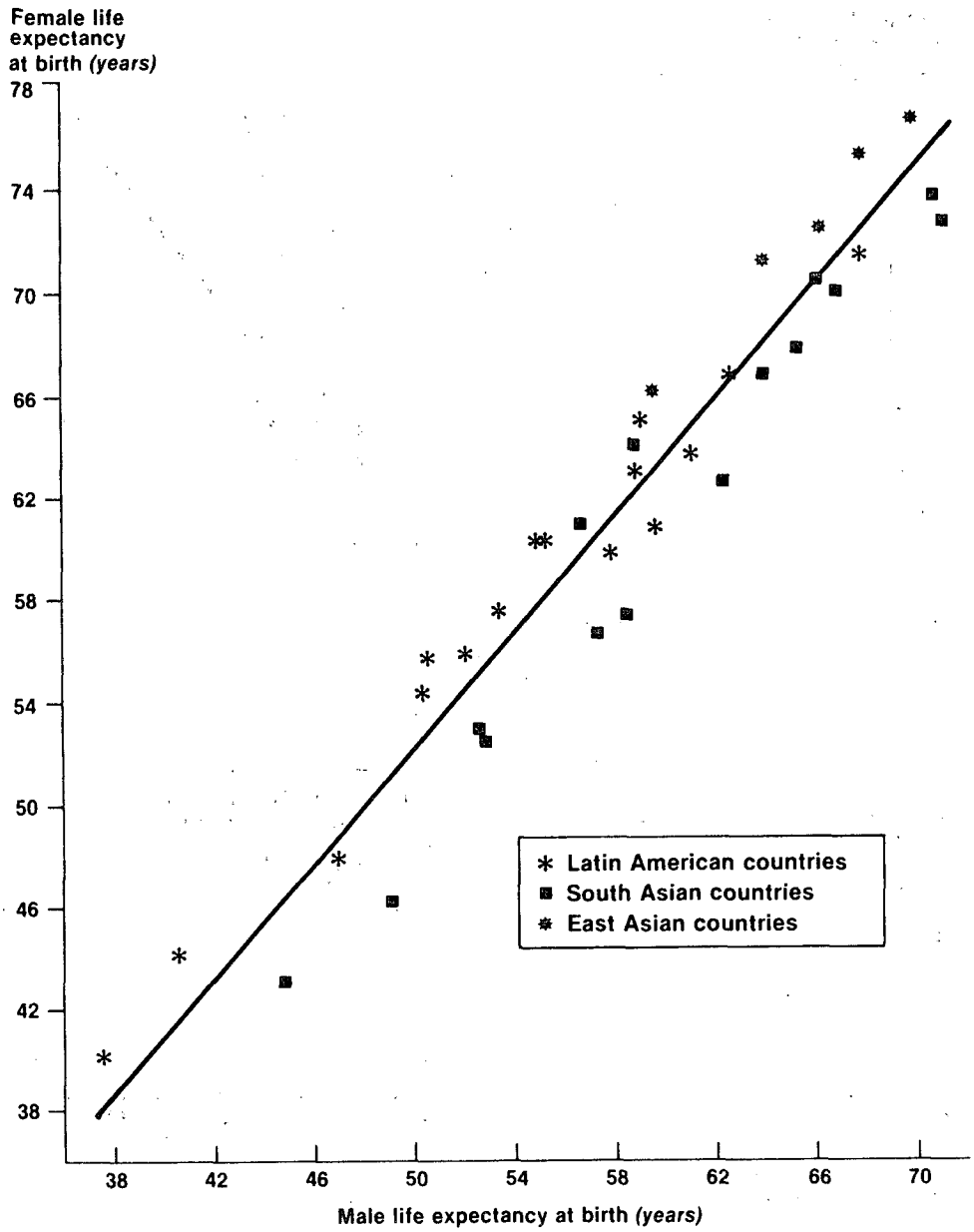
[18] World Health Organization, *World Health Statistics Annual, 1979*, vol. 1, *Vital Statistics and Causes of Death* (Geneva, 1979), table 9. The Chilean rate is especially high for pneumonia (A91–92). It has also been suggested that early weaning may be responsible for the high infant mortality rate in Chile. See S. J. Plank and M. L. Milanesi, "Infant feeding and infant mortality in rural Chile," *Bulletin of the World Health Organization*, vol. 48, No. 2 (1973), pp. 203–210.

[19] *Levels and Trends of Mortality Since 1950.*

[20] *Ibid.*

[21] Many studies have found a linear relationship between male and female life expectancy. See, for example, Samuel H. Preston and James A. Weed, "Causes of death responsible for international and intertemporal variation in sex mortality differentials", *World Health Statistics Report*, vol. 29, No. 3 (1976), pp. 144–214.

Figure 10. Life expectancy at birth for males versus life expectancy at birth for females, with orthogonal regression line for all countries combined



NOTE: East Asia including Singapore; South Asia excluding Singapore.

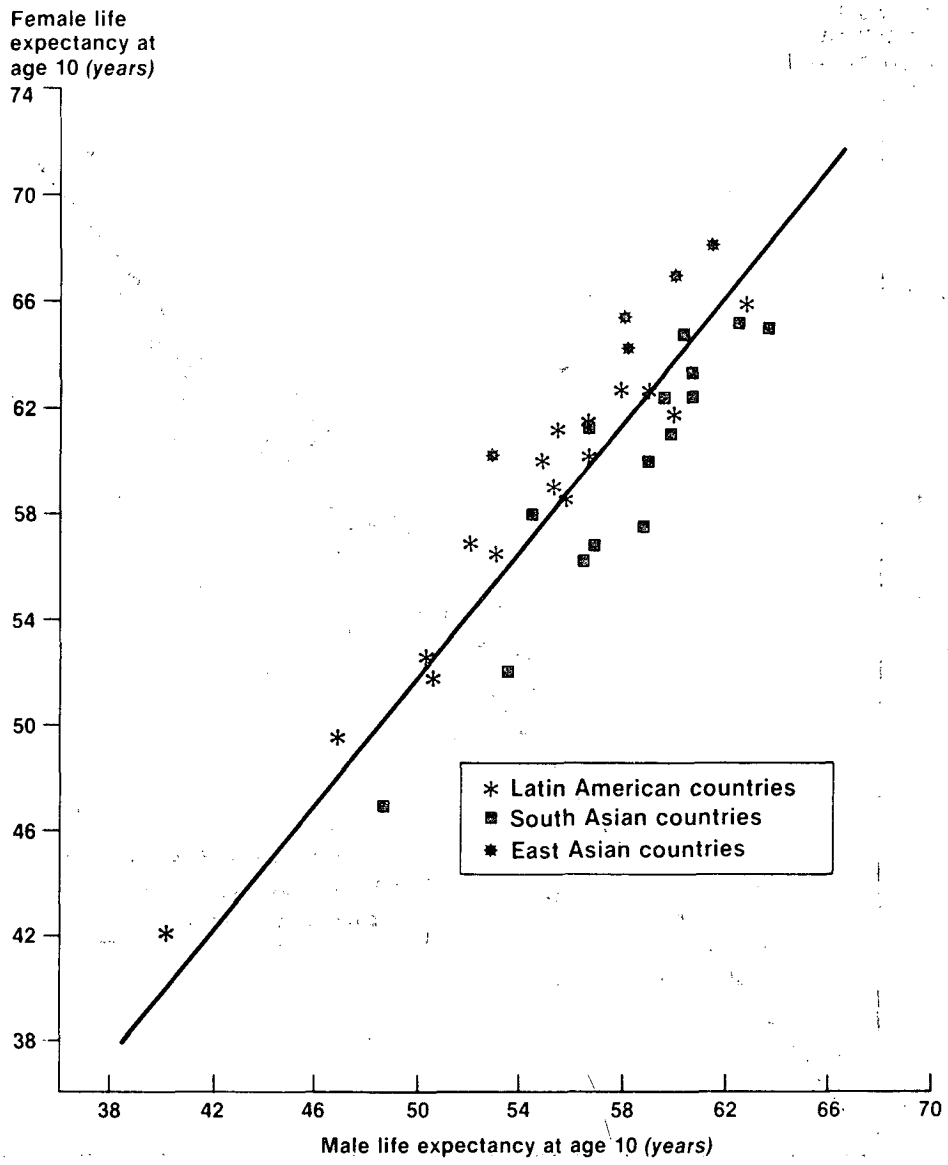
Interestingly, the clustering of sex differentials by geographical areas allowed estimation of orthogonal regression lines separately for each area. These regression equations are presented pictorially in figures 12 and 13. It is important to note that the line for East Asia is based on only five countries, all with high life expectancies; any extrapolations based on this equation should be done with extreme caution.

Figures 12 and 13 also present the line based on the tables implicit in the Coale-Demeny West region model, a model comprising mainly Western European experience. The line is very close to the Latin American line, as are the lines from the Coale and Demeny North, South and East regions (not shown). It appears that sex differentials in life expectancy at birth and age 10 for countries of Latin America are very similar to historical European experience. The differentials in Asia are dissimilar, with the countries of South Asia showing smaller differentials and those of East Asia, larger differentials.

Again, the lack of reliable life tables has precluded a confident similar analysis of mortality differentials in sub-Saharan Africa. However, using the life expectancy figures currently available in a United Nations publication,[22] this exercise has been repeated based on 25

[22] *Demographic Yearbook — Special Issue: Historical Supplement* (United Nations publication, Sales No. E/F.79.XIII.8).

Figure 11. Life expectancy at age 10 for males versus life expectancy at age 10 for females, with orthogonal regression line for all countries combined



NOTE: East Asia including Singapore; South Asia excluding Singapore.

countries for which empirical life tables are available. It should be remembered, though, that the poor quality of the data and at times indirect methods of estimation employed make any conclusion very tentative.

Figure 14 presents the scatter diagram of male life expectancy at birth versus female life expectancy, as well as the corresponding orthogonal regression line for sub-Saharan Africa. When compared with sex differentials in life expectancy at birth for the other areas, those for sub-Saharan Africa appear to be similar to those of the Latin American countries at higher levels of mortality but appear to widen more quickly as mortality declines, so that at lower levels the sex differentials in sub-Saharan Africa are somewhere between those of Latin America and East Asia.

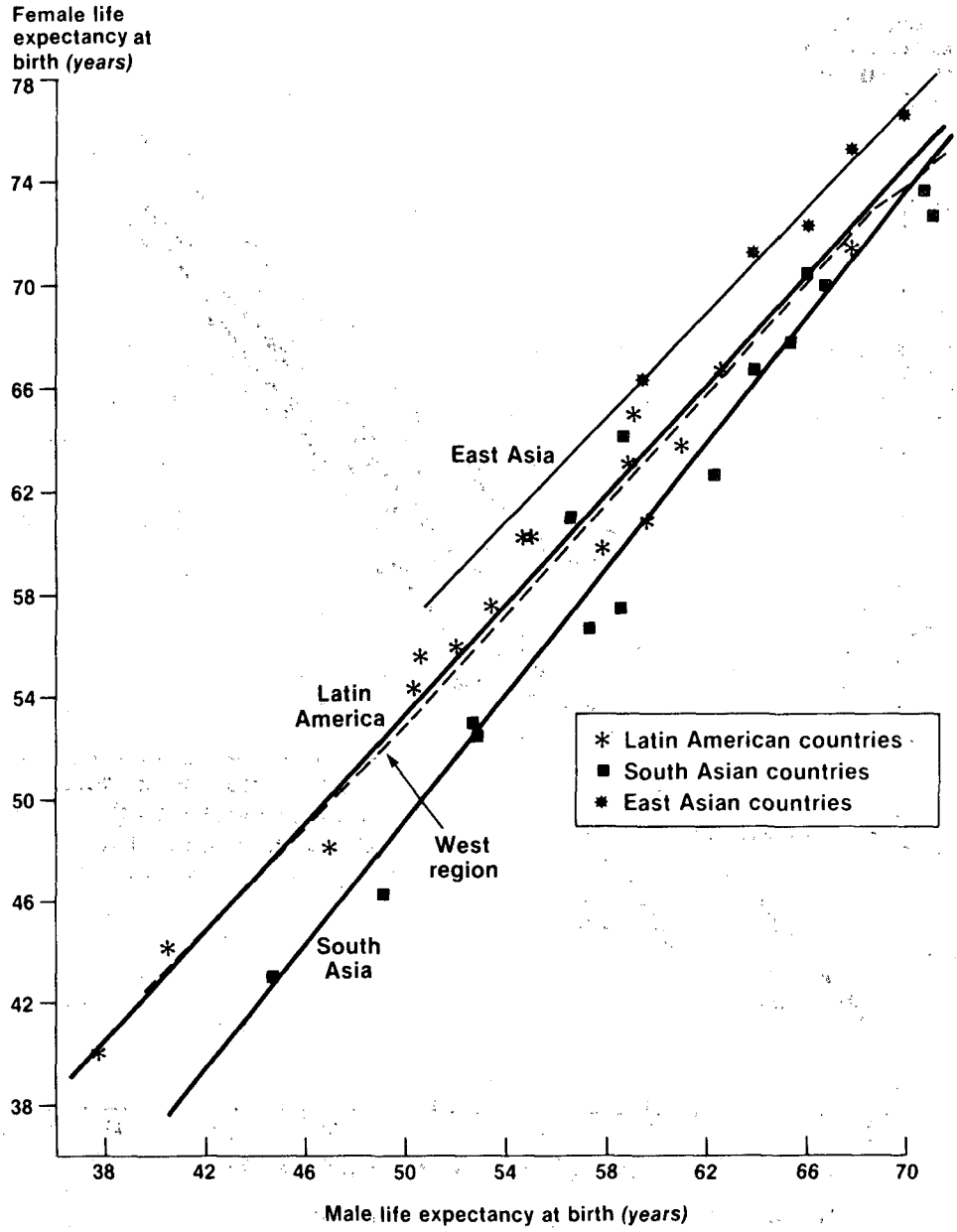
To simplify comparison, table 43 presents predicted sex differentials in life expectancy at birth at four different mortality levels for each of the areas or regions and for the regions of the Coale and Demeny model life-table system.

The United Nations data[23] present the life expectancy at birth by sex for the period 1948–1977 for all countries. Restricting attention here to those life expectancy estimates based on the most recent empirical life tables,[24] it is clear that higher female life expectancy at birth is a nearly universal phenomenon. There are only

[23] *Ibid.*

[24] That is, excluding figures provided by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat.

Figure 12. Life expectancy at birth for males versus life expectancy at birth for females, with orthogonal regression lines for each area



NOTE: East Asia including Singapore; South Asia excluding Singapore.

TABLE 43. FEMALE MINUS MALE LIFE EXPECTANCY AT BIRTH (*Years*)

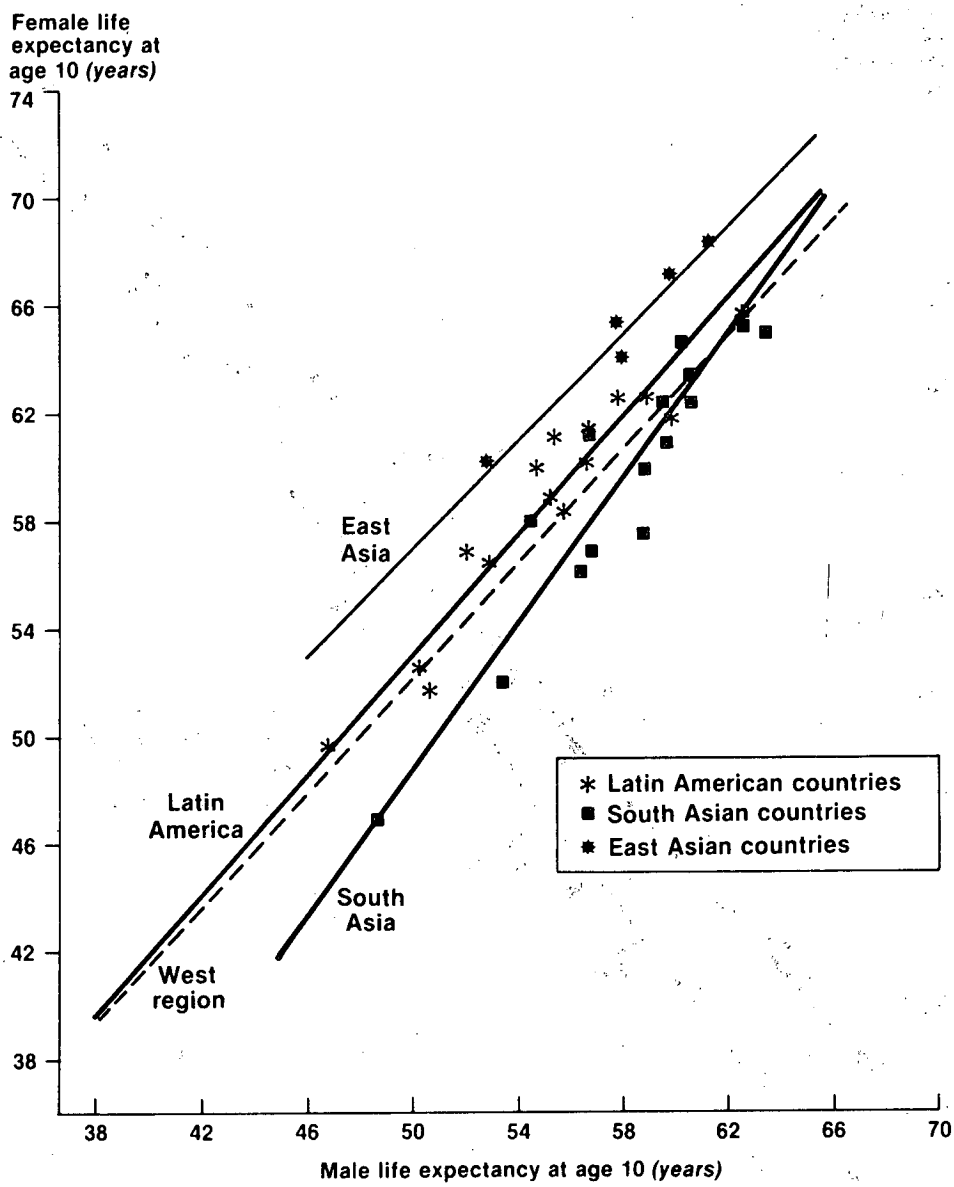
Major area or region	Life expectancy at birth (both sexes combined)			
	40 years	50 years	60 years	70 years
Africa, sub-Saharan	2.8	3.8	4.7	5.7
Latin America	2.7	3.3	4.0	4.6
East Asia[a]	—	—	6.8	7.1
South Asia[b]	−2.9	−0.8	1.4	3.5
Coale-Demeny regions				
West region	2.7	2.9	3.6	4.0
North region	3.1	3.4	3.7	3.7
East region	2.9	3.4	4.1	4.7
South region	1.7	2.8	3.8	3.9

[a] Including Singapore. [b] Excluding Singapore.

four exceptions in Africa (Liberia, 1971; Nigeria, 1965–1966; Tunisia, 1968–1969; and the Upper Volta, 1960–1961); no exceptions in Latin America; and six exceptions in South Asia (Democratic Kampuchea, 1958–1959; India, 1970–1972; Iran, 1973–1976; Jordan, 1959–1963; Sabah in Malaysia, 1970; and Pakistan, including Bangladesh, 1962).[25] Even among these exceptions, in only four cases—India, Liberia, Pakistan and Sabah—are the differentials greater than one year. Moreover, in many if not all of these countries the relatively poor

[25] The life tables for India and Tunisia are not given in *Demographic Yearbook — Special Issue: Historical Supplement*, but were available from life tables constructed for the model life-table project.

Figure 13. Life expectancy at age 10 for males versus life expectancy at age 10 for females, with orthogonal regression lines for each area



NOTE: East Asia including Singapore; South Asia excluding Singapore.

quality of the data often raises doubts as to the validity of the observed differentials.

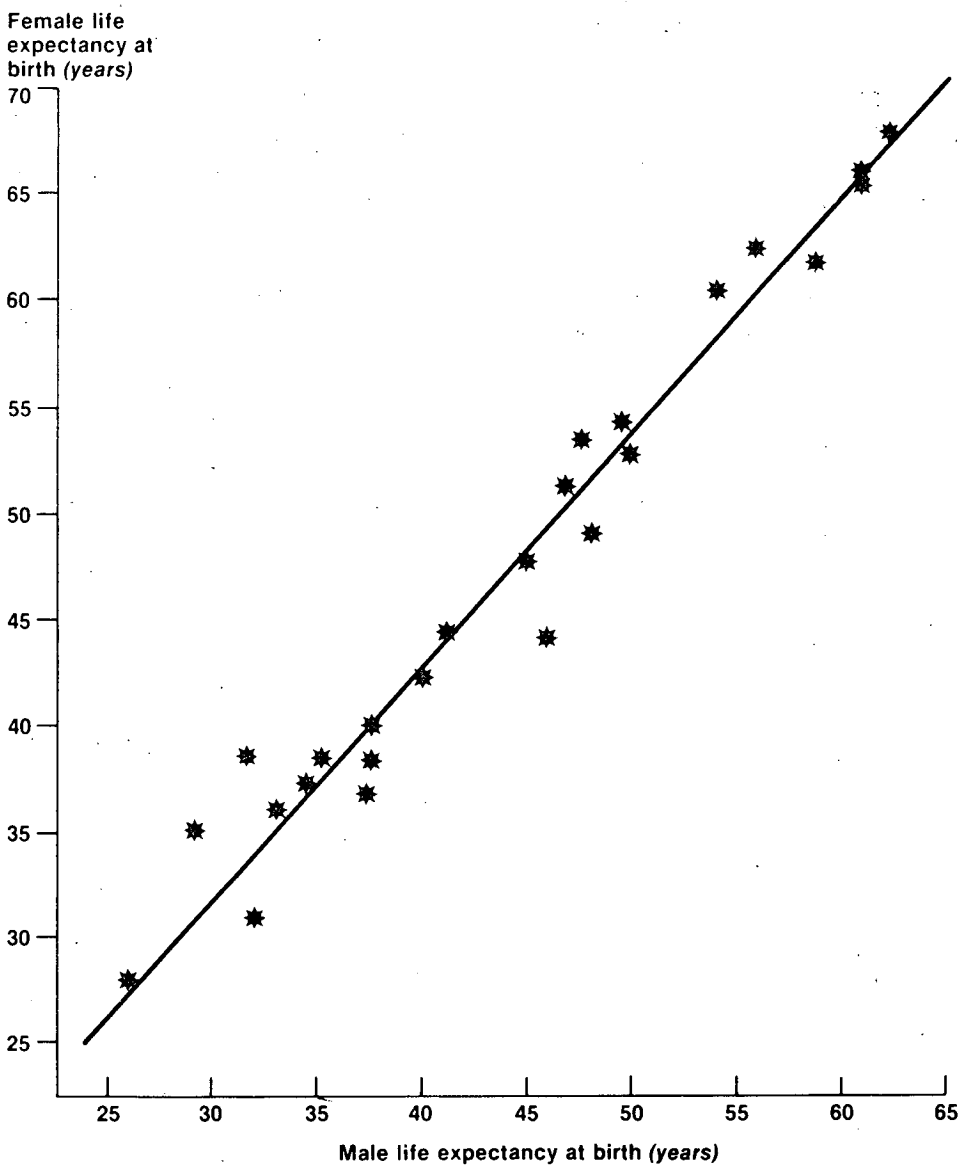
As stated previously, most examples of higher female than male mortality are limited to the ages of childhood and childbearing.[26] In Northern Africa, females show higher mortality than males in life tables from Egypt (1960 and 1965) for all ages under 5 years, in life tables from Tunisia (1968–1969) for ages 1–4 years and during the entire childbearing period, and in life tables from Algeria (1969–1971) from ages from 1 to 40 years.

As in Northern Africa, there are also in sub-Saharan Africa some age groups in which death rates are greater for females than males. With respect to the childhood years, the data for Kenya show higher female than male mortality for all ages under 10 years, as do data for Mauritius for ages 1–9. The data for the Upper Volta present higher female death rates for children aged 5–14 years and nearly identical death rates for boys and girls under 5 years. For Réunion, the Coloured population of South Africa and the United Republic of Cameroon, the death rates at ages 1–4 are only marginally (2–3 per cent) higher for males than females.

During the childbearing years, excess female mortality is estimated for ages 20–34 in Mauritius, ages 25–39 in the United Republic of Cameroon and ages 20–34 and 40–44 in the Upper Volta. In addition, the registered death rates in Madagascar, before adjustment for the incompleteness of death registration, display higher

[26] The following paragraphs are summarized from *Levels and Trends of Mortality Since 1950*. Citations for the data described will be found there.

Figure 14. Life expectancy at birth for males versus life expectancy at birth for females, sub-Saharan Africa



female than male death rates for ages 20–34. It is possible that faulty adjustment of the death registration data has disguised the true male/female differential in mortality.[27] Female mortality also appears to be higher than male mortality for part of the childbearing years in Benin (1961) for ages 20–29, in the Central African Republic (1959–1960) for ages 10–39, and in Liberia (1970) for ages 15–19 and 40–44.

During the remainder of the life span, the typical pattern of excess male mortality is generally exhibited. The Upper Volta remains an exception, however. The 1960–1961 survey recorded higher female mortality for ages 50–54 and 60–69. The Upper Volta, in fact, appears to be a special case in which the recorded survey data show very similar levels and age patterns of mortality for both males and females, which results in an alternating direction of excess mortality throughout the life span with females having excess mortality in 9 of 16 age groups.

Female mortality in Asia is generally higher than male mortality during early childhood and the reproductive ages. During the early childhood years, females exhibit higher mortality than males in the rural area of Matlab in Bangladesh (1974–1976), India (1958–1959 and 1970–1972), and Sri Lanka (1945–1947, 1952–1954 and 1970–1972). Referring to this higher female mortality during early childhood, the Government of India stated that ". . . . there is a traditional fondness for male issues in most parts of the country and a corresponding dislike for female children. All the affection and care is [sic] bestowed on male children but female children are not much cared for . . . ."[28] Higher female than male mortality at

[27] In fact, the surprisingly large sex differential in life expectancy at birth (6 years) based on the adjusted rates lend credence to the view that the death registration data may have been adjusted incorrectly. The sex differential in life expectancy based on unadjusted rates is only 1.2 years.

[28] India, Ministry of Home Affairs, Office of the Registrar General, *Census of India, 1951, Life Tables*, Paper 2 (New Delhi, 1954), p. 26. See

ages 1–4 years is also found in recent life tables from Burma (urban areas), Iran, Iraq, Malaysia, Pakistan, Republic of Korea (where the male advantage was slight) and Thailand.

Mortality among females is also higher than that of males during the childbearing years in a number of Asian countries. An analysis of age-specific death rates for 19 populations found that in 7, the death rates for women were higher than those for men in at least three of the five-year age groups during the reproductive years (i.e., 15–49 years). Those populations were Bangladesh, India, Iran, Jordan, Pakistan, and Sabah and Sarawak in Malaysia.

In Latin America, there is currently no consistent evidence in any country of higher mortality among females during either infancy or the childbearing years. However, there remain some countries exhibiting higher mortality among females than males during the childhood years (1–4). These countries are Colombia, Costa Rica, Ecuador, Guadeloupe, Guatemala, Martinique and Mexico. In Argentina, Chile and Uruguay, previous life tables have shown higher female mortality during the childbearing ages; but in the most recent tables, the usual male excess mortality now appears. It is possible that in these countries of Latin America, the excess female mortality will also disappear as total mortality continues to decline.

In summary, then, it appears that it is not uncommon in the developing countries for female mortality to exceed that of males for some or all of the childhood years and it is quite common for females to exhibit higher mortality during all or part of the childbearing ages. During the remaining years, males generally have higher death rates. The net result of these differentials is in most instances (notably excluding the higher mortality countries of Asia) greater female than male life expectancy at birth. The size of the sex differential in life expectancy at birth varies noticeably, however, with geocultural region and mortality level.

B. Developed countries

The discussion of mortality in the more developed regions is confined to the 1970s. Trends in three mortality measures are examined—the crude death rate, the expectation of life at birth and the infant mortality rate. In addition, changes in life expectancy at birth between 1970 and the late 1970s are analysed to determine the contribution of mortality decline in three broad age groups to increases in life expectancy.

Recent mortality patterns in the developed countries reflect a continuation of earlier trends: life expectancy at birth continued its upward climb, reaching new highs for males and females; infant mortality fell to new lows; and the gap between male and female life expectancy grew larger.

Trends in the crude death rate reflect not only changes in age-specific mortality but changing population age structure. The value of the crude death rate for mortality analysis is therefore limited. As one of the two components of natural increase, the crude death rate is, nevertheless, useful as a measure of net change within a population. In the *1979 Monitoring Report*,[29] it was reported that in a handful of countries the crude death rates for one or more years in the 1970s were equal to, or higher than, the crude birth rates. Those countries were Austria, the Federal Republic of Germany, the German Democratic Republic, Luxembourg; and England and Wales, and Scotland in the United Kingdom. In 1978, the same group of countries had a crude death rate very close to, or higher than, the crude birth rate. The situation was most pronounced in the Federal Republic of Germany, which had a crude death rate of 11.8 per 1,000 population, compared with a crude birth rate of only 9.4 births per 1,000 population.

In the developed countries, where the population has been aging, the crude death rate would be expected to increase even if mortality had not changed. However, in most of these countries, mortality has been declining in the 1970s, as is shown in the discussion of life expectancy at birth. The increases in the crude death rates since 1970, shown in table 44 for several of these countries (namely, Denmark, Greece, Hungary, Poland and Sweden) were due to population aging, as their over-all mortality level has remained virtually unchanged (Hungary) or has declined since 1970. In Bulgaria and the Union of Soviet Socialist Republics, however, the sizeable increases in the crude death rate since 1970 reflect to some extent increasing mortality. In many developed countries, mortality decline in the 1970s was sufficient to offset the unfavourable effects of population aging on the crude death rate, which showed a decline between 1970 and 1977 or 1978. Among these countries were the United States of America, Japan, the countries of Western Europe, and Australia and New Zealand.

The continued aging of the population in the developed countries has also affected the distribution of deaths by age, with increasing proportions of total deaths occurring in the older age groups. The percentage of total deaths occurring in age group 75 years and over in selected countries, in 1970 and in the late 1970s, is given below:

Country	*1970*	*Late 1970s*
	(percentage)	
Austria	43	51
Canada	40	41
Denmark	44	49
France	47	50
Germany, Federal Republic of	42	49
Hungary	38	42
Italy	42	46
Japan	35	43
Netherlands	45	50
Norway	48	53
Poland	31	37
Sweden	49	54
Switzerland	45	51
United Kingdom		
England and Wales	44	48
United States of America	38	42
Yugoslavia	30	36

also T. Dyson, "Levels, trends, differentials and causes of child mortality—a survey", *World Health Statistics Report*, vol. 30, No. 4 (1977), p. 291.

[29] *World Population Trends and Policies: 1979 Monitoring Report*, vol. I, *Population Trends*.

TABLE 44. CRUDE DEATH RATES AND INDICES OF RATES, DEVELOPED COUNTRIES, 1970–1978

Major area, region and country	Crude death rates (per 1,000 population)					Index (1970 = 100)				
	1970	1975	1976	1977	1978	1970	1975	1976	1977	1978
NORTHERN AMERICA										
Canada	7.3	7.4	7.3	7.2	7.3	100	101.4	100.0	98.6	100.0
United States of America	9.4	8.9	8.9	8.8[a]	...	100	94.7	94.7	93.6[a]	...
ASIA										
East Asia										
Japan	6.9	6.3	6.2	6.1	6.1	100	91.3	89.9	88.4	88.4
EUROPE										
Eastern Europe										
Bulgaria	9.1	10.3	10.1	10.7	10.5	100	113.2	111.0	117.6	115.4
Czechoslovakia	11.6	11.5	11.4	11.5[a]	11.5[a]	100	99.1	98.3	99.1[a]	99.1[a]
German Democratic Republic[b]	14.1	14.3	13.9	13.4[a]	13.9[a]	100	101.4	98.6	95.0[a]	98.6[a]
Hungary	11.6	12.4	12.5	12.4	13.1[a]	100	106.9	107.8	106.9	112.9[a]
Poland	8.2	8.7	8.8	9.0	9.3[a]	100	106.1	107.3	109.8	113.4[a]
Romania	9.5	9.3	9.6	9.6	9.7	100	97.9	101.1	101.1	102.1
Northern Europe										
Denmark	9.7	10.1	10.6	9.9[a]	10.4[a]	100	104.1	109.3	102.1[a]	107.2[a]
Finland	9.6	9.3	9.5	9.4[a]	9.2[a]	100	96.9	99.0	97.9[a]	95.8[a]
Ireland	11.4	10.6	10.5[a]	10.5[a]	10.3[a]	100	93.0	92.1[a]	92.1[a]	90.4[a]
Norway	10.0	10.0	10.0	9.8	9.9[a]	100	100.0	100.0	98.0	99.0[a]
Sweden	10.0	10.8	11.0	10.7[a]	10.8[a]	100	108.0	110.0	107.0[a]	108.0[a]
United Kingdom	11.8	11.9	12.2	11.7[a]	11.9[a]	100	100.8	103.4	99.2[a]	100.8[a]
England and Wales	11.8	11.9	12.2	11.7[a]	11.9[a]	100	100.8	103.4	99.2[a]	100.8[a]
Northern Ireland	10.9	10.7	11.1	11.0	11.0	100	98.2	101.8	100.9	100.9
Scotland	12.2	12.1	12.5	12.0	12.6[a]	100	99.2	102.5	98.4	103.3[a]
Southern Europe										
Albania	9.3	...	...	...	...	100	...	...	...	...
Greece	8.4	8.9	8.9	8.9[a]	8.7	100	106.0	106.0	106.0[a]	103.6[a]
Italy	9.7	9.9	9.8	9.6[a]	9.4[a]	100	102.1	101.0	99.0[a]	96.9[a]
Malta	9.4	8.8	9.0	8.6	10.0[a]	100	93.6	95.7	91.5	106.4[a]
Portugal	10.3	10.4	10.5	9.6[a]	9.8[a]	100	101.0	101.9	93.2[a]	95.1[a]
Spain	8.3	8.4	8.1	7.8	7.9[a]	100	101.2	97.6	94.0	95.2[a]
Yugoslavia	8.9	8.7	8.5	8.4[a]	8.7[a]	100	97.8	95.5	94.4[a]	97.8[a]
Western Europe										
Austria	13.3	12.8	12.7	12.2[a]	12.5[a]	100	96.2	95.5	91.7[a]	94.0[a]
Belgium	12.3	12.2	12.1	11.4[a]	11.7[a]	100	99.2	98.4	92.7[a]	95.1[a]
France	10.7	10.6	10.5	10.1[a]	10.3[a]	100	99.1	98.1	94.4[a]	96.3[a]
Germany, Federal Republic of[b]	12.1	12.1	11.9	11.5	11.8[a]	100	100.0	98.3	95.0	97.5[a]
Luxembourg	12.3	12.2	12.6	11.5[a]	11.8	100	99.2	102.4	93.5[a]	95.9
Netherlands	8.4	8.3	8.3	7.9	8.2[a]	100	98.8	98.8	94.0	97.6[a]
Switzerland	9.1	8.7	9.0	8.8	9.1	100	95.6	98.9	96.7	100.0
OCEANIA										
Australia-New Zealand										
Australia	9.0	7.9	8.1	7.7	7.6[a]	100	87.8	90.0	85.6	84.4[a]
New Zealand	8.8	8.2	8.2	8.4	...	100	93.2	93.2	95.5	...
USSR	8.2	9.3	9.5	9.6	...	100	113.4	115.9	117.1	...

Sources: *Demographic Yearbook—Special Issue: Historical Supplement* (United Nations publication, Sales No. E/F.79.XIII.8); and *Population and Vital Statistics Report: Data Available as of 1 April 1980*, Statistical Papers, Series A, vol. XXXII, No. 2 (ST/ESA/STAT/SER.A/132).

NOTE: Data are for countries that evaluate their completeness of death registration as 90 per cent or above.

[a] Provisional.

[b] The data which relate to the Federal Republic of Germany and the German Democratic Republic include the relevant data relating to Berlin for which separate data have not been supplied. This is without prejudice to any question of status which may be involved.

One consequence of this concentration of mortality in the older age groups is that short-term changes in general mortality levels are being increasingly affected by changes in the mortality of the elderly, who are more vulnerable to year-to-year fluctuations in the incidence of influenza and harsh weather conditions.[30]

Life expectancy at birth, which summarizes mortality at all ages, is a better measure than the crude death rate for studying mortality changes within countries, as well as in making international comparisons, for it is not affected by age structure. The life expectancy values for most of the countries listed in table 45 were calculated by the World Health Organization (WHO) from data in its files on numbers of deaths and population by age and sex. These values have been used in order to make com-

[30] "Population trends in 1978", editorial, *Population Trends*, No. 18 (Winter 1979), p. 5.

TABLE 45. TRENDS IN LIFE EXPECTANCY AT BIRTH, DEVELOPED COUNTRIES, 1970–1978
(*Years*)

Major area, region and country	*Life expectancy at birth for:*					
	Males			*Females*		
	1970	*1975*	*1978*	*1970*	*1975*	*1978*
NORTHERN AMERICA						
Canada	69.3	69.8	70.5[a]	76.2	77.3	78.2[a]
United States of America	67.1[b]	68.7	69.4	74.8[b]	76.7	77.3
EAST ASIA						
Japan	69.5	71.9	73.2	74.9	77.2	78.6
EUROPE						
Eastern Europe						
Bulgaria	69.1	68.7	68.2[a]	73.5	73.5	73.5[a]
Czechoslovakia	66.3	67.2	...	73.2	73.6	...
German Democratic Republic[c]	68.1[d]	68.6	68.9[e]	73.3[d]	74.1	74.5[e]
Hungary	66.3	66.4	66.1	72.2	72.5	72.8
Poland	66.2[f]	67.3	66.5	73.5[f]	74.8	74.9
Romania	65.7	67.5[g]	67.3	70.4	72.1[g]	72.4
Northern Europe						
Denmark	71.0	71.5	71.7	76.1	77.2	77.7
Finland	67.0[h]	67.4	...	75.8[h]	76.3	...
Ireland	68.6	69.0	...	73.2	74.3	...
Norway	71.0	71.4[h]	72.4	77.5	77.9[h]	78.8
Sweden	72.3	72.2	72.5	77.4	78.1	79.0
United Kingdom						
England and Wales	68.8	69.4[g]	70.2[a]	75.2	75.7[g]	76.3[a]
Northern Ireland	67.7	67.5	67.5[a]	73.6	74.0	74.1[a]
Scotland	67.0	67.8	68.2	73.3	74.4	74.4
Southern Europe						
Greece	71.6	72.2	72.9	76.0	76.7	77.6
Italy	68.5	69.8	...	74.6	76.1	...
Malta	68.0	...	68.8[a]	72.9	...	72.6[a]
Portugal	65.3[i]	65.1	...	71.0[i]	72.6	...
Spain	69.0[j]	70.3	70.8[d]	74.4[j]	76.1	76.7[d]
Yugoslavia	65.1	67.1	67.8[a]	69.9	71.9	73.0[a]
Western Europe						
Austria	66.4	67.6	68.4	73.4	74.7	75.7
Belgium	67.8	68.8	68.9[e]	74.2	75.3	75.5[e]
France	69.1	69.5[g]	69.9[e]	76.7	77.6[g]	77.9[e]
Germany, Federal Republic of[c]	67.3	68.1	69.2	73.6	74.7	76.0
Luxembourg	66.4	67.5[g]	68.3	73.1	74.7[g]	75.8
Netherlands	70.9	71.5	72.0	76.6	77.9	78.7
Switzerland	70.2[f]	71.6	72.0	76.4[f]	78.2	78.9
OCEANIA						
Australia-New Zealand						
Australia	67.4	69.3	70.0[a]	74.2	76.4	77.0[a]
New Zealand	68.7[f]	68.9	69.4[e]	75.0[f]	75.4	75.6[e]
USSR	64[k]	...	...	74[k]	...	...

Sources: World Health Organization, World Health Statistics Annual (Geneva), various issues, unless otherwise indicated.

For United States of America, 1970, Department of Health, Education and Welfare, Public Health Service, *Health, United States, 1979* (Washington, D. C., Government Printing Office, 1980), p. 90; for German Democratic Republic, 1970, Staatliche Zentralvervaltung für Statistik, *Bevolkersstatistisches Jahrbuch der Deutschen Demokratischen Republik 1977* (Berlin, 1977), p. 128; for Portugal, 1970, *Demographic Yearbook 1972* (United Nations publication, Sales No. E/F.73.XIII.1), p. 616; for Union of Soviet Socialist Republics, 1970, *Demographic Yearbook 1978* (United Nations publication, Sales No. E/F.79.XIII.1), p. 416.

NOTE: Unless otherwise indicated, values of life expectancy were calculated by the World Health Organization from data on deaths and population by age and sex in the World Health Organization data bank. Those values may therefore differ from official country life-table values.

[a] 1977.

[b] Official life-table values.

[c] Data include the relevant data relating to Berlin for which separate data have not been supplied. This is without prejudice to any question of status which may be involved.

[d] Official life-table values.

[e] 1976. [f] 1971. [g] 1974. [h] 1973. [i] Official life-table values.

[j] 1969. [k] Official life-table values.

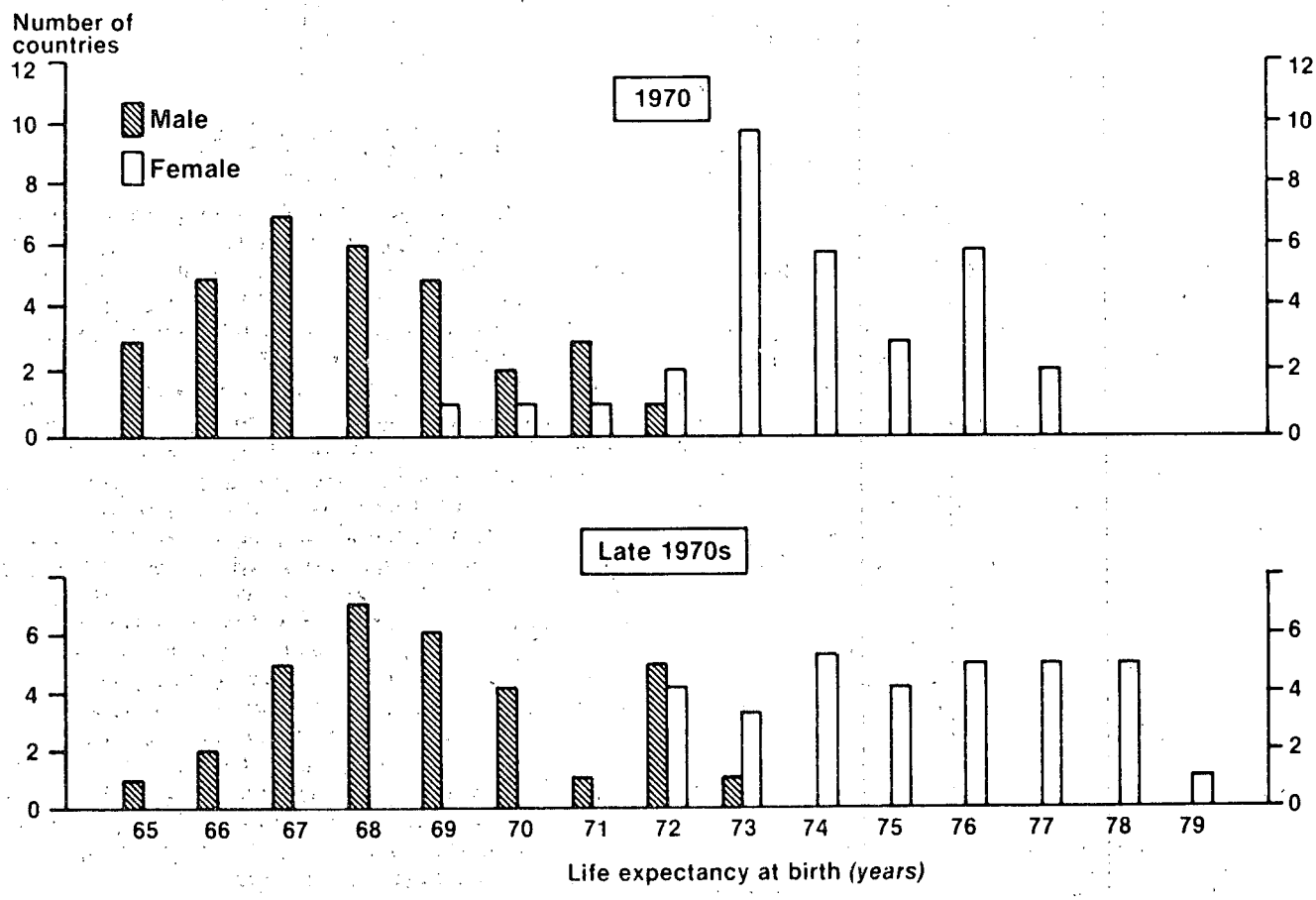
parisons among countries for the same years, as many countries do not construct life tables annually. These unofficial life expectancy values may therefore differ somewhat from those of the official life tables, but the differences are not likely to alter the main conclusions of the analysis.

Between 1970 and the late 1970s (i.e., the most recent year for which data were available, as shown in table 45), over-all mortality declined in the more developed countries, resulting in an average (unweighted) increase in life expectancy at birth of about 1.2 years for males (from 68.2 to 69.4 years) and 1.5 years for females (from 74.3 to 75.8 years). The changes between 1970 and the late 1970s with respect to the number of countries at each level of life expectancy at birth are depicted in the bar graph in figure 15. The range of life expectancies for females has shifted upward from a range of 69 to 77 years in 1970 to one of 72 to 79 years in the late 1970s. Whereas there were no countries with a life expectancy for females greater than 78 years in 1970, six countries had exceeded this level by the late 1970s: Canada; Japan; the Netherlands; Norway; Switzerland; and Sweden. Although Iceland has not been included in this tabulation because of its small population size (fewer than 300,000 inhabitants), life expectancy at birth for females in 1978 was 80.0 years, based on the WHO calculations described above. This continued decline in female mortality during the 1970s from levels that were already very low has been a noteworthy feature of recent mortality trends. It is clear that the limits of average life expectancy at birth that a population can attain under the most favourable medical and environmental conditions are not known and continue to be revised upward.[31]

The mortality trends for males in the 1970s were somewhat less favourable than those for females; and as a result, the average gap between the sexes in life expectancy at birth continued to increase, from a differential of 6.1 years in 1970 to one of 6.4 years in the late 1970s. It can be seen from figure 15 that the range of life

[31] In 1978, Bourgeois-Pichat estimated the biological limits for life expectancy at birth, i.e., the life expectancy that would result if all exogenous causes of death were eliminated, as 73.8 years for males and 80.3 years for females, based on mortality data for Norway, which has one of the lowest mortality levels. Exogenous mortality was defined as including deaths from infective and parasitic diseases, deaths due to diseases of the respiratory system, and deaths due to accidents and violence. See Jean Bourgeois-Pichat, "Future outlook for mortality decline in the world", *Population Bulletin of the United Nations, No. 11-1978* (United Nations publication, Sales No. E.78.XIII.7), pp. 12–41.

Figure 15. Frequency distributions of life expectancy at birth, 32 countries in more developed regions, 1970 and late 1970s



Source: Life expectancy values tabulated from data given in table 45, according to intervals from 65.0 to 65.9 years, from 66.0 to 66.9 years etc., rather than rounded to the nearest whole number.

expectancies for males widened by one year from a range of 65–72 years in 1970 to one of 65–73 years in the late 1970s. At the upper end of the range for males, the number of countries with life expectancies of 72 years or more increased from one in 1970 to six in the late 1970s. Those countries were Greece, Japan, the Netherlands, Norway, Sweden and Switzerland. Japan had the highest life expectancy at birth—73.2 years. However, had Iceland been included, it would have ranked first, with a life expectancy of 73.8 years in 1978, the value that Bourgeois-Pichat estimated to be the biological limit for males.[32]

In table 45, life expectancy at birth is given for three years in the 1970s—1970, 1975 and the most recent year for which data were available. In order to determine if the pace of improvement in the late 1970s differed from that of the early 1970s, average annual changes in life expectancy were computed by country for the two time intervals, 1970–1975 and 1975–1978 or the most recent available year. However, data for the Soviet Union were available only for 1971–1972; therefore, the discussion of trends in life expectancy does not take into account the mortality situation in that country. For the remainder of the countries, no consistent pattern of differences was found among them between the two intervals; and the average annual increases were virtually the same in both intervals: for males, 0.17 year in the earlier interval and 0.18 year in the later interval; and for females, 0.23 and 0.24 year, respectively.

There was considerable variation among the countries in the pace of mortality improvement in the 1970s. Based on table 45, gains in life expectancy at birth of two years or more for both sexes combined were attained by Australia, Austria, Japan, Luxembourg, the United States and Yugoslavia. These countries are widely dispersed geographically and also range widely in level of life expectancy from among the lowest (Yugoslavia) to one of the highest (Japan).

The increases in life expectancy in Japan in the 1970s are particularly noteworthy, not only because of their rapidity (a gain of 3.7 years, or 0.46 year per annum, for both males and females between 1970 and 1978), but because they occurred at life expectancy levels that were already quite high. Male life expectancy increased from 69.5 years in 1970 to 73.2 years in 1978. This level of life expectancy had been attained by several countries some three decades earlier, but progress thereafter has been extremely slow in these countries, with the result that they now trail Japan. Nevertheless, the figures for Denmark, the Netherlands and Norway suggest a more rapid improvement in the 1970s than in the two preceding decades:

Period	*Japan*	*Period*	*Denmark*	*Netherlands*	*Norway*	*Sweden*
1949–1950	56.2	1951–1955	69.9	70.9	71.1	70.5
1960–1964	66.5	1961–1965	70.3	71.7	71.0	71.6
1970–1974	70.4	1971–1975	70.9	71.2	71.4	72.1
1978	73.2	1978	71.7	72.0	72.4	72.5

Sources: For 1978, table 45. For earlier years, official life table values from *Levels and Trends of Mortality Since 1950* (United Nations publication, sales No. E.81.XIII.3), chap. II. Figures for Japan for 1960–1964 and 1970–1974 are averages of values from official life tables for individual years.

The most striking feature of the female life expectancy trends in the 1970s, as already mentioned, has been their steady climb in nearly all countries, with a few pauses but no retrogressions.

The least favourable trends in the 1970s occurred in Bulgaria and Hungary, where male life expectancy declined. Although no trend data on life expectancy are available for the USSR, the official age-specific death rates for both sexes combined increased in a number of age groups between 1971–1972 and 1975–1976,[33] implying a decline in life expectancy at birth during that period.

Changes in life expectancy at birth may be decomposed to determine the contribution of mortality changes in various age groups to total changes in life expectancy. In a recent United Nations study, changes in life expectancy at birth were decomposed into three broad age groups for two periods, approximately from the early 1950s to the early 1960s, and from the early 1960s to the early 1970s.[34] The three age groups were: under 30; from 30 to 64; and 65 years and over. Although the patterns varied among countries, during the earlier of the two intervals the greatest contributions to changes in life expectancy at birth were typically made by the youngest age group, i.e., 0–29 years; and the smallest changes were attributed to the age group 65 years and over.

In the later period, from the early 1960s to the early 1970s, the youngest age group continued to contribute the most to increases in life expectancy among males, but the contributions from the middle and oldest age groups were frequently either negligible or even negative. Among females during that period, the countries of Southern and Eastern Europe typically had a pattern similar to that of the males, with the largest increases in life expectancy coming from age group 0–29 and the smallest from age group 65 and over. In the countries outside these regions, however, the most notable feature of the female pattern was the greater contributions of the two older age groups, particularly the group aged 65 and over. One conclusion of this analysis was that the widening of the life expectancy gap between the sexes in many of the developed countries in the period from the early 1950s to the early 1970s was mainly due to the greater mortality improvement at the older ages among females.

A similar decomposition analysis has been performed, for slightly different age groups, on data for the 1970s, to

[32] *Ibid.*

[33] See Tsentralnoe statisticheskoe upravlenie pri Sovete Ministrov SSSR, *Narodnoe khoziaistvo SSSR 1972* (Moscow, Statistika, 1973), p. 49; and *Narodnoe khoziaistvo SSR za 60 Let* (Moscow, Statistika, 1977), p. 73.

[34] *Levels and Trends of Mortality Since 1950*, chap. II.

determine the contribution of mortality improvement in these age groups to increases in life expectancy between 1970 and the late 1970s. The age groups are: 0–34 years; 35–64 years; and 65 years and over. The results are presented in table 46. A diversity of patterns is displayed by these data, but if there is one outstanding feature, it is the large contribution to total change in life expectancy among females arising from mortality decline in the population aged 65 years and over. This pattern is found in almost every country outside Eastern and Southern Europe. In 18 of the countries, age group 65 and over made the greatest contribution to gains in female life expectancy; and in 10 of these countries, the contribution was one year or more. It is from the older age groups that any future substantial gains in female life expectancy at birth will have to come, as mortality among young and middle-aged females in most of the more developed countries is now very low. It has been estimated from mid-1970s data for the more developed countries that if all mortality below age 50 years were eliminated, female life expectancy at birth would be increased by only from two to three years.

TABLE 46. CHANGES IN LIFE EXPECTANCY AT BIRTH AND CONTRIBUTION TO CHANGES FROM THREE BROAD AGE GROUPS, DEVELOPED COUNTRIES, FROM 1970 TO LATE 1970s

(*Years*)

Major area, region and country	Period	Males				Females			
		Change in life expectancy	Contribution to change by age group:			Change in life expectancy	Contribution to change by age group:		
			0–34	35–64	65 and over		0–34	35–64	65 and over
NORTHERN AMERICA									
Canada	1970–1975	0.5	0.3	0.1	0.1	1.2	0.3	0.2	0.7
United States of America	1970–1976	1.9	0.7	0.8	0.4	2.1	0.5	0.6	1.1
EAST ASIA									
Japan	1970–1977	3.4	0.9	1.1	1.4	3.3	0.6	1.0	1.7
EUROPE									
Eastern Europe									
Bulgaria	1970–1977	−0.9	0.3	−0.7	−0.5	0.1	0.3	0.1	−0.2
Czechoslovakia	1970–1975	0.9	0.6	0.1	0.2	0.5	−0.2	0.3	0.4
German Democratic Republic	1970–1976	0.7	0.3	0.2	0.1	1.1	0.5	0.3	0.3
Hungary	1970–1977	0.2	0.9	−0.7	0.0	0.9	0.7	−0.2	0.4
Poland	1970–1976	0.4	0.7	−0.5	0.2	1.8	0.7	0.1	1.0
Romania	1970–1977	1.4	1.4	−0.2	0.2	1.3	1.3	0.1	−0.1
Northern Europe									
Denmark	1970–1977	0.9	0.6	0.1	0.2	2.0	0.5	0.3	1.2
Finland	1970–1975	1.2	0.3	0.5	0.4	1.8	0.3	0.4	1.1
Ireland	1970–1975	0.4	0.0	0.2	0.1	1.1	0.3	0.5	0.2
Norway	1970–1977	1.2	0.5	0.3	0.4	1.6	0.2	0.2	1.1
Sweden	1970–1977	0.5	0.5	−0.2	0.2	2.0	0.3	0.4	1.3
United Kingdom									
England and Wales	1970–1977	1.3	0.4	0.4	0.4	1.1	0.4	0.2	0.5
Northern Ireland	1970–1977	−0.3	−0.0	−0.1	−0.2	0.3	0.1	0.2	0.0
Scotland	1970–1977	1.1	0.4	0.4	0.3	1.2	0.3	0.3	0.6
Southern Europe									
Italy	1970–1974	1.2	0.7	0.1	0.4	1.6	0.7	0.3	0.6
Malta	1970–1977	1.0	1.2	0.2	−0.4	−0.3	−0.3	0.5	−0.5
Portugal	1971–1975	1.2	0.8	0.1	0.3	2.3	1.3	0.3	0.7
Spain	1970–1975	0.5	0.6	−0.0	−0.1	0.8	0.3	0.3	0.2
Yugoslavia	1970–1976	2.5	1.6	0.4	0.5	2.7	1.7	0.5	0.5
Western Europe									
Austria	1970–1977	2.1	1.0	0.4	0.7	2.1	0.8	0.4	0.9
Belgium	1970–1976	1.0	0.5	0.4	0.1	1.3	0.4	0.3	0.6
France	1970–1976	0.8	0.4	0.2	0.2	1.3	0.4	0.3	0.6
Germany, Federal Republic of	1970–1977	1.9	1.0	0.4	0.6	2.4	0.7	0.5	1.2
Luxembourg	1971–1974	1.1	0.3	0.4	0.4	1.4	1.0	−0.1	0.5
Netherlands	1970–1977	1.3	0.5	0.5	0.2	2.2	0.4	0.3	1.5
Switzerland	1970–1977	2.0	0.7	0.7	0.7	2.8	0.5	0.7	1.6
OCEANIA									
Australia-New Zealand									
Australia	1970–1977	2.5	0.6	0.9	1.0	2.8	0.6	0.7	1.6
New Zealand	1970–1975	0.7	0.1	0.2	0.3	0.9	0.1	0.3	0.5

Sources: For the decomposition procedure, life-table values calculated from data on deaths and population by age and sex in the World Health Organization data bank. Life-table values for 1970 were calculated by the United Nations Secretariat; those for the more recent year were calculated by the World Health Organization and published in *World Health Statistics Annual, 1979* (Geneva, 1979), tables 10 and 11. These values may therefore differ from official country life-table values. For the formulae used for the decomposition, *Levels and Trends of Mortality Since 1950* (United Nations publication, Sales No. E.81.XIII.3), chap. II.

In most of the Eastern European countries, the greatest contributions to increases in female life expectancy were made by the age group under 35 years. These contributions were very modest in absolute terms, however; and progress in the two older age groups was virtually at a standstill, or even negative, in several countries. This slow-down has occurred at what are relatively low levels of female life expectancy at birth, some 73 years around 1970.

The patterns in Southern European countries were erratic, but in the two countries with the largest increases in female life expectancy—Portugal and Yugoslavia—mortality improvement in the youngest of the three age groups was responsible for by far the largest portion of the change.

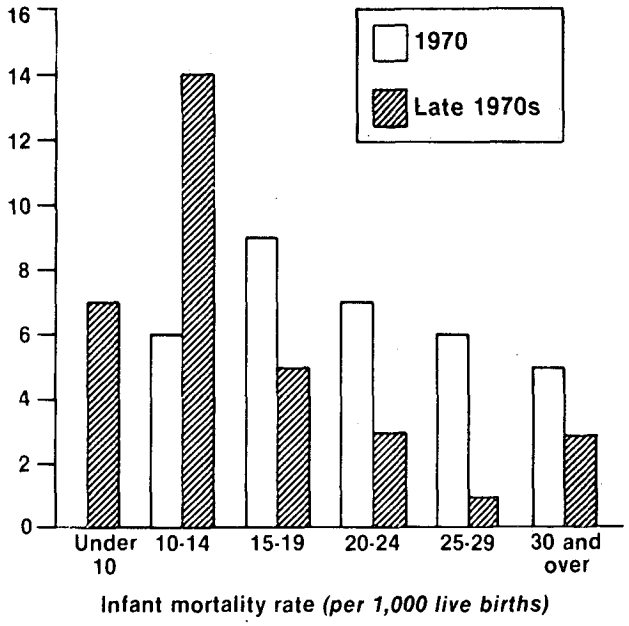
A consistent feature of the pattern of mortality change among males between 1970 and the late 1970s was the greater contribution of the youngest age group over that of either of the two older age groups. This change occurred in most of the countries given in table 46 and continued earlier trends described above. Notable exceptions were Australia and Japan, where trends were most favourable among the oldest males. Progress was slowest in age group 35–64, where mortality actually increased in half a dozen countries, four of them in Eastern Europe. Such trends also were observed in age group 30–64 in the 1960s. While the contribution to life expectancy gains from the oldest age group can be described for most of the countries as from negligible to rather modest, the gain was a decided improvement over trends in the 1960s, which resulted in a negative contribution from this age group in many countries.[35] For males, there is greater potential for mortality gains below the age of 50 years than for females. An estimate for the mid-1970s indicates that life expectancy at birth could be extended by from four to five years if all mortality below the age of 50 years were eliminated.

Infant mortality trends in the more developed countries were generally very favourable in the 1970s (see table 47). Figure 16 shows the dramatic shift that took place between 1970 and the late 1970s in the distribution of infant mortality rates. Rates under 15 per 1,000 live births were recorded in 21 countries at the latter date, compared with only 6 countries in 1970. Of the 21 countries, 7 had rates under 10, and that of Sweden was less than 8. Just as the estimates of a population's attainable life expectancy at birth have continued to be revised upward, so the estimates of the lower limits of infant mortality continue to be challenged by experience.

The declines in infant mortality have been so pronounced for many countries that their 1977 or 1978 indices (1970 equalling 100) are in the fifties and sixties. More than half the countries listed in table 47 fall into this category. As was the case with life expectancy at birth, substantial declines in infant mortality occurred both in countries with high initial rates (e.g., Romania and Yugoslavia) and those with relatively low rates (e.g., Denmark, Finland and Japan).

Despite the rapid over-all progress made in reducing infant mortality in the 1970s, however, there was still a fourfold difference between the highest and lowest rates in 1978. Rates in excess of 30 persisted in Portugal, Romania and Yugoslavia.

Figure 16. Frequency distributions of infant mortality rates, 33 countries in more developed regions, 1970 and late 1970s



Source: Table 47 in the present report.

[35] See *Levels and Trends of Mortality Since 1950*, chap. II.

TABLE 47. INFANT MORTALITY RATES, AND INDICES OF RATES, DEVELOPED COUNTRIES, 1970–1978

Major area, region and country	Infant mortality rates (deaths per 1 000 live births)					Index (1970 = 100)				
	1970	1975	1976	1977	1978	1970	1975	1976	1977	1978
NORTHERN AMERICA										
Canada	18.8	14.3	13.5	12.4	...	100.0	76.1	71.8	66.0	...
United States of America	20.0	16.1	15.2	14.0[a]	...	100.0	80.5	76.0	70.0[a]	...
EAST ASIA										
Japan	13.1	10.0	9.3	8.9	8.4	100.0	76.3	71.0	67.9	64.1

TABLE 47 (*continued*)

Major area, region and country	Infant mortality rates (deaths per 1,000 live births)					Index (1970 = 100)				
	1970	1975	1976	1977	1978	1970	1975	1976	1977	1978
EUROPE										
Eastern Europe										
Bulgaria	27.3	23.1	23.5	23.7[a]	22.2	100.0	84.6	86.1	86.8[a]	81.3
Czechoslovakia	22.1	20.8	21.0	19.6[a]	18.7	100.0	94.1	95.1	88.7[a]	84.6[a]
German Democratic Republic[a]	18.5	15.9	14.0	13.1[a]	13.2[a]	100.0	85.9	75.7	70.8[a]	71.4[a]
Hungary	35.9	32.8	29.8	26.2	24.4	100.0	91.4	83.0	73.0	68.0
Poland	33.2	24.9	23.8	24.6	22.4[a]	100.0	75.0	71.7	74.1	67.5[a]
Romania	49.4	34.7	31.4	31.2	30.3	100.0	70.2	63.6	63.2	61.3
Northern Europe										
Denmark	14.2	10.4	10.2	8.9[a]	8.9[a]	100.0	73.2	71.8	62.7[a]	62.7[a]
Finland	13.2	9.6	9.9	9.1	...	100.0	72.7	75.0	68.9	...
Ireland	19.5	17.5	14.6[a]	15.7[a]	14.9[a]	100.0	89.7	74.9[a]	80.5[a]	76.4[a]
Norway	12.7	11.1	10.5	9.2	...	100.0	87.4	82.7	72.4	...
Sweden	11.0	8.6	8.3	8.0[a]	7.7[a]	100.0	78.2	75.5	72.7[a]	70.0[a]
United Kingdom	18.4	16.0	14.5	14.1[a]	13.3[a]	100.0	87.0	78.8	76.6[a]	72.3[a]
England and Wales	18.1	15.7	14.3	13.7[a]	13.2[a]	100.0	86.7	79.0	75.7[a]	72.9[a]
Northern Ireland	22.9	20.4	18.3	17.2	17.2[a]	100.0	89.1	79.9	75.1	75.1[a]
Scotland	19.6	17.2	14.3	16.1	12.9[a]	100.0	87.8	75.5	82.1	65.8[a]
Southern Europe										
Greece	29.6	24.0	22.5	20.3[a]	19.3	100.0	81.1	76.0	68.6[a]	65.2
Italy	29.6	21.2	19.5	17.6[a]	16.0[a]	100.0	71.6	65.9	59.5[a]	54.1[a]
Malta	27.9	17.5	15.0	13.5	14.4[a]	100.0	62.7	53.8	48.4	51.6[a]
Portugal	58.0	38.9	...	...	...	100.0	67.1	...	...	...
Spain	26.5	18.9	17.1	15.9[a]	15.1[a]	100.0	71.3	64.5	60.0[a]	57.0[a]
Yugoslavia	55.5	39.7	37.1[a]	35.2[a]	33.6[a]	100.0	71.5	66.8	63.4[a]	60.5[a]
Western Europe										
Austria	25.9	20.5	18.2	16.9[a]	14.9[a]	100.0	79.2	70.3	65.3[a]	57.5[a]
Belgium	21.1	16.1	15.3	11.8[a]	11.7[a]	100.0	76.3	72.5	55.9[a]	55.5[a]
France	18.2	13.8	12.5	11.4[c]	10.6[c]	100.0	75.8	68.7	62.6[a]	58.2[a]
Germany, Federal Republic of[b]	23.6	19.8	17.4	15.5	14.7	100.0	83.9	73.7	65.7	62.3
Luxembourg	24.6	13.5	17.9	10.6	10.6	100.0	54.9	72.8	43.1	43.1
Netherlands	12.1	10.6	10.7	9.5	9.5[a]	100.0	87.6	88.4	78.5	78.5[a]
Switzerland	15.1	10.7	10.7	9.8	8.6	100.0	70.9	70.9	64.9	57.0
OCEANIA										
Australia-New Zealand										
Australia	17.9	14.3	13.8	12.5	...	100.0	79.9	77.1	69.8	...
New Zealand	16.7	16.0	14.0	14.2	13.8	100.0	95.8	83.8	85.0	82.6
USSR	24.4	27.7[d]	...	...	...	100.0	113.5[d]	...	...	...

Sources: Unless otherwise indicated, *Demographic Yearbook 1974* (United Nations publication, Sales No. E/F.75.XIII. 1), table 20; *Demographic Yearbook 1977* (United Nations publication, Sales No. E/F.78.XIII. 1), table 15; *Demographic Yearbook 1978* (United Nations publication, Sales No. E/F.79.XIII. 1), table 15; *Demographic Yearbook—Special Issue: Historical Supplement* (United Nations publication, Sales No. E/F.79.XIII. 8); and *Population and Vital Statistics Report: Data Available as of 1 April 1980*, Statistical Papers, series A, vol. XXXII, No. 2 (ST/ESA/STAT/SER.A/132).

For Spain, Instituto Nacional de Estadistica, *Anuario estadistico de España 1979* (Madrid, 1980?), p. 70.

[a] Provisional.

[b] The data which relate to the Federal Republic of Germany and the German Democratic Republic include the relevant data relating to Berlin, for which separate data have not been supplied. This is without prejudice to any question of status which may be involved.

[c] Excluding live-born infants dying before registration of birth.

[d] 1974.

Chapter VII

POPULATION STRUCTURE*

Population size and growth rate are basic elements to be taken into account in development planning. Also of critical importance is the structure of the population because subgroups of population, such as children, workforce, elderly people, women, and ethnic and religious groups, have unique problems and require special attention. In this chapter, however, discussion is limited to the age structure of the population, which is determined by preceding levels and trends of fertility and mortality and, in some instances, immigration and emigration.

A. Aging of populations

One of the most important trends in the age structure of population today is the aging of populations, characterized by a relative decrease of the younger population accompanied by a relative increase of the older population. The aging of populations, which has long been recognized as a phenomenon in the developed countries, has apparently begun to emerge in the 1970s on a worldwide basis. During the 1950s and 1960s, the age structure of populations in the less developed regions as a whole was becoming slightly younger due to persistently high, if not rising, fertility rates and declining infant and child mortality rates. However, the fertility decline that began in many parts of the less developed regions, including China, during the late 1960s has reversed the former trend and tended to make the population structure older. This new trend appears likely to accelerate in the coming decades.

The aging of populations is a demographic process in which the size of the older population increases in relation to that of the younger population. When mortality begins to decline from a previously high level, it has the effect of imparting a somewhat younger age distribution to the population (when controlled for fertility). This effect occurs because disproportionate gains in survival rates are usually made at the very young ages. After a medium-to-low mortality régime has been in effect for some period, however, further declines in mortality will result in an older age structure of the population. In reality, however, as mortality in a country approaches a low level, it is likely that fertility will also be declining moderately, or even rapidly; and this decline produces a more significant effect on the age structure than that resulting from decreasing mortality. At this stage, both fertility and mortality changes combine to produce an older age structure.

* Prepared by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat.

Median age

The changing age structure of a population can be shown, for instance, by tracing trends in the median age. It is the median age which divides the population into two equal parts: one older, and the other younger. The median age of the world population decreased from 23.3 years in 1950 to 21.6 years in 1970, apparently due to the reduction of infant and child mortality rates among the less developed regions. Since that time, this figure has been increasing. The average median age for the world is estimated to be 22.6 years in 1980 and is projected by the United Nations to increase to 26.1 years by 2000 (see table 48).

TABLE 48. MEDIAN AGE OF POPULATION FOR THE WORLD, MORE DEVELOPED REGIONS AND LESS DEVELOPED REGIONS, 1950–2000

Year	*World*	*More developed regions*[a]	*Less developed regions*[b]
1950	23.3	28.2	21.1
1960	22.5	29.2	19.8
1970	21.6	30.2	18.9
1980	22.6	31.4	20.1
1990	24.3	33.5	22.1
2000	26.1	35.8	24.1

Source: Based on *Selected Demographic Indicators by Country, 1950–2025: Demographic Estimates and Projections as Assessed in 1980* (ST/ESA/SER. R/38), p. 17, table 6.

[a] Including Northern America, Japan; Eastern, Northern, Southern and Western Europe; Australia-New Zealand and Union of Soviet Socialist Republics.

[b] Including all regions other than those given above in footnote a.

As is to be expected from the diversity of demographic trends among countries and regions of the world, there are large differences in the median age attained by various countries and regions. According to United Nations estimates for 1980, the Federal Republic of Germany has the highest median age, 36.6 years, followed by Sweden with 36.3 years. In contrast, some countries of Africa have very low median ages, such as 16.0 years in Liberia and 16.3 years in Nigeria. When all the countries of the world are grouped into two categories, i.e., the more developed and the less developed regions, their median ages in 1980 are 31.4 and 20.1 years, respectively. In the more developed regions, the average median age has been rising continuously since 1950, when it was 28.2 years. On the other hand, among the less developed regions, the average median age decreased from 21.1 years in 1950 to 18.9 years in 1970; however, the trend was reversed thereafter.

The aging of populations, which began during the 1970s in the less developed regions, is not likely, however, to narrow the gap between the median age of the more developed and the less developed regions in the near future because the aging process is advancing more rapidly in the former regions. The difference in the median age between the two regions has increased continuously, from 7.1 years in 1950 to 11.3 years in 1980, and is projected to increase further to 11.7 years in 2000.

One way to visualize the process of aging in a population structure is through graphs as shown in figure 17, where the current and future compositions of population by age and sex are illustrated through a series of population pyramids for the more developed and the less developed regions separately. In comparison with the latter group, the population pyramid of the more developed regions currently has a bell shape and will approach a rectangular shape in the future. This means that the population in these regions will approximate more closely a stationary state in about half a century, when more or less constant numbers of births will be matched by nearly equal numbers of deaths which will occur at advanced ages. In contrast, the current population pyramid for the less developed regions looks like a triangle, spreading out at the base like an unfolded fan. Such a pattern implies a rapidly growing population. However, the shape of the pyramid will gradually be transformed into a bell shape in the future as the aging process proceeds, due to a projected fertility decline. By 2025, the pyramid will begin to look like those of the more developed regions today.

As mentioned before, the aging of a population has two aspects: the relative decrease of children and young persons; and the relative increase of the elderly population. In the more developed regions, the proportion of population aged 0–14 dropped from about 29 per cent in 1960 to 23 per cent in 1980 (see table 49). This change occurred because of the fertility decline following the post-war "baby boom", and the young population subsequently increased very slowly in the 1960s and even decreased in the 1970s. In the coming 20 years, the growth rate of the population aged 0–14 years is not expected to exceed 0.3 per cent per annum in the more developed regions, while the total population is projected to increase at an annual rate of more than 0.5 per cent. By the year 2000, the proportion of population aged 0–14 in the more developed regions is projected to decrease to 21 per cent.

On the other hand, the elderly population aged 65 and over in the more developed regions, which accounts for 11 per cent of the total population in 1980, has been increasing at an average annual rate of approximately 2.3 per cent in the past 30 years. During that period, the growth rate of the total population did not exceed 1.3 per cent. The rate of increase of the elderly population, however, is projected to slow to 1.0 per cent in the 1980s and then increase to 1.6 per cent in the 1990s, due to the peculiar age structure apparently caused by the losses in the Second World War. The percentage of total population in age group 65 and over in the more developed regions thus increased from 9 per cent in 1960 to 11 per cent in 1980 and is estimated to be 13 per cent in the year 2000.

In the less developed regions, the proportion of the population in age group 0–14 declined only slightly in the 1970s, from about 42 per cent in 1970 to 39 per cent in 1980. By the year 2000, the proportion is projected to drop to 33 per cent. This decline has been caused mainly by the reduction of fertility which reduced the growth rate of the young population from 2.5 per cent in the 1960s to 1.6 per cent annum in the 1970s. The proportion of the elderly, aged 65 and over, in the less developed regions is still relatively small, estimated to be 4 per cent of the total

TABLE 49. STRUCTURE OF POPULATION, BY BROAD AGE GROUPS, FOR THE WORLD, MORE DEVELOPED REGIONS AND LESS DEVELOPED REGIONS, 1950–2000

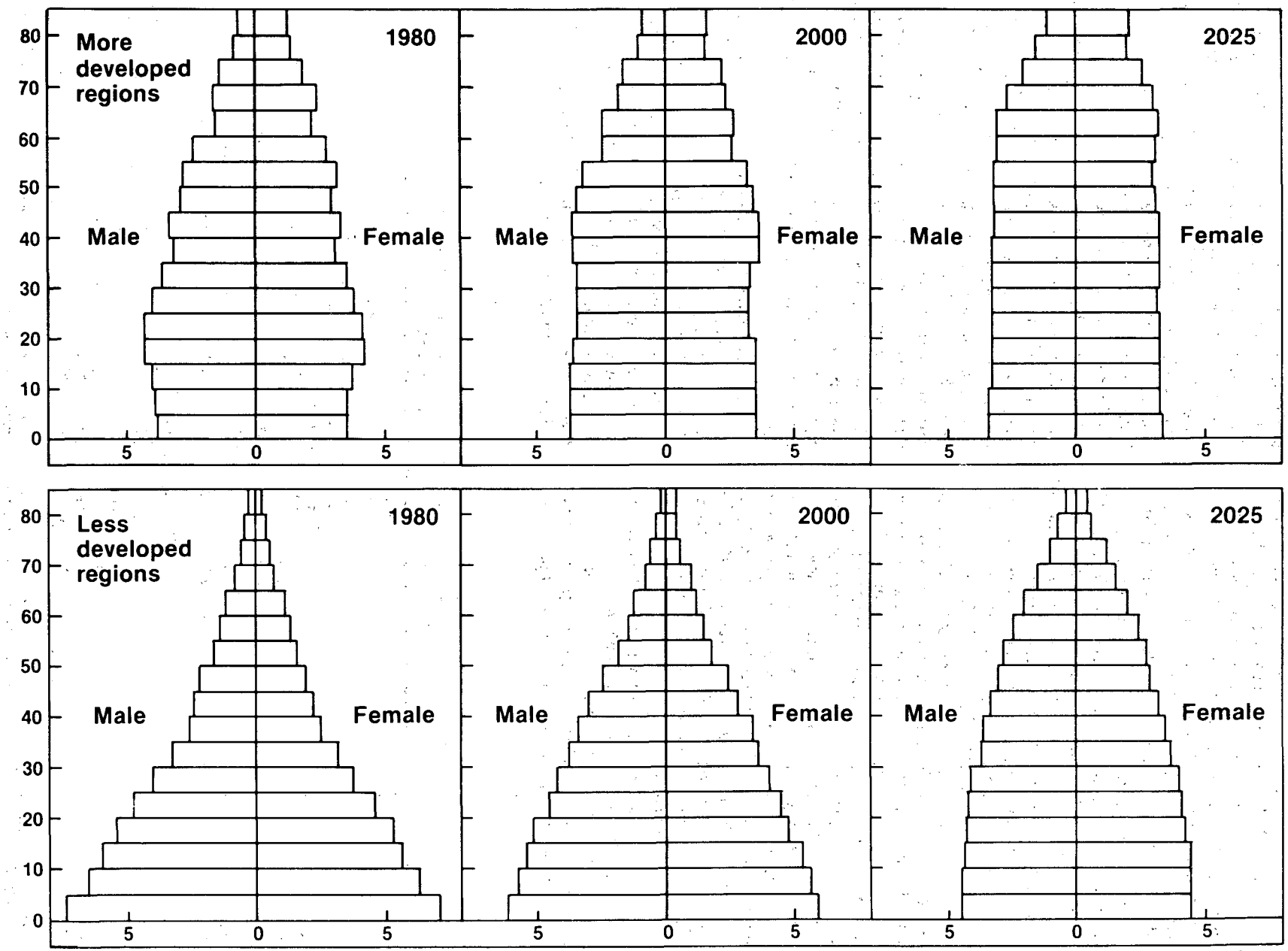
Year	*World age groups*			*More developed regions[a] age groups*			*Less developed regions[a] age groups*		
	0–14	*15–64*	*65+*	*0–14*	*15–64*	*65+*	*0–14*	*15–64*	*65+*
	Population (millions)								
1950	878	1 508	139	231	537	64	647	971	75
1960	1 130	1 742	165	270	595	80	860	1 148	85
1970	1 386	2 107	203	277	668	102	1 108	1 439	101
1980	1 553	2 620	259	261	742	128	1 292	1 877	132
1990	1 696	3 230	317	265	801	140	1 432	2 428	176
2000	1 877	3 839	403	267	839	166	1 610	2 999	237
	Percentage distribution[b]								
1950	34.8	59.7	5.5	27.8	64.6	7.6	38.2	57.3	4.4
1960	37.2	57.4	5.4	28.6	62.9	8.5	41.1	54.9	4.1
1970	37.5	57.0	5.5	26.5	63.8	9.7	41.8	54.3	3.8
1980	35.0	59.1	5.9	23.1	65.6	11.3	39.1	56.9	4.0
1990	32.4	61.6	6.0	21.9	66.4	11.6	35.5	60.2	4.4
2000	30.7	62.7	6.6	21.0	66.0	13.0	33.2	61.9	4.9

Source: Based on *Selected Demographic Indicators by Country, 1950–2025: Demographic Estimates and Projections as Assessed in 1980* (ST/ESA/SER.R/38), p. 18, table 7.

[a] For coverage of "more developed regions" and "less developed regions", see table 48.

[b] Percentage distribution of total population by age groups.

Figure 17. Population pyramids for the more developed and less developed regions, 1980, 2000 and 2025



in 1980. But the rate of growth of elderly persons, which was 2.7 per cent per annum in the 1970s, will continue to increase in the near future, exceeding not only the growth rate of the population aged 0–14 in the less developed regions but the comparable growth rate of the elderly population in the more developed regions. This projection highlights the potential importance of the aging problem in the less developed regions.

As for the working-age population, the more developed and the less developed regions are facing serious but contrasting problems in the coming years. In the more developed regions, the previous fertility decline will manifest itself in a rapidly declining growth rate of the working-age population in the near future. During the decade of the 1970s, that portion of the population grew at an average annual rate of 1.2 per cent. The rate, however, is projected to decrease to 0.7 per cent in the 1980s and 0.4 per cent in the 1990s. In terms of actual numbers, the average annual increase will drop from 8 million in the 1970s to 6 million in the 1980s and 3 million in the 1990s.

In the less developed regions, the growth rate of the working-age population in the coming decades is projected to decline only slightly, from 2.6 per cent per annum in the 1970s to 2.5 per cent in the 1980s and 2.3 per cent in the 1990s, indicating the likelihood of a continuing serious employment problem. The size of the annual increase will grow in the coming decades, reaching 53 million, up from 43 million in the 1970s.

B. Dependency ratio

One of the indicators used to measure the economic implications of a changing age structure is the dependency ratio. The childhood dependency ratio is defined as the ratio of the population aged 0–14 years to those aged 15–64, multiplied by 100. The old-age dependency ratio is defined as the ratio of the population aged 65 years and over to those aged 15–64, multiplied by 100. The total dependency ratio is defined as the sum of the childhood and old-age dependency ratios.

Table 50 shows the total, childhood and old-age ratios for the world as a whole and for the more developed and less developed regions separately. The total dependency ratio in 1980 was higher in the less developed regions, owing to the fact that the childhood dependency ratio was 69 in those regions and 35 in the more developed regions. This ratio greatly outweighed the fact that the old-age dependency ratio was 7 in the less developed and 17 in the more developed regions in 1980.

In the 1970s, due to the rising median age of the population, the dependency ratio began to decrease on a world-wide basis. The average ratio for the world rose from 67 in 1950 to 75 in 1970 and then declined to 69 by 1980. It is projected to fall to 59 by 2000. The expected future decline in the total dependency ratio is primarily due to the projected rapid decline in the childhood dependency ratio in the less developed regions, from 69 in 1980 to 54 in 2000. This decline would certainly help to reduce the economic burden on the working-age population in the less developed regions; but the ratio, 54, is still much higher than the 32 which is projected for the same year for the more developed regions. On the other hand, the old-age dependency ratio in the less developed regions is projected to increase slightly, from 7 to 8 in the coming 20 years.

In the more developed regions, the old-age dependency ratio is projected to increase from 17 in 1980 to 20 in 2000. However, as the child dependency ratio is projected to decline from 35 to 32 in the same period, the total dependency ratio in the more developed regions will probably stay at more or less the current level.

Table 50. Age dependency ratios for the world, more developed regions and less developed regions, 1950–2000

Year	World			More developed regions[a]			Less developed regions[a]		
	Total[b]	Childhood[c]	Old age[d]	Total	Childhood	Old age	Total	Childhood	Old age
1950	67	58	9	55	43	12	74	67	8
1960	74	65	10	59	45	14	82	75	7
1970	75	66	10	57	42	15	84	77	7
1980	69	59	10	52	35	17	76	69	7
1990	62	53	10	51	33	18	66	59	7
2000	59	49	11	52	32	20	62	54	8

Source: Based on *Selected Demographic Indicators by Country, 1950–2025: Demographic Estimates and Projections as Assessed in 1980* (ST/ESA/SER.R/38) p. 19, table 8.

[a] For coverage of "more developed regions" and "less developed-regions", see table 48.

[b] Total age dependency ratio is defined as the sum of the childhood dependency ratio and the old-age dependency ratio.

[c] Childhood dependency ratio is defined as the ratio of the population aged 0–14 to those aged 15–64, multiplied by 100.

[d] Old-age dependency ratio is defined as the ratio of the population aged 65 and over to those aged 15–64, multiplied by 100.

Chapter VIII

INTERNATIONAL MIGRATION*

The patterns of international migration that emerged around the middle of the 1970s have largely persisted during the past two years. Substantial stocks of migrant workers have built up in the resource-rich countries of Northern Africa and Western South Asia, chiefly from other countries within the regions but with increasing numbers from other regions and especially from East Asia and other regions of South Asia. International migration in Europe appears to be continuing its period of relative stabilization following the growth of large stocks of migrant workers during the preceding decade and a half. In Northern America and Oceania, levels of long-term immigration for resettlement have remained steady but with increasing proportions of the migrant flows coming from the less developed regions. Existing data give no indication of significant changes in patterns or levels of flows in Latin America or in Africa south of the Sahara.

In addition to flows of migrants admitted for permanent resettlement and migrant workers, the issue of undocumented migration remains a matter of serious concern, particularly for countries with substantial net immigration. However, the problem of obtaining more accurate demographic data on these flows continues unresolved. Flows of highly trained professionals into the countries that have been the traditional beneficiaries of the "brain drain" appear not to have changed very much and may have abated slightly. On the other hand, reports are widespread of difficulties in many net sending countries, resulting from shortages of technical and skilled workers and trained craftsmen who have joined the labour migration flows, especially into Northern Africa and Western South Asia. Lastly, during the past two years there have been several substantial new flows of refugees in various parts of the world.

The obtaining of timely and accurate demographic data on international migration remains a difficult problem. In all but quite highly developed countries, the periodic census remains the chief source of information. Estimates of flows both into and out of a given country are not commonly available from direct observation, not always even in countries with highly developed statistical systems; the data that do exist normally require very careful appraisal before they can be used. Measures to obtain improved statistics on international migration remain a matter of considerable urgency.

In this discussion, attention is focused on three issues in international migration of immediate concern: labour migration into the resource-rich countries of Northern Africa and Western South Asia; labour migration in Europe; and refugees. These are, of course, by no means the only issues of major concern. They were selected for this monitoring report because some of the other topics have been covered more fully in previous monitoring reports and for still others there are no significant new sources of data.

A. Northern Africa and Western South Asia

Massive levels of international migration, in relation to the size of the national populations of the host countries, are among the most important of the many profound social and economic changes that have occurred in Northern Africa and Western South Asia since the sharp rise in petroleum prices began in 1973. The speed with which the stocks of migrants have built up has added significantly to the impact on both net sending and receiving countries. Moreover, the size and speed of the development of such flows has strained the abilities of the national statistical systems to measure them accurately and with sufficient detail.

The most recent date for which there are complete estimates of stocks of migrants for the countries of Northern Africa and Western South Asia is 1975. Even for that date, the estimates continue to have to be revised slightly as further studies are done and as more data are made available and analyzed.

Results of a very recent set of estimates[1] for Arab countries in those regions are given in tables 51 and 52.[2] They indicate that there were some 1.8 million migrant workers in countries of that region in 1975. The two most important receiving countries were the Libyan Arab

* Prepared by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat.

[1] J. S. Birks and C. A. Sinclair, *International Migration and Development in the Arab Region*, A World Employment Programme Study (Geneva, International Labour Office, 1980); and a large number of supporting reports and working papers, all published under the auspices of the World Employment Programme.

[2] These estimates of numbers of migrant workers differ slightly from those used by other authors who have dealt with this subject. In the aggregate, differences tend to be small but specific numbers from a particular country of origin to a particular country of destination are sometimes considerable. These discrepancies reflect the difficulties with which such estimates are made. The estimates by Birks and Sinclair, *op. cit.*, are used here chiefly because they are consistent with other information discussed below. For another recent set of estimates see, for example, K. Ecevit, "Labor imports/exports for economic development—the Middle East experience," paper presented to the Sixth World Congress on Human Resources, Employment and Development, Mexico City, August 1980. The aggregate difference for the same set of countries between these sets of estimates is 0.056.

TABLE 51. MIGRANT WORKERS IN ARAB COUNTRIES OF NORTHERN AFRICA AND WESTERN SOUTH ASIA, BY COUNTRY OF ORIGIN AND COUNTRY OF EMPLOYMENT, 1975
(*Thousands*)

	Country of origin																		
Country of employment	*Egypt*	*Yemen*	*Jordan*[a]	*Democratic Yemen*	*Syrian Arab Republic*	*Lebanon*	*Sudan*	*Algeria, Morocco and Tunisia*	*Oman*	*Iraq*	*Somalia*	*All Arab countries*	*Pakistan*	*India*	*Iran*	*Turkey*	*Other Asian countries*	*Europe and Americas*	*Africa and other*	*Total*
Bahrain	1.2	1.1	.6	1.1	0.1	0.1	0.4	[b]	1.4	0.1	[b]	6.1	6.7	8.9	1.9	[b]	0.9	4.4	[b]	29.3
Iraq	7.0	[b]	5.0	[b]	[b]	3.0	0.2	[b]	[b]	[b]	[b]	15.2	5.0	5.0	40.0	[b]	[b]	0.5	[b]	65.7
Jordan (East Bank)	5.3	[b]	[b]	[b]	20.0	7.5	[b]	[b]	[b]	[b]	[b]	32.8	[b]	[b]	[b]	[b]	[b]	0.1	[b]	32.9
Kuwait	37.6	2.8	47.6	8.7	16.6	7.2	0.9	[b]	3.7	18.0	0.2	143.3	11.0	21.4	28.9	[b]	1.1	2.0	0.1	208.0
Libyan Arab Jamahiriya	229.5	[b]	14.2	[b]	13.0	5.7	7.0	41.0	[b]	[b]	[b]	310.4	4.5	0.5	[b]	9.0	0.5	7.0	0.5	332.3
Oman	4.6	0.1	1.6	0.1	0.4	1.1	0.5	0.1	[b]	[b]	0.3	8.8	32.5	26.0	0.4	[b]	0.2	2.8	[b]	70.7
Qatar	2.8	1.2	6.0	1.2	0.8	0.5	0.4	[b]	1.9	[b]	[b]	14.8	16.0	16.0	4.0	[b]	2.0	0.8	[b]	53.7
Saudi Arabia	95.0	280.4	175.0	55.0	15.0	20.0	35.0	[b]	17.5	2.0	5.0	699.9	15.0	15.0	10.0	0.5	8.0	15.0	10.0	773.9
United Arab Emirates	12.5	4.5	14.5	4.5	4.5	4.5	1.5	[b]	14.0	0.5	1.0	62.0	100.0	61.5	21.0	[b]	2.0	5.0	[b]	251.5
Yemen	2.0	[b]	0.2	[b]	0.2	[b]	[b]	[b]	[b]	[b]	[b]	2.4	[b]	[b]	[b]	[b]	[b]	0.1	[b]	2.5
TOTAL	397.5	290.1	264.7	70.6	70.6	49.6	45.9	41.1	38.5	20.6	6.5	1 297.7	190.7	154.3	106.2	9.5	14.7	37.7	10.6	1 820.5

Source: J. S. Birks and C. A. Sinclair, *International Migration and Development in the Arab Region*, A World Employment Programme Study (Geneva, International Labour Office, 1980).

[a] Including persons of Palestinian origin.
[b] No migrants from this country or area of origin reported.

TABLE 52. MIGRANT POPULATIONS IN ARAB COUNTRIES OF NORTHERN AFRICA AND WESTERN SOUTH ASIA, BY COUNTRY OF ORIGIN AND COUNTRY OF RESIDENCE, 1975
(*Thousands*)

	Country of origin																			
Country of residence	*Jordan*[b]	*Egypt*	*Yemen*	*Democratic Yemen*	*Syrian Arab Republic*	*Lebanon*	*Sudan*	*Algeria, Morocco and Tunisia*	*Oman*	*Iraq*	*Somalia*	*All Arab countries*	*Pakistan*	*India*	*Iran*	*Turkey*	*Other Asian countries*	*Europe and Americas*	*Africa and other*	*Total*
Bahrain	2.5	3.3	2.0	1.8	0.2	0.3	0.1	[b]	1.7	0.3	[b]	12.2	17.8	17.2	4.0	[b]	1.5	3.3	1.0	56.0
Iraq	15.3	17.5	[b]	[b]	[b]	0.7	0.4	[b]	[b]	[b]	[b]	33.9	10.0	7.5	50.0	[b]	[b]	0.7	[b]	102.1
Jordan (East Bank)	[b]	5.9	[b]	[b]	22.0	22.0	[b]	[b]	[b]	[b]	[b]	49.9	[b]	[b]	[b]	[b]	[b]	0.2	[b]	50.2
Kuwait	204.2	60.5	4.8	12.3	41.0	24.8	1.6	0.3	7.3	45.1	0.6	402.4	23.0	32.1	40.8	0.1	1.0	2.5	0.5	502.5
Libyan Arab Jamahiriya	35.4	327.5	[b]	[b]	37.8	14.2	14.0	58.5	[b]	[b]	[b]	487.4	12.8	1.1	[b]	11.2	0.7	17.5	0.7	531.5
Oman	4.9	9.8	0.2	0.2	1.1	3.2	1.0	0.2	[b]	[b]	0.5	21.0	65.0	38.5	0.5	[b]	0.2	7.0	[b]	132.2
Qatar	17.0	4.0	1.9	1.7	1.9	1.3	0.8	[b]	3.2	[b]	[b]	31.8	28.0	27.8	5.2	[b]	2.4	1.8	[b]	97.0
Saudi Arabia	536.8	201.3	322.2	153.4	43.5	37.9	71.8	[b]	41.0	5.0	8.0	1 420.9	47.8	34.5	12.5	0.62	11.5	22.7	14.5	1 565.0
United Arab Emirates	36.5	21.0	5.6	8.5	11.3	11.3	2.5	[b]	21.2	0.8	1.5	120.2	201.8	107.5	15.0	[b]	2.1	9.5	[b]	456.0
Yemen	0.6	4.2	[b]	[b]	0.4	[b]	[b]	[b]	[b]	[b]	[b]	5.2	[b]	[b]	[b]	[b]	[b]	0.2	[b]	5.4
TOTAL	853.2	655.1	336.7	177.9	159.2	115.7	92.1	59.0	74.4	51.1	10.6	2 584.9	406.2	266.2	128.1	12.0	19.4	65.4	15.8	3 497.9

Source: J. S. Birks and C. A. Sinclair, *International Migration and Development in the Arab Region*, A World Employment Programme Study (Geneva, International Labour Office, 1980).

[a] Including persons of Palestinian origin.
[b] No migrants from this country or area of origin reported.

Jamahiriya and Saudi Arabia, which together contained over half the total stock in the region. Substantial numbers also were found in Kuwait and the United Arab Emirates. In 1975, the majority of all migrant workers had come from other Arab countries, particularly Democratic Yemen, Egypt, Jordan and Yemen. The Libyan Arab Jamahiriya and Saudi Arabia depended almost entirely upon other Arab countries as the sources for their migrant flows, while Bahrain, Qatar, the United Arab Emirates; and, to a lesser extent, Kuwait had already begun to attract substantial proportions of their migrants from selected non-Arab countries of Asia and elsewhere.

A noteworthy feature of the migration flows into Northern Africa and Western South Asia may be observed by comparing the estimates of numbers of workers (table 51) with the total number of migrants (table 52). A widespread view has been that the flows of migrants into these countries have consisted almost entirely of workers. The comparison demonstrates, however, that such is not the case. Along with the approximately 1.8 million migrant workers, there were in 1975 approximately 1.6 million additional persons who had migrated into the countries of Northern Africa and Western South Asia but had not entered the labour force. Since unemployment levels in these regions are generally very low, at least a significant proportion of these non-working entrants are likely to be dependants of migrant workers. Some other factors may also be involved; it is quite likely that in all of the receiving countries, some persons who enter as dependants subsequently accept employment but do not report it. Others presumably are international migrants whose moves are unrelated to the labour migration flows—pilgrims, students, spouses and so on. Nevertheless, the dependants of workers are almost certainly the major component of the flow.

The proportions of migrants employed do not vary a great deal by region of origin. Among migrants from other Arab countries, the proportion is almost exactly 0.50. However, there are comparatively large variations in the proportions employed according to the individual country of origin. Migrants from Egypt and Yemen have comparatively high proportions employed, 0.61 and 0.86, respectively, whereas migrants from Democratic Yemen and from Jordan (including Palestinians) are much less likely to be employed; the proportions are 0.40 and 0.31, respectively. Corresponding proportions for other Arab countries with substantial numbers of emigrants are between 0.40 and 0.60. Of all non-Arab Asian migrants, 0.52 are employed. Again, some differences are found among the various groups of migrants of Asian origin. Among migrants from Pakistan, workers are a minority (0.47), while among those from India, the proportion is 0.58. Among the less numerous and more recently arrived migrants from other countries in Asia, just over three fourths are employed. This markedly higher proportion probably reflects the fact that the development of the migration flow from East Asia and Eastern South Asia is still at an earlier phase and also the greater tendency for these flows to be organized through contractual agreements between the host country and an agency of the sending country or a transnational corporation, for work on a specific project. The corresponding proportion for migrants from Europe and America is 0.58, the same as that for India.

Between the various host countries, the variations in proportions of all immigrants who are employed are only moderate. The proportion is higher in the Libyan Arab Jamahiriya, 0.62, near the aggregate average in the United Arab Emirates and in Saudi Arabia, 0.55 and 0.49, respectively; and lower in Kuwait, 0.41. It is noteworthy that these ratios of foreign workers to total migrants are not markedly different from those recently observed in Europe. For six of the leading countries of net labour immigration (Belgium, France, the Federal Republic of Germany, the Netherlands, Sweden and Switzerland) the proportion is 0.47 with a range from 0.36 (Belgium) to 0.54 (Switzerland).

The presence of these substantial numbers of dependants in the migrant flows into the net immigration countries of Northern Africa and Western South Asia cannot but have profound social and economic consequences, for both sending and receiving countries. However, precisely what the long-term demographic and other consequences might be, apart from the sheer numbers involved, is not all that obvious. In particular, although it might seem plausible to assume that worker migrants who are accompanied by dependants are more likely to stay for a longer time or to attempt to settle permanently, that may not be the case. The recent European experience with migrant workers and dependants suggests that the relationship between the proportion of migrants who are dependants and the likelihood and timing of their eventual return to country of origin is quite complex.

In general, migrants from a given country of origin distribute themselves in a way that is neither equal nor proportional to the distribution of all migrants among receiving countries. Rather, there are distinct paths between specific pairs of countries. For example, as of 1975, Saudi Arabia attracted less than 33 per cent of all Egyptian migrants but over 95 per cent of all those from Yemen, about 62 per cent of those from Jordan (including Palestinians) and some 86 per cent of all emigrants from Democratic Yemen. Other specific pairs of countries are similarly linked by disproportionately large or small flows, as the case may be. Propinquity is a major factor, but is probably decreasing in importance over time, especially with larger numbers of migrants coming from outside the regions.

The most striking feature of migration in these regions, from virtually every point of view, is the sheer size of the migrant stocks in relation to the size of the national populations of most of the major receiving countries. (Iran and Iraq, with over 100,000 immigrants in their populations as of 1975, were also among the leading receiving countries of the region. However, their very large native-born populations—33 million and 11 million, respectively—made the relative impact of migrants comparatively slight.) As can be seen in table 53, the proportion of the resident population that is foreign is

one fifth or more in each of the leading countries of immigration; and it rises to one half or more in Kuwait, Qatar and the United Arab Emirates. Indeed, in the United Arab Emirates, nationals are outnumbered by more than two to one. Even higher proportions of immigrants are observed in the labour force of these selected countries. In Qatar and the United Arab Emirates, more than four fifths of the respective labour forces are of foreign origin. In every case, immigrants constitute more than one third of the labour force.

The numbers of migrants in relation to the populations of the countries of their origin among the countries of Northern Africa and Western South Asia are generally lower, but are, none the less, significant. Several of the leading countries of emigration have quite large populations; Egypt, the Sudan, the Syrian Arab Republic and Yemen, which together provided over one third of all migrants into the receiving countries of the region, each had a national population of more than 5 million in 1975. For other countries, the outflows were relatively large. The number of persons identified by Birks and Sinclair[3] on the basis of their studies as Jordanians (including Palestinians) is equivalent to just slightly less than one third the total population of Jordan. Democratic Yemen and Yemen each also appear to have over 5 per cent of their population outside their national boundaries as participants in the intraregional migration flows. For all other countries of these regions, intraregional emigration appears to have been equivalent to less than 4 per cent of their total population. It must also be noted that a number of countries of these regions have experienced net emigration to other regions of the world, especially to Europe and the Americas. Egypt, Iraq, Jordan, Lebanon and the Syrian Arab Republic have all participated in these flows.[4]

Information for the years following 1975 is not complete. However, indirect evidence, such as numbers of work permits issued by some countries, remittances reported and so forth, is sufficient to support three important observations. First, the stocks of immigrants, workers and others, in Northern Africa and Western South Asia have continued to increase. There has almost certainly been a decline in Iran, with the departure of an estimated 85,000 migrants from Northern America and Europe and of a majority of the 120,000 workers from Afghanistan who were reported in the country in 1975. However, in all of the other net immigration countries, indications are that the number of migrants has continued to increase. In particular, Algeria and Iraq, with large national populations, were able to meet a large part of their labour force needs with comparatively little immigration up to about 1976. Since that time, labour imports have accelerated. For example, the number of foreign workers recruited by Algeria rose from 9,800 in 1975 to 21,400 in 1977.[5]

A second observation is that increasing numbers of migrants were drawn from countries of East Asia and Eastern South Asia. Tables 51 and 52 show that about one fourth of all immigrants in 1975 were from Asian countries outside Western South Asia. Bahrain, Iraq, Oman, Qatar and the United Arab Emirates each drew half or more of all their immigrants from these countries. The great majority came from just three countries—India, Iran and Pakistan. Since 1975, India and Pakistan have continued to be major participants in the migration flows to Northern Africa and Western South Asia. In addition, however, a number of countries further south and east have begun to participate. Workers at virtually all skill levels, from highly trained professionals and managers to clerks, craftsmen and construction workers, are participating. The leading countries of origin of this newer flow are Bangladesh, Malaysia, the Philippines, the Republic of Korea, Sri Lanka and Thailand. Nearly all of the net receiving countries have begun to draw migrants from the countries of East Asia and Eastern South Asia, probably reflecting above all else that the pools of potential migrants within the requisite skills in the net sending Arab countries are being exhausted.

There are reports of serious labour shortages in some of the sending countries, such as Egypt, Jordan and Yemen. As can be seen in Table 51, by 1975, Jordan had itself begun to depend in part upon migrant workers. Serious labour shortages in Yemen are reported to have

[3] *Op. cit.*

[4] The most recent general summary of these global flows remains *Trends and Characteristics of International Migration Since 1950* (United Nations publication, Sales No. E.78.XIII.5).

[5] K. Ecevit, *op. cit.*, p. 5.

TABLE 53. TOTAL AND IMMIGRANT POPULATIONS AND LABOUR FORCE, SELECTED ARAB COUNTRIES OF NET IMMIGRATION IN NORTHERN AFRICA AND WESTERN SOUTH ASIA, 1975
(*Thousands*)

Country	Population			Labour force		
	Total	Immigrant	Proportion	Total	Immigrant	Proportion
Bahrain	256	56.0	0.22	75.8	30.0	0.40
Kuwait	1 002	502.5	0.50	299.8	208.0	0.69
Libyan Arab Jamahiriya	2 430	531.5	0.22	783.6	334.4	0.42
Oman	766	132.2	0.17	207.7	70.7	0.34
Qatar	170	97.0	0.57	66.2	53.7	0.81
Saudi Arabia	7 180	1 565.0	0.22	1 799.9	773.4	0.43
United Arab Emirates	558	456.0	0.82	296.5	251.5	0.85

Source: J. S. Birks and C. A. Sinclair, *International Migration and Development in the Arab Region*, A World Employment Programme Study (Geneva, International Labour Office, 1980); and *Demographic Yearbook 1978* (United Nations publication, Sales No. E.79.XIII.1).

led to actual declines in agricultural output and in land under cultivation since 1975. There are two exceptions to this growing dependence on Asian sources: the Libyan Arab Jamahiriya, which, apart from the sending Arab countries, has continued to draw more heavily from Northern America, Europe and Turkey;[6] and Iraq, which has attracted nearly two thirds of its migrant labour force from Iran.

The third observation is that the Governments of the net receiving countries are, in general, attempting to exercise increased control over the size and characteristics of the migrant flows. Regulations have been strengthened and more rigorously implemented. Increased use is being made of formal arrangements between sending and receiving countries. Two important considerations give rise to this trend. First, the receiving countries are concerned that the very large numbers of immigrants within their borders, an unknown but significant proportion of whom had entered without the permission of the host country, could become a threat to political stability. Secondly, as development has proceeded in the region, labour force requirements have begun to shift from a situation where workers at all skill levels were needed, including large amounts of unskilled labour, to one where the needs are becoming more specialized. To fill these specialized needs, the countries of immigration have had to go further afield into other regions and to recruit in a more selective fashion.

There has been a good deal of discussion and some controversy over the social and economic consequences of labour migration. Among the benefits for sending countries, reduction of unemployment and resulting social tensions, acquisition of occupational skills and values which can be put to use by returned migrants and remittances in money and kind have been mentioned. In particular, worker remittance flows have become a very important source of foreign exchange for many sending countries. Table 54 reports recent estimates of worker remittances received in selected countries with migrant flows into countries of Northern Africa and Western South Asia. It is obvious that very substantial capital flows are involved, to the extent that for some countries worker remittances are a leading factor in the country's international balance of payments. (Moreover, it should be recognized that the actual values remitted were quite probably in every case higher than the amounts reported, since the figures given do not include funds transferred informally nor the value of goods purchased abroad and brought back to the country of origin.) In addition, table 54 reflects the rapid increase in the importance of migration from countries of South Asia. During the two-year interval from mid-1975 to mid-1977, remittances to Pakistan and Bangladesh increased by factors of about 3 and 5, respectively. For India, the increase was some 50 per cent in one year, from mid-1975 to mid-1976.

For 1975, the available data indicate that the average annual remittance per migrant worker for these countries, excluding the Sudan, was just slightly less than $1,350. Remittances per worker ranged from $630 (Jordan) to $2,680 (India). The comparatively low estimate for Jordan probably reflects in part a much lower proportion of workers in the flow of migrants from Jordan. There is no readily apparent explanation for the very low figure ($39) for annual remittances per migrant worker from the Sudan.

Benefits to the countries of immigration include, above all else, the alleviation of labour shortages. Given the small national populations of most of the resource-rich countries of Northern Africa and Western South Asia, as well as, in most cases, their previously low educational levels, economic growth anywhere near the actual level would have been virtually impossible without large-scale immigration. In addition, it has been observed that migrant workers are often willing to accept lower wages, poorer working conditions and less desirable occupations, thus helping to hold down costs of production. Lastly, it has been argued that workers make fewer demands as dependent members of the host society: they normally arrive as young adults and are expected to remain only as long as they are likely to be employed.

[6] Recent newspaper accounts suggest that since 1977, the Libyan Arab Jamahiriya has reduced the over-all number of foreign workers and has sharply reduced the numbers from Egypt, the United States of America and Europe. There is reported to be some increase in the numbers from East Asia and Eastern South Asia.

TABLE 54. NET WORKER REMITTANCES FOR SELECTED COUNTRIES WITH SIGNIFICANT MIGRANT FLOWS INTO NORTHERN AFRICA AND WESTERN SOUTH ASIA, 1970–1977
(*Millions of dollars*)

	Net worker remittances					
	Amount				*As percentage of total exports*	
Country	*1970*	*1975*	*1976*	*1977*	*1970*	*1977*
Bangladesh	...	15.3	18.1	78.3	...	14.5
Egypt	29.0	365.5	755.1	896.7	3.0	25.4
India	95.0	414.0	615.5	...	4.3	9.5[a]
Jordan	15.5	166.6	411.0	419.1	17.4	62.2
Pakistan	...	275.6	409.9	866.3	...	60.6
Sudan	...	1.8	9.5	36.8	...	4.7
Yemen	...	309.7	796.3	914.3	...	799.1

Source: World Bank, *World Tables, 1980*, 2nd ed., (Baltimore, Maryland, Johns Hopkins University Press, 1980).
[a] 1976.

Thus, the over-all burden of dependency for the receiving society is reduced.

However, significant costs have also been found. For the countries of origin, difficulties may arise from the loss of needed skilled workers; it is not only the unemployed who emigrate. Moreover, skills acquired by migrant workers may have little relationship to labour force needs in the sending country. The use to which remittances have been put have not always been very beneficial. In the experience of many countries, substantial amounts are spent on consumer goods and personal residences rather than on the development of productive capacity. Labour shortages in particular sectors or skill categories may distort or impede economic development in the sending countries. Speculative rises in the price of land and general inflation have been ascribed to the rapid influx of remittances. There is likely to be a good deal of social disruption associated with the large-scale absence of a quite age/sex specific segment of the population. At a very broad level, the exportation of labour may seriously increase the vulnerability of a sending country to political and economic events in the receiving countries.

Empirical research on the consequences of labour migration for countries of origin is scarce and fragmentary. The modest number of case studies that have been carried out at the micro level suggest that the consequences vary considerably, often in response to unique local conditions, and that they are rarely either wholly positive or detrimental.

Two difficulties have caused particular concern in the receiving countries. First, although the migrants usually are officially viewed as temporary, they are by no means always willing to depart when the host Government wishes them to do so. Recent experience in various regions has been that the stocks of migrant workers and their families are strongly persistent. Secondly, where there are large stocks of migrant workers in relation to the size of the national population, there are serious concerns that the migrant presence may contribute to political instability. Where the stocks of migrants have continued for some length of time, neither returning to their country of origin nor being assimilated into the host population, the so-called "problems of the second generation" have begun to appear: migrant children, marginal to the cultures both of their country of origin and of the host country; a disfranchised minority concentrated in separate and often substandard residential zones, with access only to the less desirable and less secure jobs. Further, the presence of the migrants is said to depress wages and working conditions for national workers and thus to discourage the development of the national labour force. Lastly, there appears to be a positive association between flows of migrant workers and of undocumented migrants.

There is no consensus on the net consequences of labour migration. However, it is probable that most Governments in net receiving countries now view the long-term disadvantages as outweighing short-term gains, and hence that use of migrant labour should be avoided if possible. In the case of the resource-rich countries of Northern Africa and Western South Asia, the challenge of making use of large-scale flows of migrant workers (and their dependants), while at the same time minimizing the difficulties that may attend such flows, is formidable. For the countries of origin the opportunities and risks may indeed be even greater.

B. Europe and the Mediterranean basin

Another cluster of countries linked by flows of labour migration are those of Western Europe and the Mediterranean basin. This system has functioned for nearly two decades and was an important factor in European economic growth during the 1960s and the early 1970s. However, the rate of increase in migrant stocks in this region sharply declined around 1974, the same time that the numbers of foreign workers began their rapid rise in the Libyan Arab Jamahiriya and in Western South Asia. As table 55 indicates, among the leading countries of immigration during the most recent period there was a substantial increase in the foreign population in the Netherlands and moderate increases in several others. While the stocks continue to be substantial, their changes reflect less the effects of the entry of new migrant workers and more the results of family reunification and natural increase. To a considerable degree, this might be characterized as a period of relative stabilization in international migration for Europe, following the preceding decade and a half when stocks and flows were building up steadily. During the second half of the 1970s, flows out of the leading countries of net immigration tended to decline from higher levels around 1975; and by the late 1970s, they were generally comparatively close to the inflows. Thus, in most of these countries, the average length of residence of immigrants has tended to rise.

Table 55. Total foreign population, selected countries of immigration in Europe, 1974–1978
(*Thousands*)

Country of immigration	*1974*	*1976*	*1978*
Belgium	805	852	877
France	...	3 698	...
Germany, Federal Republic of	4 127	3 948	3 981
Netherlands	315	376	435
Sweden	401	418	424
Switzerland	1 064	859	898

Source: Organisation for Economic Co-operation and Development, Directorate for Social Affairs, Manpower and Education, *SOPEMI: Continuous Reporting System on Migration, 1979 Report* (Paris, 1979).

The patterns of flows of workers as well as of total migrants in Europe and the Mediterranean Basin show some of the same characteristics observed in Western South Asia. Here, too, there are distinct flows between specific pairs of countries, reflecting propinquity but also historical and cultural-linguistic ties. As shown in tables 56 and 57, Algerians go to France but almost nowhere else, and Austrians go to the Federal Republic of Germany and to Switzerland. Finns go almost exclusively to Sweden. On the other hand, migrants from some countries are rather concentrated in just one or two countries of destination. Those from Italy and Morocco

TABLE 56. STOCKS OF FOREIGN WORKERS IN SELECTED COUNTRIES OF WESTERN EUROPE, 1978
(*Thousands*)

Country of immigration	*Country of origin*													
	Algeria	*Austria*	*Finland*	*Greece*	*Italy*	*Morocco*	*Portugal*	*Spain*	*Tunisia*	*Turkey*	*Yugoslavia*	*Other EEC[a] countries*	*Other non-EEC[a] countries*	*Total*
Belgium[b]	2.4	3.7	c	9.6	106.4	22.2	3.9	27.3	1.9	17.0	3.0	87.7	18.2	306.3
France	361.0	c	c	c	175.8	181.4	385.0	184.5	73.7	36.3	43.1	66.2	135.8	1 642.8
Germany, Federal Republic of	c	76.0	2.9	153.3	305.1	c	59.9	95.8	c	540.5	380.2	131.6	216.6	1 961.9
Netherlands	c	c	c	2.0	10.4	31.0	5.4	17.6	1.2	45.1	8.1	52.6	23.0	196.4
Sweden	0.3	2.0	104.5	8.1	2.7	0.6	0.9	1.7	0.4	4.5	24.6	32.0	42.2	224.5
Switzerland	c	19.5	c	4.8	240.1	c	4.9	61.6	c	16.7	26.2	83.7	31.9	489.4

Source: Organisation for Economic Co-operation and Development, Directorate for Social Affairs, Manpower and Education, *SOPEMI: Continuous Reporting System on Migration, 1979 Report* (Paris, 1979).

[a] European Economic Community.

[b] Based on data gathered in 1977.

[c] Nationality in question not identified separately.

[d] Based on data gathered in 1976.

TABLE 57. STOCKS OF FOREIGN RESIDENTS IN SELECTED COUNTRIES OF WESTERN EUROPE, 1978
(*Thousands*)

Country of immigration	*Country of origin*													
	Algeria	*Austria*	*Finland*	*Greece*	*Italy*	*Morocco*	*Portugal*	*Spain*	*Tunisia*	*Turkey*	*Yugoslavia*	*Other EEC[a] countries*	*Other non-EEC[a] countries*	*Total*
Belgium[b]	9.7	9.2	c	24.3	287.0	81.0	9.9	64.5	4.7	59.4	c	223.4	77.8	850.9
France	790.2	c	c	c	465.9	299.9	823.0	507.3	147.1	57.9	74.0	153.0	379.9	3 698.2
Germany, Federal Republic of	c	159.3	8.8	305.5	572.5	28.9	109.9	188.9	19.2	1,165.1	610.2	267.2	545.6	3 981.1
Netherlands	0.4	3.7	c	4.1	21.1	64.0	9.4	24.8	2.0	106.6	13.9	109.7	75.7	435.4
Sweden	0.6	3.7	187.6	18.1	5.5	1.4	1.7	3.6	0.9	14.7	40.4	61.1	84.9	424.2
Switzerland	c	34.7	c	8.9	442.7	c	7.5	96.1	c	29.6	37.7	168.8	72.1	898.1

Source: Organisation for Economic Co-operation and Development, Directorate for Social Affairs, Manpower and Education, *SOPEMI: Continuous Reporting System on Migration, 1979 Report* (Paris, 1979).

[a] European Economic Community.

[b] Based on data gathered in 1977.

[c] Nationality in question not identified separately.

[d] Based on data gathered in 1976.

tend to disperse rather more widely, but for rather different reasons. Emigration from Italy is of long standing and has been facilitated by the membership of that country in the European Economic Community (EEC).

As stated above, the proportions of all migrants who are workers in these European host countries do not differ very much from the corresponding figures for the leading countries of immigration in Western South Asia. Excluding Belgium, the proportions of total immigrants who are workers fall within the rather narrow range of 0.44–0.54. The proportion for Belgium is markedly lower at 0.36. Moreover, the low proportions of workers in the total migrant flow into Belgium is generally consistent for migrants from all countries of origin and is particularly low, 0.23, for migrants from non-EEC countries. An important factor associated with the low proportion of workers in the migrant stocks in Belgium is the high proportion of all migrants who are children: about one third of all migrants are in age group 0–14 years.

There is also comparatively little variation in the proportions of workers among all migrants by country of origin. Except for Yugoslavia, the proportion for all countries, including other EEC countries, ranges between 0.44 and 0.55. Among the stock of migrants from Yugoslavia, the proportion of all migrants classified as workers (0.62) is distinctively high. On the other hand, migrants from the diverse sets of countries classified as "other non-EEC" have a distinctly low proportion of workers (0.38). The proportion of other non-EEC migrants who are workers is particularly low in the case of Belgium, but is also below 0.4 for France, the Federal Republic of Germany and the Netherlands.

Membership in the European Economic Community is an important factor in European migration flows since such membership permits virtually unimpeded international movement within the community by nationals of member States. In 1978, about one fourth of all migrants, as well as of all migrant workers described in tables 56 and 57, were of EEC-member origin (Italy plus "other EEC"). Of these, just about two thirds were Italian. What is most notable is that there are considerable variations in the importance of migrants of EEC origin in the flows into the receiving countries, both members and non-members. Belgium and Switzerland each receive almost two thirds of their migrants from an EEC country, while for France and Sweden, the corresponding proportions are about 0.15. However, EEC membership does not make a perceptible difference in the proportion of workers in the total migrant flows.

In the leading countries of immigration of Europe, migrants tend to be between 5 and 10 per cent of the total population. Exceptions are the Netherlands, where migrants were 3 per cent of the total; and Switzerland, where they were 14 per cent as of 1978. The proportions of migrant workers in the total labour force were quite similar.

As of late 1978 and early 1979, unemployment rates had become comparatively high among foreign workers in Europe and were generally higher than those for national workers. The rate was highest in Belgium, 13.8 per cent; it was 8.6 per cent in France, 5 per cent in the Federal Republic of Germany, 4.4 per cent in Sweden; and it fell to 0.4 per cent in Switzerland.

For most European countries, flow data for international migration are available along with information on existing stocks.[7] These data indicate that in 1978 Belgium had a net gain of 2,400 persons, down from an average of just about 9,200 in the two previous years. In France, permanent immigration was 58,500 in 1978, down from an average 79,000 in the three previous years. Empirical estimates of emigration from France are not available, but it is believed that they are likely to outweigh immigration. The Federal Republic of Germany had a slight net gain of some 4,500 persons in 1978, following four successive years of net emigration. The Netherlands and Sweden each had comparatively small net inflows—19,700 and 16,100, respectively. The net emigration from Switzerland was 10,500, a substantial reduction from the outflows of 29,000 in 1977 and 65,400 in 1976.

The evidence of net migration rates converging on zero and of substantial rates of unemployment among foreign workers in a number of countries of immigration is a clear reflection of the relative economic slow-down in Europe.

Among the traditional leading countries of net emigration, Greece and Italy experienced moderate net inflows from 1975 onward; many were returnees from Northern and Western Europe. For Italy, the net return was some 15,000 in 1977 and 3,600 in 1978. Spain and Portugal continued to experience emigration. Spain had a net outflow of 157,000 from 1975 to 1978. Portugal had an emigration of 17,000 in 1977 and 18,600 in 1978, chiefly to Canada, the United States of America and Venezuela. Regularizations of undocumented migrants to France and Venezuela suggest that at least an additional 11,700 departed in each of the two years. Turkey has continued to have net emigration, about 44,000 in 1978, with increasing numbers going to Northern Africa and Western South Asia. For Yugoslavia, it appears that net migration has almost reached zero in recent years, with a small net return of workers offset by a small outward movement, chiefly of dependants of workers previously established abroad.

As indicated in table 58, remittances to countries with major emigration streams to Europe remained substantial. There were downward trends for Spain and Turkey and continuing rises for Greece, Portugal and especially Yugoslavia. It should be noted that for a number of these countries not all remittances are sent by migrants in Europe. In the case of Greece, for example, 44 per cent of all remittances came from Northern America. In the case of Tunisia, the figures reported include transfers from migrants in other Arab countries as well as from Europe. Therefore, estimates of *per capita* remittances based on net flows could be misleading. Such evidence as exists suggests that in general, however, the amounts were substantial. Estimates based on work done in Sweden

[7] Organisation for Economic Co-operation and Development, *SOPEMI: Continuous Reporting System on Migration, 1979 Report* (Paris, 1979).

TABLE 58. NET WORKER REMITTANCES, SELECTED COUNTRIES WITH SIGNIFICANT MIGRANT FLOWS INTO EUROPE, RECENT YEARS
(*Millions of dollars*)

Country	Net worker remittances					
	Amount				As percentage of total exports	
	1970	1975	1977	1978	1970	1977
Algeria	209.0	397.0	309.4	...	19.3	5.0
Greece	324.0	707.8	880.3	984.0[a]	29.9	19.5
Italy	...	979.0[a]	1 412.0[a]	...	...	...
Portugal	...	889.9	1 226.0[a]	1 695.0[a]	29.2	...
Spain	518.0	1 022.3	1 164.0	946.0[a]	10.7	7.0
Tunisia	18.0	126.3	144.7	...	5.5	10.7
Turkey	264.0	1 293.1	943.4	...	34.2	40.3
Yugoslavia	498.0	1 695.0	2 097.0[a]	2 899.0[a]	20.7	27.8[b]

Sources: World Bank, *World Tables, 1980*, 2nd ed. (Baltimore, Maryland, Johns Hopkins University Press, 1980); and Organisation for Economic Co-operation and Development, *SOPEMI: Continuous Reporting System on Migration, 1979 Report* (Paris, 1979).

[a] Estimates of the Organisation for Economic Co-operation and Development (OECD), which are not completely comparable to those of the World Bank. In the case of Yugoslavia, the OECD estimates include both international transfers and money exchanged by Yugoslav workers while in Yugoslavia.

[b] 1975.

indicate that in 1978 the average annual remittance of Greek workers was equivalent to nearly three months' wages in manufacturing industry.

The United Kingdom of Great Britain and Northern Ireland has had a rather distinctive pattern of international migration, not closely linked to those of the countries of continental Europe. During recent years, the predominant flows have produced a net emigration of an average of 40,000 per annum, made up chiefly from an immigration stream from the New Commonwealth, Pakistan and other countries that was more than compensated for by an outflow largely to the Old Commonwealth and to South Africa. However, in the most recent period, from mid-1978 to mid-1979, there was a small net immigration, 6,300. To a large extent this was a result of a decline in the number of emigrants to the countries of the Old Commonwealth and a small net inflow from South Africa.

A noteworthy reversal in the direction of international migration occurred in Ireland during the 1970s. According to a preliminary report of the 1979 census of Ireland, the country experienced a net inward flow of some 107,000 persons over the period 1971–1979.[8] This represents a reversal of the historical pattern of net emigration from Ireland. The net immigration flow was at an annual rate of 4.2 per 1,000 for the eight-year period and had a sex ratio of 1.31.

C. Northern America and Oceania

Among the non-European developed countries, Canada had declining net immigration from 1974/75, when the figure reached 133,000, to 1978/79, when it fell to 30,000. The decline in net immigration mostly reflected the lower levels of immigration authorized by the Government in response to economic difficulties and comparatively high unemployment. By 1978, the majority of immigrants were admitted by reference to family reunification. Before the 1970s, the great majority of the immigrants came from Europe. However, there has been a steady trend in Canada towards the acceptance of increasing proportions of migrants from other regions, especially from Asia. During the later 1970s, 63 per cent of all immigrants reported their last previous residence to have been other than in Europe.

In Australia, the over-all tendency was for a rise in net permanent and long-term migrants during the later 1970s. In 1979, net long-term and permanent immigration was 69,000, as compared with 51,600 in 1978. An important factor in the increase was the larger numbers of immigrants from New Zealand and from Viet Nam. The long-term trend towards diminishing proportions of immigrants from Europe continued during this period: by 1979, one fourth of all the migrants had been born in Europe.

The United States of America has continued to receive immigrants with a moderately rising trend. From 1974 through 1976, the number admitted as immigrants was about 400,000 per annum. In 1978, the number admitted for permanent residence plus refugees rose to 530,000 and in 1979 to 559,000. As with Australia and Canada, the trend towards drawing a progressively smaller proportion of all migrants from Europe continued. By 1977, 16 per cent of the migrants admitted reported their previous permanent residence as Europe.

D. Refugees

During this most recent period, there have been a series of large-scale refugee flows. As of mid-1980, the global total number of refugees reported by various United Nations agencies had risen to 8.0 million. Of this total, 80 per cent have found refuge in developing countries.

It has been estimated that in all of Asia, there were some 3.5 million refugees. In Western South Asia, there

[8] *Census of Population of Ireland, 1979* (Dublin, 1979), p. IX.

were just over 2 million refugees—mainly Palestinians—of concern to United Nations agencies. It is estimated that in Eastern South Asia more than 1 million refugees had fled their countries in very recent years, although some have by now returned. Thailand has received over 325,000 refugees from Democratic Kampuchea, the Lao People's Democratic Republic and Viet-Nam, some 81,000 of whom were subsequently resettled elsewhere. China has received 235,000 refugees and displaced persons from Viet Nam. At the same time, Viet Nam has experienced an inflow of 150,000 persons from Democratic Kampuchea, many of whom have more recently been repatriated. The United States of America has accepted about 130,000 refugees from this region. A substantial proportion of the 146,000 persons established in France also are from this region. Others have been received within the countries that are members of the Association of South East Asian Nations (ASEAN), notably in Australia, which has a stock of just over 300,000 refugees; in Hong Kong, with 56,000; and in Malaysia, which has received 98,000. Elsewhere in Asia, some 710,000 refugees from Afghanistan entered Pakistan during late 1979 and early 1980. By late 1980, the Office of the United Nations High Commissioner for Refugees reported that the number had risen to 1.2 million.

The largest number of refugees for any area is the currently estimated 2.8 million found in sub-Saharan Africa. It is reported that over 1 million refugees from Ethiopia are in Somalia and that the Sudan has some 500,000 refugees from Ethiopia and other neighbouring countries. There are estimated to be slightly under 300,000 refugees in Zaire. In Northern America, the United States of America has recently received a renewed flow from Cuba, estimated to be over 100,000 in early 1980, along with a continuing influx from Haiti. The total number of refugees anticipated by the United States for 1980 is some 365,000. Canada has recently reported its readiness to accept 27,000 refugees for 1980, the expectation being that they will come chiefly from Eastern South Asia.

The review of these three issues brings out several general characteristics of international migration. First, international migration flows in the modern world continue to show elements of continuity with past conditions. An instance of this is the importance of historical links between selected pairs of countries in influencing contemporary streams of migrant workers. A second characteristic of international migration, however, is the rapidity with which flows can change. A trickle may become a flood within a period of only a few years. Thirdly, international migration is strongly and directly linked to the over-all development process and to the international division of labour in particular. Lastly, international migration is a factor of significant and probably increasing importance for development. It can clearly have a major impact on composition of the labour force and international flows of funds, in addition to sheer demographic consequences, which may themselves be very considerable.

Chapter IX

URBANIZATION*

The distribution of people among geographical regions, between rural and urban residences, and within the system of cities is one of the essential characteristics of any population. Its pattern is intimately tied to the social and economic development of a country in different ways: the geographical distribution of a population, in part, is the result of the development that has taken place in the country; but, on the other hand, it also defines one of parameters of socio-economic development. For example, the distribution of people is influenced by the way in which a country became a nation; and the distribution in itself affects the division of labour (i.e., the production and exchange of goods and services).

There are also connections between the various components of population distribution. The concentration of the population within a certain geographical region is often related to the existence of a "primate" city, i.e., one that is substantially larger than the next two or three largest cities. On the other hand, the incidence of primacy is less frequent among countries with a high proportion of the population living in cities. Population distribution, because of its many social and economic consequences, has been identified by many Governments as one of their most serious concerns, and attention is increasingly focused on urban aspects, particularly the growth of large cities.[1] This chapter therefore presents new information about changes in: (*a*) the urban/rural differential; (*b*) the system of cities, or urban hierarchy; and (*c*) the growth of large cities. The discussion of the new data presented shows that the world urban population, as is already the case for the world rural and total population, will soon (by the end of the twentieth century) become concentrated in the developing countries and that a substantial part of future urbanization will occur in large cities.

A. Size and growth of urban and rural populations

The prevailing pattern in developed and, in particular, in developing countries is one of net rural-rural migration. Consequently, rural populations grow at a slower rate than their rate of natural increase (since part of the natural increase is "drained off" by rural-urban migration), while the growth of urban populations is a function of both natural increase and rural-urban migration. Recent findings from a United Nations study[2] show that while for the developed countries rural-urban migration is the more prominent source for urban population growth, the opposite is true in developing countries: in the latter group, natural increase, which of course tends to be high for both urban and for rural components of the total population, accounts for almost three fifths (58.3 per cent) of total urban population growth.

Despite the important role of rural net out-migration, the reasons for this process are still not entirely clear. Factors associated with rural net out-migration during recent decades were found to include the level of and increases in the gross domestic product per capita (which tends to be linked to the proportion of the labour force engaged in agriculture); the initial proportion urban, the rural rate of natural increase, and the growth rate of agricultural production per rural resident.[3]

A very substantial body of scholarly effort has been given to the disentangling of the relative importance of the various factors associated with net rural-urban migration. Particular attention has been given to the respective roles of economic, demographic, social and political conditions and to the importance of those experienced chiefly in rural areas of origin, as distinguished from others experienced chiefly in urban areas of destination. As a whole, the issue remains unresolved but it now appears quite clear that there are multiple causes in complex interaction at work, functioning both in areas of origin and in those of destination. Recently, there appears to be a tendency to give greater attention to factors operating in rural areas than was the case earlier.[4] It is in the context of the relationships between these various factors that the discussion of urban and rural population growth and growing urbanization begins.

It has been observed in previous reports that urbanization is occurring rapidly and, further, that urbanization is mainly a consequence of the rapid increase in total populations. This chapter is intended to update the previous quantitative estimates and projections of urbanization and, further, to highlight the unique aspects of recent and projected urbanization: namely, that world urbanization is increasingly taking place in developing

* Prepared by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat.

[1] See, for example, *Population Distribution Policies in Development Planning* (United Nations publication, Sales No. E.81.XIII.5); and "Report on monitoring of population policies" (E/CN.9/XX/CRP.2).

[2] *Patterns of Urban and Rural Population Growth* (United Nations publication, Sales No. E.79.XIII.9).

[3] *World Population Trends and Policies: 1979 Monitoring Report* vol. I, *Population Trends* (United Nations publication, Sales No. E.79.XIII.4).

[4] See, for example, Michael P. Todaro, *Internal Migration in Developing Countries: A Review of Theory, Evidence, Methodology and Research Priorities* (Geneva, International Labour Office, 1976); and Glenn Firebaugh, "Structural determinants of urbanization in Asia and Latin America, 1950–1970", *American Sociological Review*, vol. 44, No. 2 (April 1979), pp. 199–215.

countries and is also on an increasingly large scale, as manifested by the pre-eminence of large cities and agglomerations in the urban structure.

The most recently updated estimates and projections of urban and rural population, based on the 1978 estimates and projections of total population, are shown in tables 59 and 60. They highlight the major geographical regions individually as well as the world total and totals of the more and less developed regions collectively. Table 61 shows the percentage urban within each area.

In 1975, the less developed regions achieved for the first time in modern history a majority of the world urban population. Only five years later in 1980, the urban population of the developing countries exceeds that of the developed countries by about one fourth. By the year 2000, it is expected that the urban population of the less developed regions will be more than double the urban population of the more developed regions.

Figure 18 demonstrates that the share of three of the major developing areas (Africa, Latin America and South Asia) is increasing; in East Asia, the share has recently begun to level off. All of the major developed areas (Europe, Northern America, Oceania and the Union of Soviet Socialist Republics) are experiencing a decline in their share of the total urban population. The decline in Europe, the birthplace of urban industrialization, is particularly precipitous. Europe, which still contained almost a third of the world urban population as recently as 1950, is projected to contain less than 15 per cent 20 years from now.

The absolute increases in population associated with the increased urban shares of the developing countries are enormous. Indeed, the urban population of the less developed regions is expected to double in the last 20 years of this century, whereas the urban population of the developed countries should increase by only about one fourth. Africa has the fastest growing urban population, followed by South Asia. Both of these populations are expected to double by the year 2000. In Latin America, the urban population is projected to be almost double.

TABLE 59. URBAN POPULATION AND URBAN AVERAGE ANNUAL GROWTH RATES, MAJOR AREAS AND REGIONS, 1970–2000

	Urban population (millions)						*Urban annual growth rate*			
Major area and region	*1970*	*1975*	*1980*	*1985*	*1990*	*2000*	*1970–1975*	*1975–1980*	*1980–1985*	*1985–2000*
WORLD TOTAL	1 368	1 574	1 809	2 085	2 403	3 162	2.8	2.8	2.8	2.8
MORE DEVELOPED REGIONS[a]	687	747	802	857	911	1 010	1.7	1.4	1.3	1.1
LESS DEVELOPED REGIONS[b]	681	827	1 008	1 228	1 493	2 152	3.9	4.0	4.0	3.7
AFRICA	81	104	135	175	224	350	5.1	5.2	5.8	4.6
Eastern Africa	11	15	22	30	41	71	7.0	7.0	6.8	5.7
Middle Africa	10	14	18	24	30	44	5.7	5.5	5.2	4.2
Northern Africa	30	38	48	60	75	108	4.5	4.7	4.5	3.9
Southern Africa	11	13	15	18	22	31	3.1	3.5	3.7	3.5
Western Africa	18	24	32	42	56	95	5.6	5.7	5.7	5.4
LATIN AMERICA	162	197	238	285	338	456	3.9	3.8	3.6	3.1
Caribbean	11	13	16	18	21	27	3.5	3.1	3.0	2.6
Middle America	36	45	56	70	86	124	4.4	4.4	4.3	3.8
Temperate South America	28	31	34	37	40	45	1.9	1.8	1.7	1.4
Tropical South America	87	108	133	161	191	260	4.4	4.1	3.8	3.2
NORTHERN AMERICA	159	170	181	195	209	234	1.3	1.3	1.4	1.2
EAST ASIA	277	323	371	425	487	634	3.1	2.8	2.7	2.7
China	178	209	243	284	334	459	3.1	3.1	3.1	3.2
Japan	74	84	91	97	102	111	2.4	1.7	1.2	0.9
Other East Asia	24	30	37	44	51	64	4.6	4.0	3.5	2.5
SOUTH ASIA	235	286	353	437	542	818	4.0	4.2	4.3	4.2
Eastern South Asia	57	69	85	106	131	197	3.9	4.1	4.3	4.2
Middle South Asia	146	175	215	266	332	510	3.7	4.1	4.3	4.3
Western South Asia	32	42	53	66	80	111	5.1	4.7	4.3	3.5
EUROPE	302	323	341	358	374	408	1.4	1.0	1.0	0.9
Eastern Europe	55	60	65	71	76	86	1.6	1.8	1.6	1.3
Northern Europe	65	68	70	71	73	76	0.8	0.5	0.4	0.4
Southern Europe	72	80	87	94	101	114	2.1	1.7	1.6	1.3
Western Europe	110	116	119	122	125	133	1.1	0.5	0.5	0.6
OCEANIA	14	16	17	19	21	25	2.5	2.1	2.0	1.7
USSR	138	155	173	191	208	237	2.3	2.2	2.0	1.5

[a] Including Northern America, Japan, all regions of Europe, Australia, New Zealand and USSR.

[b] Including all regions of Africa, all regions of Latin America, China, Other East Asia, all regions of South Asia, Melanesia, and Micronesia-Polynesia.

TABLE 60. RURAL POPULATION AND RURAL AVERAGE ANNUAL GROWTH RATES, MAJOR AREAS AND REGIONS, 1970–2000

Major area and region	Rural population (millions)						Rural annual growth rate			
	1970	1975	1980	1985	1990	2000	1970–1975	1975–1980	1980–1985	1985–2000
WORLD TOTAL	2 309	2 459	2 606	2 745	2 873	3 038	1.3	1.2	1.1	0.7
MORE DEVELOPED REGIONS[a]	362	346	329	312	295	263	−0.9	−1.0	−1.1	−1.1
LESS DEVELOPED REGIONS[b]	1 947	2 113	2 277	2 433	2 577	2 775	1.6	1.5	1.3	0.9
AFRICA	273	302	334	370	406	478	2.0	2.0	2.0	1.7
Eastern Africa	90	100	112	125	140	171	2.2	2.2	2.3	2.1
Middle Africa	31	33	35	37	39	42	1.1	1.1	1.1	0.9
Northern Africa	52	56	61	65	69	75	1.5	1.6	1.4	1.0
Southern Africa	14	16	18	19	21	23	2.3	2.1	1.9	1.1
Western Africa	86	97	109	123	137	167	2.4	2.4	2.4	2.0
LATIN AMERICA	121	125	130	135	141	152	0.8	0.8	0.8	0.8
Caribbean	14	15	15	15	16	16	0.8	0.5	0.5	0.4
Middle America	31	34	36	39	42	48	1.6	1.6	1.5	1.3
Temperate South America	8	8	7	7	7	6	−0.9	−0.8	−0.8	−0.8
Tropical South America	68	70	71	74	76	81	0.5	0.6	0.6	0.7
NORTHERN AMERICA	67	66	65	64	62	56	−0.2	−0.4	−0.4	−0.9
EAST ASIA	704	741	765	779	787	772	1.0	0.6	0.4	−0.1
China	647	687	714	731	742	730	1.2	0.8	0.5	−0.0
Japan	30	28	25	23	21	18	−1.5	−1.9	−2.0	−1.5
Other East Asia	27	26	26	25	24	23	−0.3	−0.5	−0.6	−0.4
SOUTH ASIA	875	969	1 069	1 169	1 261	1 388	2.0	2.0	1.8	1.1
Eastern South Asia	229	255	282	309	333	362	2.2	2.0	1.8	1.1
Middle South Asia	605	670	741	812	878	972	2.1	2.0	1.8	1.2
Western South Asia	42	44	45	47	49	53	0.8	0.8	0.8	0.8
EUROPE	157	151	143	135	127	112	−0.8	−1.1	−1.1	−1.2
Eastern Europe	48	47	45	43	41	36	−0.8	−0.7	−0.9	−1.2
Northern Europe	15	14	12	11	10	9	−1.9	−2.1	−2.0	−1.6
Southern Europe	56	54	52	50	47	43	−0.5	−0.8	−0.9	−1.1
Western Europe	38	36	33	31	29	25	−1.0	−1.6	−1.5	−1.4
OCEANIA	6	6	6	5	5	5	−0.0	−0.4	−0.6	−0.3
USSR	106	99	94	89	84	75	−1.2	−1.1	−1.1	−1.2

[a] Including Northern America, Japan, all regions of Europe, Australia, New Zealand and USSR.

[b] Including all regions of Africa, all regions of Latin America, China, Other East Asia, all regions of South Asia, Melanesia, and Micronesia-Polynesia.

Meanwhile, Europe may experience only a 20 per cent increase in its urban population.

The situation with regard to the distribution of the world rural population is similar to that of the urban population but more striking (table 60.). As in the case of the urban population, the shares of the world rural population contained within each of the more developed regions shown in figure 19 are declining and the shares of the world rural population in the less developed regions, except East Asia, are increasing; but the differentials between the more developed and the less developed regions are much more extreme and increasing. Whereas the urban population of the less developed regions currently exceeds that of the more developed regions by almost one fourth, the rural population of the developing countries is almost seven times as large as that of the developed countries; and by the year 2000, the rural population of the less developed regions will be about 10 times as large as that of the more developed regions. Almost half of the increase of the rural population of the developing countries is located in South Asia alone.

Whereas the rural population of the developing countries will increase by a little more than 20 per cent between now and the year 2000, the rural population of the developed countries will actually decrease by about 20 per cent. In absolute terms, most of the widening gap is due to trends in the less developed regions. Whereas the developed regions will lose about 66 million rural inhabitants between now and the year 2000, the less developed regions will gain almost half a billion rural inhabitants.

During the past five years the world urban population has been expanding at a rate of about 2.8 per cent per annum. This average is the net result of relatively slow urban growth in the more developed regions (1.4 per cent per annum) combined with rapid urban growth in the less developed regions (4.0 per cent). In both cases, the rates of urban growth are expected to slow somewhat by the end of the century. Among the more developed regions, Europe has the slowest annual urban growth rate, 1 per cent, followed by Northern America, which had an annual rate of 1.3 per cent. In contrast, among the less developed regions, Africa had the highest urban growth

TABLE 61. PROPORTIONS OF POPULATION LIVING IN URBAN AREAS, BY MAJOR AREA AND REGION, 1970–2000
(*Percentage*)

Major area and region	*1970*	*1975*	*1980*	*1985*	*1990*	*2000*
WORLD TOTAL	37.2	39.0	41.0	43.2	45.6	51.0
MORE DEVELOPED REGIONS[a]	65.5	68.3	70.9	73.3	75.5	79.4
LESS DEVELOPED REGIONS[b]	25.9	28.1	30.7	33.5	36.7	43.7
AFRICA	22.8	25.6	28.8	32.1	35.5	42.2
Eastern Africa	10.6	13.1	16.1	19.4	27.8	29.4
Middle Africa	25.1	29.7	34.5	39.2	43.8	51.5
Northern Africa	36.9	40.4	44.2	48.0	51.9	59.0
Southern Africa	43.8	44.8	46.5	48.7	51.4	57.7
Western Africa	17.4	19.8	22.5	25.6	28.9	36.2
LATIN AMERICA	57.3	61.2	64.7	67.8	70.6	75.1
Caribbean	44.6	48.0	51.2	54.3	57.2	62.3
Middle America	53.8	57.3	60.7	63.9	66.9	72.2
Temperate South America	77.9	80.1	82.2	83.9	85.4	87.8
Tropical South America	56.2	60.8	65.0	68.6	71.6	76.2
NORTHERN AMERICA	70.4	72.0	73.7	75.4	77.2	80.7
EAST ASIA	28.2	30.3	32.7	35.3	38.2	45.1
China	21.6	23.2	25.4	28.0	31.1	38.6
Japan	71.3	75.1	78.2	80.8	82.9	85.9
Other East Asia	47.4	53.5	59.0	63.8	67.7	73.2
SOUTH ASIA	21.2	22.8	24.8	27.2	30.1	37.1
Eastern South Asia	20.0	21.4	23.2	25.4	28.2	35.3
Middle South Asia	19.4	20.7	22.5	24.7	27.4	34.4
Western South Asia	43.5	48.8	53.7	58.0	61.7	67.5
EUROPE	65.8	68.2	70.5	72.6	74.4	78.4
Eastern Europe	53.2	56.2	59.2	62.2	65.1	70.4
Northern Europe	81.3	83.3	85.0	86.4	87.7	89.6
Southern Europe	56.2	59.4	62.5	65.3	68.0	72.8
Western Europe	74.4	76.3	78.1	79.8	81.3	84.2
OCEANIA	70.8	73.4	75.7	78.0	80.0	82.6
USSR	56.7	60.9	64.8	68.2	71.3	76.0

[a] Including Northern America, Japan, all regions of Europe, Australia, New Zealand and USSR.
[b] Including all regions of Africa, all regions of Latin America, China, Other East Asia, all regions of South Asia, Melanesia and Micronesia-Polynesia.

rate, about 5 per cent per annum; and South Asia, which is heavily weighted by India, had the next highest urban growth rate, about 4 per cent.

Population in the rural areas of the world has grown at a rate of 1.2 per cent per annum during the past five years. This has been the net result of negative rural growth in the more developed regions (– 1.0 per cent per year) and a positive rural growth rate of 1.5 per cent per annum in the less developed regions. The rural growth rate of population in the developing countries roughly equals the growth rate of urban areas. Rural decline in the developed countries is expected to continue at roughly 1 per cent per annum until the end of the century, while annual rural population growth in the developing countries is expected to slow to about 1 per cent per annum. Among the more developed regions, Europe and the USSR had the greatest rates of rural decline. As was the case with urban growth, Africa and South Asia had the greatest rates of increase in their rural populations.

As a consequence of the above-mentioned differentials in urban and rural growth, only 20 years from now, in the year 2000, a significant milestone in human demographic history will probably be passed. The world population, which had always been largely rural, will become predominantly urban. By that year, some 51 per cent of the world population will be urban dwellers. Urban majorities are quite recent in both the more developed and the less developed regions; even the more developed regions barely achieved an urban majority at mid-century. Moreover, the developing countries alone will almost achieve an urban majority by the end of this century, as they are expected to become 44 per cent urban, compared with 31 per cent currently. The proportion of the population in the developed regions, which is urban, will increase by almost 9 percentage points to reach a level of almost 80 per cent urban in the year 2000, though there is evidence in some countries, discussed below, that the relative growth of non-metropolitan or at least smaller metropolitan areas is gaining.

As far as individual regions are concerned, each one in both the more developed and the less developed groups tends to conform closely to the average of its development category, except for those in Latin America. Whereas the proportion urban in the less developed regions as a whole

Figure 18. Percentage distribution of the world urban population by major area and by less developed and more developed regions, 1950–2000

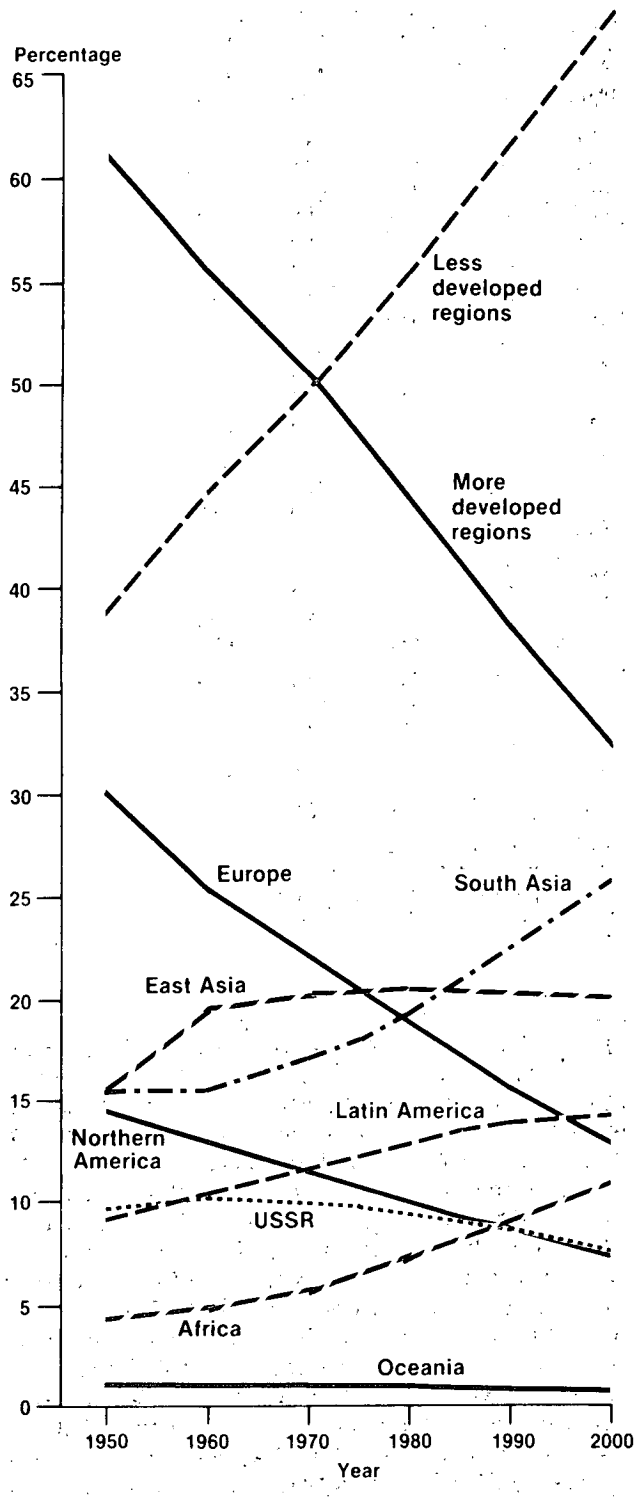
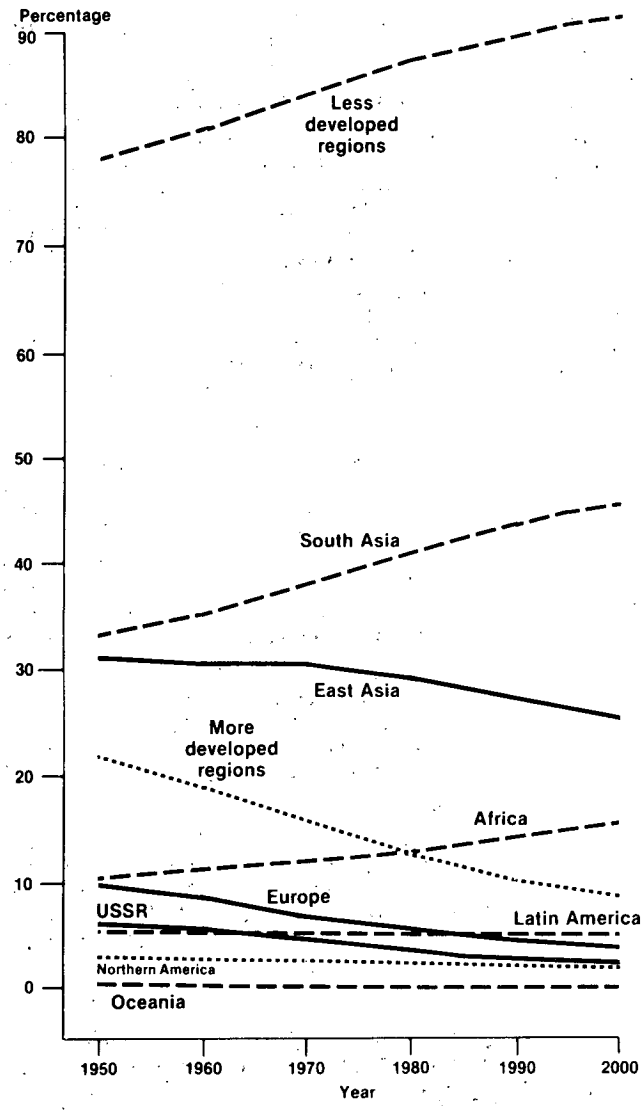


Figure 19. Percentage distribution of the world rural population, by major area and by less developed and more developed regions, 1950–2000

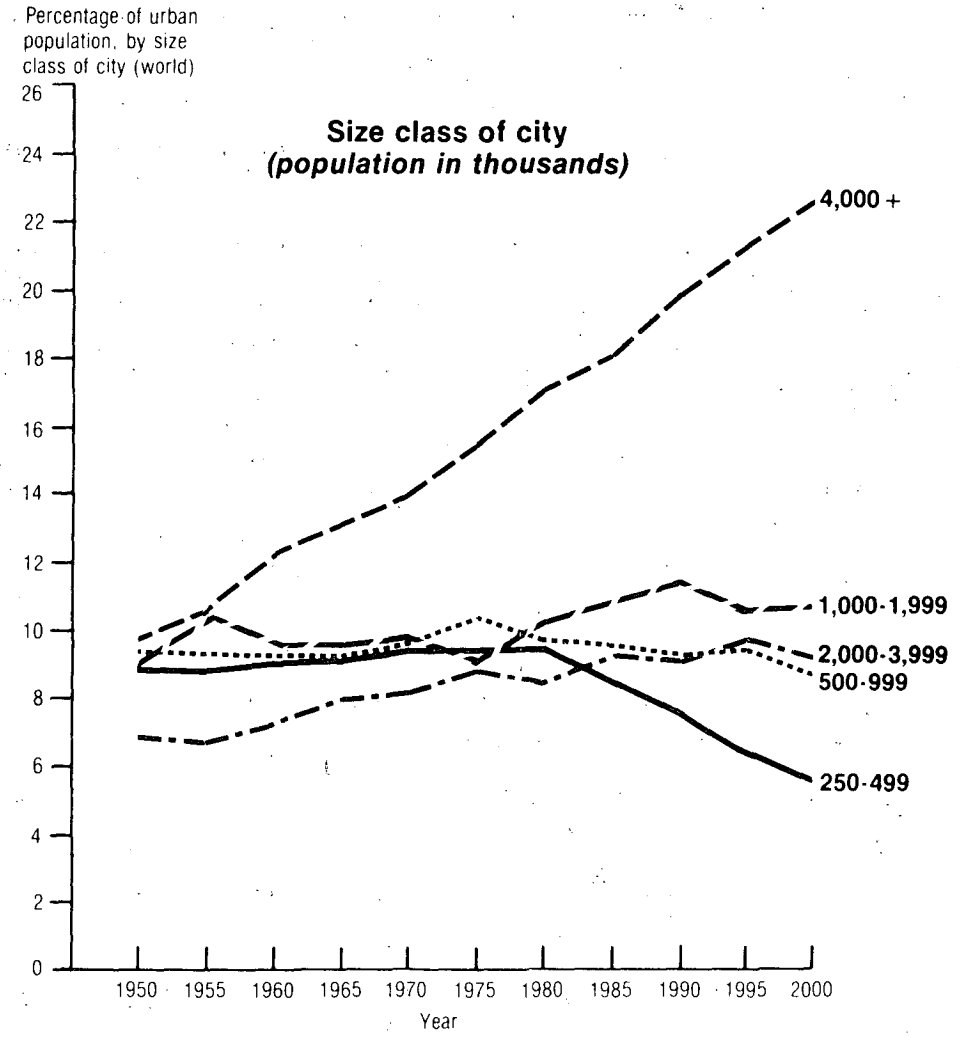


is 31 per cent, the percentage urban in Latin America is more than double that figure. In this regard, the situation in Latin America is more typical of a more developed region than a less developed region.

B. Size of locality

Turning now to the scale of urbanization, it is obvious from figure 20 and tables 62 and 63 that the percentage of the world urban population residing in cities of 4 million or more is increasing rapidly. In 1950, only 10 per cent of the world urban population resided in the largest cities. Currently, the proportion is about 17 per cent and by the year 2000 it will rise to almost a quarter of the world urban population. The number of cities with 4 million or more inhabitants now stands at almost 40, and it is projected that by the year 2000 the number of such cities will more than double. It is difficult to project with as much confidence the population of cities in the smaller size categories. Data on small cities and towns that may grow or agglomerate into those categories are limited. However, the available evidence suggests that the total population of cities in the smaller size categories are unlikely to grow very much and may even decline somewhat

Figure 20. Share of the world urban population, by size class of city, 1950–2000



by the year 2000. The share of the world urban population accounted for by cities with population between 500,000 and 4,000,000 has remained relatively constant and is expected to remain roughly the same for the rest of the century.

As illustrated in figure 21, the greatest contrast between the developed and the developing countries with regard to the patterns of development of the various size of place categories over time relates to the share of the urban population living in cities of 4 million inhabitants or more. Whereas the urban population share of the cities of 4 million or more in the less developed regions is increasing very rapidly, the share of such cities in the urban population of the more developed regions is levelling out at about 18 per cent and may even decline somewhat by the end of the century. It is clear that much of the rapid increase in these largest cities has been in the developing rather than the developed countries. During the past decade, the world acquired 14 additional cities in the largest category. Eleven of these cities are in the less developed regions where the number of cities in the largest category increased from 12 in 1970 to 23 in 1980. It is noteworthy that a large majority of the largest cities in the less developed regions are in Asia. By the year 2000, about a quarter of the urban population of the less developed regions is projected to be living within about 60 cities of 4 million or more inhabitants.

The rapid growth of the share of the world urban population living in cities of 4 million or more inhabitants has naturally been associated with a more rapid growth in absolute numbers in these cities. In addition the number of cities in this open-ended category has grown by "graduation" of smaller cities into the upper open-ended category. For both reasons, the size class of cities of 4 million or more inhabitants, has been increasing in population somewhat more rapidly than other size class. During the past decade, cities of 4 million or more inhabitants as a group increased by about two thirds—from 191 million inhabitants to 311 million—while the total urban population of the world increased by only one third—from 1,370 million to 1,810 million. Between now and the year 2000, it is projected that the population of cities in size class 4 million and over will more than double—from 311 million to 719 million—while the total

TABLE 62. NUMBER OF CITIES, POPULATION AND PERCENTAGE OF TOTAL URBAN POPULATION IN CITIES OF A PARTICULAR SIZE CLASS, THE WORLD, MORE DEVELOPED REGIONS AND LESS DEVELOPED REGIONS, 1970–2000

(*Population in thousands*)

Size class of city (thousands)	*1970*	*1975*	*1980*	*1985*	*1990*	*2000*
			World			
4 000+						
Population	191 394	243 431	311 425	377 758	479 173	718 800
Number of cities	24	30	38	44	56	82
Percentage of urban population	14.0	15.5	17.2	18.1	19.9	22.7
2 000+						
Population	303 227	383 890	465 378	572 040	699 093	1 012 392
Number of cities	64	81	95	115	136	192
Percentage of urban population	22.0	24.4	25.7	27.4	29.1	32.0
1 000+						
Population	438 256	529 494	653 640	800 550	974 820	1 354 444
Number of cities	160	185	234	284	338	440
Percentage of urban population	32.0	33.6	36.1	38.4	40.6	42.8
500+						
Population	570 279	694 767	830 815	1 003 931	1 200 398	1 632 951
Number of cities	349	419	487	578	666	839
Percentage of urban population	41.7	44.1	45.9	48.2	50.0	51.7
250+						
Population	700 678	844 345	1 003 560	1 184 753	1 386 653	1 812 839
Number of cities	729	853	982	1 092	1 189	1 342
Percentage of urban population	51.2	53.7	55.5	56.8	57.7	57.3
			More developed regions			
4 000+						
Population	108 281	125 222	135 511	149 734	163 873	179 122
Number of cities	12	14	15	17	19	21
Percentage of urban population	15.8	16.8	16.9	17.5	18.0	17.7
2 000+						
Population	165 743	187 860	203 812	230 985	248 780	273 501
Number of cities	33	37	40	48	51	56
Percentage of urban population	24.1	25.2	25.4	27.0	27.3	27.1
1 000+						
Population	235 270	264 525	298 882	330 240	362 990	398 216
Number of cities	83	92	110	123	137	146
Percentage of urban population	34.2	35.4	37.3	38.5	40.0	39.4
500+						
Population	306 769	342 229	377 560	415 314	454 433	511 237
Number of cities	184	199	223	247	274	313
Percentage of urban population	44.6	45.8	47.1	48.5	50.0	50.6
250+						
Population	373 368	420 437	463 523	508 433	549 943	609 166
Number of cities	381	425	471	515	548	592
Percentage of urban population	54.3	56.3	57.8	59.3	60.4	60.3
			Less developed regions			
4 000+						
Population	83 113	118 208	175 914	228 022	315 300	539 677
Number of cities	12	16	23	27	37	61
Percentage of urban population	12.2	14.3	17.5	18.6	21.1	25.1
2 000+						
Population	137 484	196 030	261 566	450 312	738 891	341 055
Number of cities	31	44	55	85	136	67
Percentage of urban population	20.2	23.7	26.0	27.8	30.2	34.3
1 000+						
Population	202 985	264 968	354 758	470 309	611 830	956 230
Number of cities	77	93	124	161	201	294
Percentage of urban population	29.8	32.0	35.2	38.3	41.0	44.4
500+						
Population	263 509	352 537	453 255	588 616	745 965	1 121 714
Number of cities	165	220	264	331	392	526
Percentage of urban population	38.7	42.6	45.0	47.9	50.0	52.1
250+						
Population	327 310	423 907	540 036	676 320	836 709	1 203 673
Number of cities	348	428	511	577	641	750
Percentage of urban population	48.1	51.3	53.6	55.1	56.1	55.9

TABLE 63. AVERAGE ANNUAL GROWTH RATES OF CITY POPULATION, BY CITY SIZE CLASS, 1970–2000

Size class of city (thousands)	Average annual growth rate (percentage)				
	1970–1975	1975–1980	1980–1985	1985–1990	1990–2000
World					
4 000+	4.81	4.93	3.86	4.76	4.06
2 000+	4.72	3.85	4.13	4.01	3.70
1 000+	3.78	4.21	4.05	3.94	3.29
500+	3.95	3.58	3.79	3.57	3.08
250+	3.73	3.45	3.32	3.15	2.68
More developed regions					
4 000+	2.91	1.58	2.00	1.80	0.89
2 000+	2.51	1.63	1.48	0.95	2.50
1 000+	2.34	2.44	1.89	2.00	0.93
500+	2.19	1.96	1.91	1.80	1.18
250+	2.37	1.95	1.57	1.85	1.02
Less developed regions					
4 000+	7.04	7.95	5.19	6.48	5.37
2 000+	7.10	5.77	5.31	5.56	4.95
1 000+	5.33	5.84	5.64	5.26	4.47
500+	5.82	5.03	5.23	4.74	4.08
250+	5.17	4.84	4.50	4.26	3.64

urban population will increase by 75 per cent – from 1,810 million to 3,160 million.

The preceding discussion emphasized the fact that the greater part of urbanization through the end of the present century will occur in developing countries. This process has many consequences and poses many issues; a few of the most salient are discussed here.

Past experience has shown that urbanization tends to be closely associated with the process of demographic transition, i.e., the move towards modest mortality and fertility levels. Urbanization has also provided the infrastructure in terms of transportation, communication and commerce that is essential for industrialization. The shape of these relationships might differ in developing countries as compared with developed countries but their direction is likely to be the same.

Yet, there are also important costs associated with urbanization, particularly in the case of very large cities and in countries where urbanization is taking place at a very rapid pace. As concerns the rate of urbanization, there is a clear analogy to the rate of total population growth: in most instances, it is not the absolute size of population (or of proportion urban) which is of the greatest importance. Rather, it is the rate of growth. High rates in and of themselves are likely to impose sharp strain.

Similarly, extreme levels of concentration of urban population into one or a few cities may produce economic as well as social stresses. It is generally accepted that beyond a certain size (but one which is unknown in any given case) per capita costs for essential services and infrastructure rise significantly.

Moreover, a high level of urban concentration may be detrimental to national development by impeding the growth of other regions.[5]. The concentration of the urban population in a single primate city or in a few large cities (such as the triangle of São Paulo/Rio de Janeiro/Belo Horizonte in Brazil) can lead to serious regional imbalances. This situation suggests that the shape of the urban hierarchy, as well as the proportion urban *per se*, needs to be examined further in terms of such factors as the division of labour, capital transfers, transportation networks or migration streams.

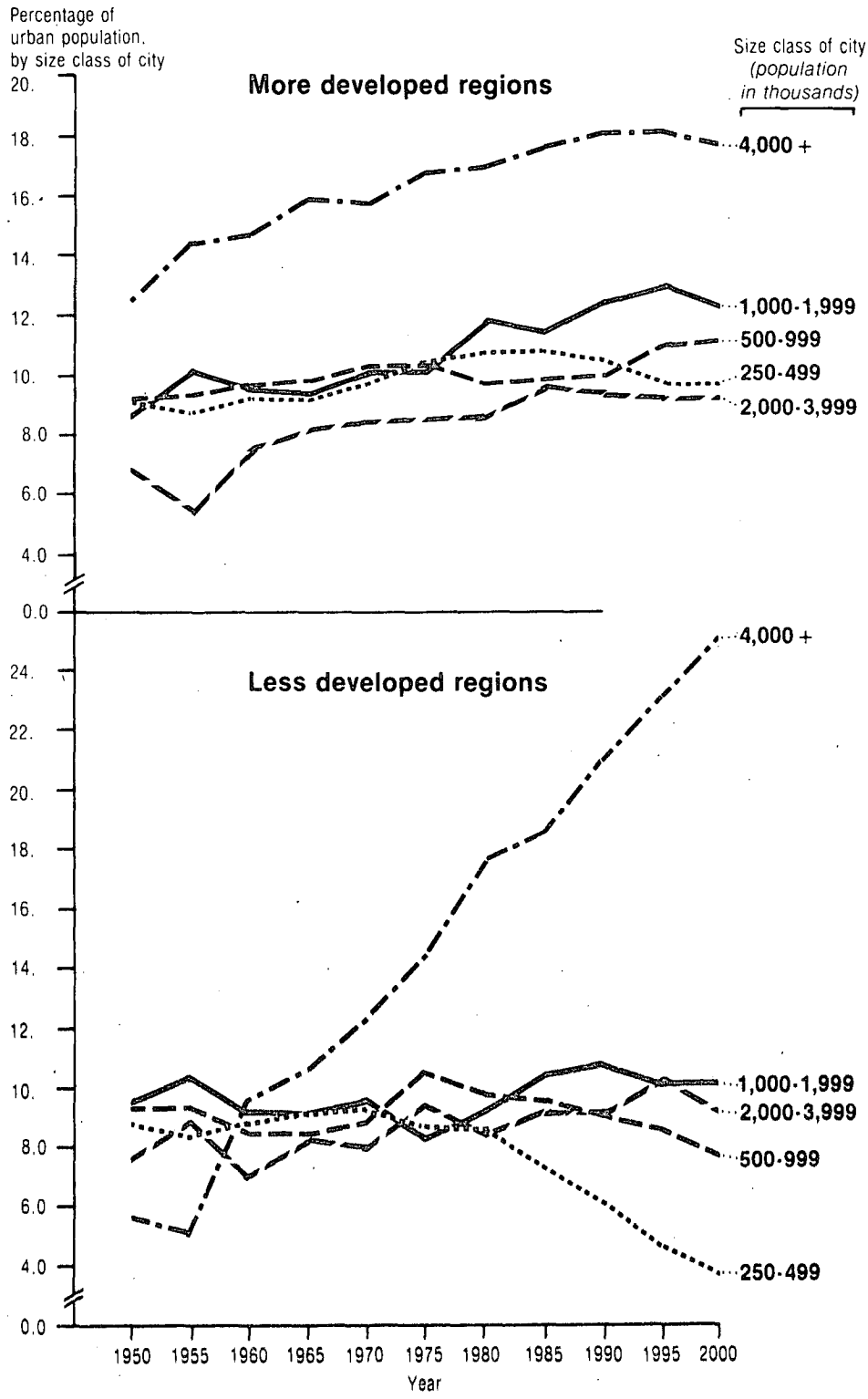
C. THE MEGA-CITY

Major cities have existed for a long time but the scale of these cities has not been as large as those now existing. Some of the very famous ancient cities contained no more than a few thousand inhabitants. During the nineteenth century, cities of 100,000 or more inhabitants were classified as "great cities".[6] Today one would scarcely recognize the names of most of the more than 1,500 such cities. During the first half of the present century, cities of a million or more inhabitants were generally recognized as very important cities. They were frequently referred to as "metropoli". Around mid-century, however, there began to develop in the more developed regions what could be called "mega-cities"—that is, single agglomerations of an unprecedented size, 10 million or more inhabitants. These single agglomerations or mega-cities contain numerous legally distinct and independent units, each with its own administrative boundaries. However,

[5] Niles M. Hansen, *French Regional Planning* (Bloomington, Indiana, Indiana University Press, 1968).

[6] Adna Ferris Weber, *The Growth of Cities in the Nineteenth Century*, 2nd ed. (Ithaca, New York, Cornell University Press, 1963). Originally published in 1899 for Columbia University (by the Macmillan Company, New York), as vol. XI of *Studies in History, Economics and Public Law*.

Figure 21. Share of urban population, by size class of city, more developed and less developed regions, 1950–2000



the mega-city as viewed from the air would appear as a physically compact and continuous unit of settlement with urban density and with little or no rural territory included.

The mega-city has emerged rapidly over the past 30 years and is expected to continue to expand up to the year 2000:

Year	*Number of mega-cities with 100 million or more inhabitants*			*Approximate size of largest mega-city*
	World	*More developed regions*	*Less developed regions*	
1950	2	2	0	10 million
1980	10	4	6	20 million
2000	25	5	20	30 million

As can be seen, in 1950, only the more developed regions had mega-cities; and even so, there were only two—New York and London (see table 64). At that time, 10 million inhabitants was approximately the upper limit of mega-city size ever achieved; and these occurrences were unique, for the third largest mega-city (Rhein-Ruhr) had only about 7 million inhabitants.

In 1980, the world had 10 mega-cities, the majority of which were in the less developed regions rather than in the more developed regions. These cities are listed in table 64, which gives the 35 largest cities in the world and their populations at five-year intervals between 1950 and 2000.

Not only has the number of mega-cities increased, but the maximum scale of these cities has doubled since 1950, from 10 million to 20 million. Both New York and Tokyo/Yokohama have a population of about 20 million; even Mexico City—the third largest—has a population of 15 million. Although the majority (6 out of 10) of the mega-cities are in the less developed regions, the only two to reach the maximum size of 20 million are in developed countries.

However, according to United Nations projections, there will be some 25 mega-cities in the world by the year 2000 and the approximate size of the largest mega-city will have increased by another 10 million—from 20 million in 1980 to 30 million at the end of the century. Only one mega-city (Mexico City) is expected to reach the 30 million maximum. The second largest is expected to be São Paulo at 25.8 million and the third largest may be Shanghai at 23.7 million. By the end of the century, the three largest cities will be in the less developed regions rather than in the more developed regions; and the overwhelming majority of the mega-cities (20 out of 25) is expected to be in the developing countries. The mega-cities expected to be greater than 20 million in the year 2000 are: Mexico City; São Paulo; Shanghai; Tokyo/Yokohama, New York and Beijing.

Concern over the growth of the world's largest cities, as in the case of concern for urbanization in general, has resulted recently in a good deal of both theoretical and applied research. Given that much of the projected urban growth will take place in the developing countries, the issue arises whether the urban problems of developing countries will be like those observed in developed countries. Today, the argument that many developing countries are over-urbanized in relation to their economic level is generally rejected on grounds that comparisons with the developed countries or the mechanical applications of development models are ahistorical and do not take into consideration the specific cultural and socio-economic conditions of individual countries. Furthermore, it remains to be seen whether and to what extent urban problems may differ in response to variations in style of development.

A second major issue concerns the relationship between size and the efficiency of cities. At this point, the optimal size of cities remains undetermined, and it is generally agreed that it is in part a function of the goals and planning objectives of Governments rather than having any kind of purely objective basis independent of any political and social value considerations. At the same time, for any prevailing level of technology, there almost certainly are limits beyond which the urban agglomeration process cannot go. Moreover, the day-to-day problems of governance and administration, finance, maintenance of infrastructure and provision of services clearly will set practical limits to megalopolitan growth. The issue is important because information about it is essential to any assessment of whether cities or agglomerations in the developing countries (and in the developed countries as well) are in fact going to reach 25 million or 30 million inhabitants by the end of the century, or if some diseconomies of scale will give rise to a countertrend towards decentralization.

The figures for the year 2000 presented above are, after all, only projections. What will actually happen by the year 2000 in both the less developed and the more developed regions is still uncertain. Individual agglomerations cannot expand indefinitely, particularly where technology and investment are weak. However, even a few decades ago, the present and currently projected maximum city sizes were not generally contemplated.

It is in technologically advanced countries, where after about a century of increasing centralization in cities, some indications of decentralization have recently been found. However, the decentralization does not appear to be a consequence of any insurmountable constraints on mega-city expansion; rather, because with high technology and heavy investment in transportation and communications, it appears that constraints on decentralization are being relaxed. The division of labour that is at the core of the technology of the more developed regions necessitates close co-ordination through communication. Where transportation and communication are limited, close physical proximity in cities is an important means to maintain the necessary contact. Because of the necessary compactness of settlement, space becomes scarce and precious. But as technology and investment in transportation and communications are expanded, it becomes increasingly possible to perform more and more functions at a distance from cities. In a number of the developed countries, the growth of certain kinds of non-urbanized areas is increasing in relation to urban areas.[7] This growth may occur because of decentralized work opportunities or the desire to own a residence in a scenic outlying location, even if it means a long commute to work in the city. It may also be in part related to the aging of the population, as older people may retire to non-

[7] There is a large and rapidly growing literature on this subject. See, for example, Calvin L. Beale, *The Revival of Population Growth in Non-Metropolitan America* (Washington, D.C., United States Department of Agriculture, Economic Research Service, 1975); Shunichi Inoue, "Stagnant growth of Japanese major metropolitan regions in the era of post-industrial development", *New Conceptual Approaches to Migration in the Context of Urbanization*, (Dolhain, Belgium, Ordina Editions for the International Union for the Scientific Study of Population, 1980); Toshio Kuroda, "Urbanization and population redistribution in Japan", *Patterns of Urbanization: Comparative Country Studies*, Sidney Goldstein and David F. Sly, eds. (Dolhain, Belgium, Ordina Editions for the International Union for the Scientific Study of Population, 1977); James L. Sundquist, *Dispersing Population: What America Can Learn from Europe* (Washington, D.C., The Brookings Institution, 1975); I. H. Burnley, "The urbanization of the Australian population 1947–1971", *Urbanization in Australia: The Post-War Experience*, I. H. Burnley, ed. (Cambridge, Cambridge University Press, 1974).

TABLE 64. THIRTY-FIVE LARGEST AGGLOMERATIONS IN THE WORLD, RANKED BY SIZE, 1950–2000

(*Population in millions*)

Rank	*1950*	*Population*	*1960*	*Population*	*1965*	*Population*	*1970*	*Population*	*1975*	*Population*
1.	New York/north-eastern New Jersey	12.3	New York/north-eastern New Jersey	15.4	New York/north-eastern New Jersey	17.0	New York/north-eastern New Jersey	18.4	New York/north-eastern New Jersey	19.7
2.	London	10.4	London	10.7	Tokyo/Yokohama	12.6	Tokyo/Yokohama	14.9	Tokyo/Yokohama	17.7
3.	Rhein-Ruhr	6.9	Tokyo/Yokohama	10.7	London	10.8	Shanghai	10.7	Shanghai	12.4
4.	Tokyo/Yokohama	6.7	Rhein-Ruhr	8.7	Rhein-Ruhr	9.2	London	10.6	Mexico City	11.9
5.	Shanghai	5.8	Shanghai	7.7	Shanghai	9.2	Los Angeles/Long Beach	9.5	Los Angeles/Long Beach	10.8
6.	Paris	5.5	Paris	7.2	Los Angeles/Long Beach	8.3	Rhein-Ruhr	9.3	São Paulo	10.7
7.	Greater Buenos Aires	5.3	Los Angeles/Long Beach	7.1	Paris	8.0	Mexico City	9.0	London	10.3
8.	Chicago/north-western Indiana	4.9	Greater Buenos Aires	6.9	Greater Buenos Aires	7.7	Paris	8.5	Beijing	9.3
9.	Moscow	4.8	Chicago/north-western Indiana	6.5	Chicago/north-western Indiana	7.1	Greater Buenos Aires	8.5	Rhein-Ruhr	9.3
10.	Calcutta	4.6	Moscow	6.3	Mexico City	6.8	São Paulo	8.0	Greater Buenos Aires	9.3
11.	Los Angeles/Long Beach	4.0	Osaka/Kobe	5.7	Moscow	6.8	Chicago/north-western Indiana	7.6	Paris	9.2
12.	Osaka/Kobe	3.8	Calcutta	5.6	Osaka/Kobe	6.7	Osaka/Kobe	7.6	Rio de Janeiro	8.9
13.	Milan	3.6	Mexico City	5.1	Calcutta	6.3	Beijing	7.5	Osaka/Kobe	8.7
14.	Greater Bombay	3.0	Beijing	4.7	São Paulo	6.0	Moscow	7.1	Chicago/north-western Indiana	8.1
15.	Mexico City	3.0	Milan	4.5	Beijing	5.9	Rio de Janeiro	7.1	Calcutta	7.8
16.	Philadelphia/New Jersey	2.9	Rio de Janeiro	4.5	Rio de Janeiro	5.6	Calcutta	7.0	Moscow	7.4
17.	Rio de Janeiro	2.9	São Paulo	4.4	Milan	5.0	Greater Bombay	5.9	Greater Bombay	7.0
18.	Detroit	2.8	Greater Bombay	4.1	Greater Bombay	4.9	Milan	5.6	Seoul	6.8
19.	Naples	2.8	Philadelphia/New Jersey	4.0	Cairo/Giza/Imbaba	4.6	Cairo/Giza/Imbaba	5.4	Cairo/Giza/Imbaba	6.3
20.	Leningrad	2.6	Detroit	3.9	Philadelphia/New Jersey	4.3	Seoul	5.3	Milan	6.2
21.	Manchester	2.5	Cairo/Giza/Imbaba	3.7	Detroit	4.2	Philadelphia/New Jersey	4.6	Jakarta	5.7
22.	Birmingham	2.5	Tianjin	3.5	Tianjin	3.9	Detroit	4.5	Philadelphia/New Jersey	4.8
23.	São Paulo	2.5	Leningrad	3.5	Leningrad	3.8	Jakarta	4.4	Detroit	4.8
24.	Cairo/Giza/Imbaba	2.5	Naples	3.2	Jakarta	3.5	Tianjin	4.3	Tianjin	4.7
25.	Tianjin	2.4	Hong Kong	2.7	Seoul	3.4	Leningrad	4.0	Manila	4.5
26.	Boston	2.2	Jakarta	2.7	Naples	3.4	Naples	3.6	Delhi	4.4
27.	Shenyang	2.2	Birmingham	2.7	Hong Kong	3.3	Manila	3.6	Teheran	4.2
28.	Berlin [West]	2.2	San Francisco/Oakland	2.7	San Francisco/Oakland	3.0	Delhi	3.6	Leningrad	4.2
29.	Beijing	2.2	Boston	2.6	Delhi	2.9	Hong Kong	3.5	Madras	4.1
30.	San Francisco/Oakland	2.0	Shenyang	2.6	Manila	2.9	San Francisco/Oakland	3.4	Madrid	4.0
31.	Leeds/Bradford	1.9	Manchester	2.5	Boston	2.8	Madrid	3.3	Karachi	4.0
32.	Glasgow	1.9	Katowice	2.4	Shenyang	2.8	Teheran	3.3	Hong Kong	3.9
33.	Hamburg	1.8	Seoul	2.4	Birmingham	2.8	Bangkok/Thonburi	3.2	Istanbul	3.9
34.	Vienna	1.8	Delhi	2.3	Madrid	2.8	Karachi	3.1	Bangkok/Thonburi	3.9
35.	Hong Kong	1.7	Wuhan	2.3	Katowice	2.6	Madras	3.1	Naples	3.9

TABLE 64 (*continued*)

Rank	*1980*	*Population*	*1985*	*Population*	*1990*	*Population*	*1995*	*Population*	*2000*	*Population*
1.	New York/north-eastern New Jersey	20.2	Tokyo/Yokohama	21.7	Tokyo/Yokohama	23.0	Mexico City	27.2	Mexico City	31.0
2.	Tokyo/Yokohama	20.0	New York/north-eastern New Jersey	20.8	Mexico City	22.9	Tokyo/Yokohama	23.8	São Paulo	25.8
3.	Mexico City	15.0	Mexico City	18.7	New York/north-eastern New Jersey	21.5	São Paulo	23.2	Shanghai	23.7
4.	Shanghai	14.3	São Paulo	16.6	São Paulo	19.9	New York/north-eastern New Jersey	22.2	Tokyo/Yokohama	23.7
5.	São Paulo	13.5	Shanghai	16.3	Shanghai	18.6	Shanghai	21.1	New York/north-eastern New Jersey	22.4
6.	Los Angeles/Long Beach	11.6	Beijing	13.7	Beijing	16.1	Beijing	18.5	Beijing	20.9
7.	Beijing	11.4	Rio de Janeiro	12.6	Rio de Janeiro	14.7	Rio de Janeiro	17.0	Rio de Janeiro	19.0
8.	Rio de Janeiro	10.7	Los Angeles/Long Beach	12.4	Los Angeles/Long Beach	13.1	Greater Bombay	14.1	Greater Bombay	16.8
9.	Greater Buenos Aires	10.1	Greater Buenos Aires	10.8	Greater Bombay	11.8	Calcutta	13.8	Calcutta	16.4
10.	London	10.0	Calcutta	10.1	Calcutta	11.7	Los Angeles/Long Beach	13.7	Jakarta	15.7
11.	Paris	9.7	Paris	10.1	Seoul	11.5	Jakarta	13.3	Los Angeles/Long Beach	13.9
12.	Osaka/Kobe	9.5	Osaka/Kobe	10.1	Greater Buenos Aires	11.4	Seoul	12.9	Seoul	13.7
13.	Rhein-Ruhr	9.2	Seoul	10.0	Jakarta	11.0	Greater Buenos Aires	11.9	Cairo/Giza/Imbaba	12.9
14.	Calcutta	8.8	Greater Bombay	9.9	Osaka/Kobe	10.5	Cairo/Giza/Imbaba	11.3	Madras	12.7
15.	Seoul	8.4	London	9.8	Paris	10.4	Osaka/Kobe	10.8	Greater Buenos Aires	12.1
16.	Greater Bombay	8.4	Rhein-Ruhr	9.1	Cairo/Giza/Imbaba	9.9	Madras	10.6	Karachi	11.6
17.	Chicago/north-western Indiana	8.2	Jakarta	8.9	London	9.5	Paris	10.6	Delhi	11.5
18.	Moscow	7.7	Cairo/Giza/Imbaba	8.5	Rhein-Ruhr	8.9	Manila	9.8	Manila	11.4
19.	Cairo/Giza/Imbaba	7.4	Chicago/north-western Indiana	8.5	Chicago/north-western Indiana	8.8	Baghdad	9.7	Teheran	11.1
20.	Jakarta	7.2	Moscow	8.0	Madras	8.7	Teheran	9.7	Baghdad	11.0
21.	Milan	6.7	Milan	7.1	Moscow	8.4	Istanbul	9.7	Osaka/Kobe	10.9
22.	Manila	5.5	Madras	6.9	Manila	8.2	Delhi	9.6	Istanbul	10.8
23.	Delhi	5.4	Manila	6.8	Istanbul	8.2	Karachi	9.6	Bangkok/Thonburi	10.6
24.	Madras	5.4	Teheran	6.7	Teheran	8.2	London	9.3	Paris	10.6
25.	Teheran	5.4	Istanbul	6.6	Baghdad	8.2	Chicago/north-western Indiana	9.1	Dacca	10.5
26.	Istanbul	5.2	Delhi	6.6	Delhi	8.0	Rhein-Ruhr	8.8	Bogotá	9.6
27.	Baghdad	5.1	Baghdad	6.6	Karachi	7.8	Bogotá	8.7	Chicago/north-western Indiana	9.3
28.	Tianjin	5.1	Karachi	6.2	Bogotá	7.5	Moscow	8.7	London	9.2
29.	Karachi	5.0	Bogotá	6.2	Milan	7.5	Bangkok/Thonburi	8.6	Moscow	9.0
30.	Bogotá	4.9	Bangkok/Thonburi	5.7	Bangkok/Thonburi	7.0	Dacca	8.2	Rhein-Ruhr	8.6
31.	Detroit	4.9	Tianjin	5.7	Lima/Callao	6.7	Milan	7.8	Lima/Callao	8.6
32.	Philadelphia/New Jersey	4.9	Lima/Callao	5.7	Tianjin	6.3	Lima/Callao	7.7	Tianjin	8.1
33.	Bangkok/Thonburi	4.7	Madrid	5.1	Dacca	6.1	Tianjin	7.2	Kinshasa	8.0
34.	Lima/Callao	4.7	Detroit	5.0	Kinshasa	5.6	Kinshasa	6.9	Milan	7.9
35.	Madrid	4.6	Philadelphia/New Jersey	5.0	Madrid	5.5	Taipei	6.0	Lagos	7.7

[a] Rhein-Ruhr is an urban agglomeration in the Federal Republic of Germany which has been described as a "region of urban scenery". It is a coalescence of numerous individual communes into a larger collective commune enacted through administrative reforms. The currents of job commuters between cities of the Ruhr region have been employed as functional criteria in the delineation of the agglomeration. The largest individual city in the Rhein-Ruhr agglomeration is Cologne. It would, however, be unrepresentative to refer to the agglomeration as the Cologne agglomeration, as that city contains only on the order of 10 per cent of the total population of the Rhein-Ruhr agglomeration and thus does not represent the "core of domination" over the agglomeration that other major metropolitan centres do which normally contain more than one quarter, and often as much as one half or more, of the total population of an agglomeration. Other cities included in Rhein-Ruhr are Bottrop, Castrop-Rauxel, Dortmund, Düsseldorf, Duisburg, Essen, Gelsenkirchen, Gladbeck, Hagen, Herne, Iserlohn, Krefeld, Leverkusen, Lünen, Mülheim an der Ruhr, Neub, Oberhausen, Recklinghausen, Remscheid, Solingen, Wanne-Eickel, Wattenscheid, Witten and Wuppertal.

urban or less urban locations, for financial reasons or because of personal preferences which can be exercised more easily when the couple is no longer bound to areas with appropriate work opportunities.

Lastly, it may be recognized that the future course of any trend towards decentralization is likely to be influenced by basic structural changes in the economy and the social system. The precise effect of any such change is, of course, highly conjectural. However, to take one example, continued or increased energy scarcity might well tend to foster centralizing tendencies, as a pattern of dispersed residences imposes higher energy costs for heating and transportation. Similarly, changes in family structure, in female participation in the labour force and in fertility levels may have a significant impact on the size and location of the residences most commonly desired.

Part Two

POPULATION AND DEVELOPMENT

INTRODUCTION

In addition to surveying the world population situation, part two of this report examines a number of special topics on the relationships between contemporary demographic trends and socio-economic development. An attempt is made to define more clearly the complex interactive network of linkages between the two by treating development as both a determinant and a consequence of population change. The chapters include studies of the association between fertility, mortality and socio-economic variables; the developmental aspects of mortality differentials, the causes and consequences of internal migration in developing countries; the determinants of labour force participation, with special emphasis on the demographic characteristics of working women; the demographic aspects of changes in levels and patterns of consumption, the potential population-supporting capacity of agricultural land and the disparities associated with socio-demographic development.

That socio-economic disparities may be important factors in explaining disparities in rates of population growth was demonstrated in a cross-national regression analysis. The findings indicate that much of the difference between developing countries with regard to their crude birth rates, gross reproduction rates and life expectancy at birth can be explained in terms of differences in indicators of education, status of women, gross domestic product per capita, income distribution and rural/urban distribution of the population. When all variables are considered, a greater portion of the variance can be explained in the case of mortality than in the case of fertility. However, this study points to a stronger role for economic variables in the determination of fertility than mortality. In particular, there is an indication that the distribution of income may be more important than the level of gross domestic product per capita as a determinant of fertility.

From the viewpoint of policy formation, a knowledge of differentials in mortality provides a basis for measuring health inequalities among and within communities and for identifying those population groups whose lives can be improved through changes in health and other developmental policies. Unfortunately, data on differentials in mortality are scarce. This is particularly true in the case of the countries of Africa. Nevertheless, the available information points to large differentials in mortality both among and within the countries of the less developed and the more developed regions.

Research studies in developing countries have established that differentials in early childhood mortality are associated with the educational levels of the mother, but little evidence is available to identify the means by which maternal education influences the complex of factors which determines the level of infant and child mortality. Differentials in mortality also exist among adults but they do not appear to be as large as those among children.

Within the developed countries, it appears that differentials in mortality by social class are large and persistent. However, it is difficult to identify the cause of these differentials because data are rarely available by cause of death as well as social class.

In considering mortality and morbidity, it is important to remember that health is not only a desirable goal in itself; it is also an indispensable component of social and economic development. Conversely, the attainment of health targets depends upon social and economic progress. That this progress has not been satisfactory is reflected in the fact that about 800 million people in the developing countries have incomes too low to ensure basic nutrition and access to essential health services.

Among the most important interactions between health and development are those in which population growth and change are intermediate variables. Health status will affect the age distribution and a change in the age distribution will in turn alter the demand for health services. Family planning is one of the most important operational elements in programmes to reduce rates of population growth, programmes that can also enhance the health of mothers and infants. Conversely, a sharp decline in early childhood mortality rates is often prerequisite to lowering fertility rates.

Like health activities, rural-urban migration is an essential component of the modernization process. However, current rates of rural-urban migration may be excessive. Because the reasons for migrating can be traced to the difference between levels of living in rural and urban areas, a number of policy options are open to Governments wishing to moderate the flow. But first it is necessary to decide whether intervention is warranted.

Migrants generally find employment, improve their level of living and even earn a surplus which they can then remit to their areas of origin. However, the consequences of out-migration from the viewpoint of the rural areas are more ambiguous. Theoretical constructs point to gains and losses and empirical studies in this regard are inconclusive. Thus, the question of whether rural-urban migration is beneficial or harmful to rural development remains to be resolved.

It is often hypothesized that, due to rural-urban migration, urbanization has outpaced industrialization in much of the developing world. However, most studies question the view that migrants cause urban unemployment. If the migrants are in prime working ages and bring useful skills, they will benefit the areas of destination.

The demographic effects of migration are more defi-

nite. Although migrants tend to have higher fertility than the general urban populace, their fertility is lower than comparable persons who remain in the rural areas. It is thus possible that increased rural-urban migration will reduce the fertility level of the country as a whole.

The size of the labour force is determined by the size and age/sex composition of the population and the proportions, of the various groups who are economically active. In low-income agrarian countries, most people contribute to subsistence from an early age and most men spend their adult years in the labour force. However, the situation is more complex in regard to women. In developing countries, a number of very different patterns emerge, involving both high and low participation rates in rural and urban areas. The participation of women appears to decline at first and then rise with industrialization. And there is a variety of age profiles of female labour force participation.

Among the socio-economic determinants of female activity rates are the industrial/occupational structure and the level of aggregate demand. Though the causal process is not certain, empirical studies tend to confirm a positive relationship between the indices of education and the probability of labour force participation.

In addition to economic and social factors, demographic factors, such as fertility and migration, are significant determinants of female labour force participation rates. It has long been hypothesized that there is a strong inverse relationship between fertility and female activity rates. This view has recently received further empirical support from comparative analyses of data from the World Fertility Survey.

Migration also affects the labour force participation of women. The departure of men from rural areas tends to increase female participation in agriculture. Because migration usually takes place for economic reasons, all migrants, including females, tend to have higher participation rates than non-migrants. Furthermore, population mobility can be expected to reallocate labour from areas where there are relatively few employment opportunities to areas where more labour is required.

In general, a woman's current work status is related to her demographic characteristics, including her age, current marital status and the age of her youngest living child. This relationship is demonstrated by data on women's work histories derived from the World Fertility Survey. Based on three countries of Latin America and seven countries of Asia, the results point to three patterns. In some countries, a substantial proportion of women work prior to their marriage. In other countries, work experience is reasonably high both before and after marriage. In still others, few women are recorded as working in any circumstances.

In most countries, current work rates rise with age. This increase is closely linked to the fact that current work rates are also higher for women whose youngest child is older. Furthermore, it is usually the case that instances of females working away from home are negatively associated with the number of children because in such cases work and child-rearing are more difficult to reconcile.

It is clear that socio-economic changes are both the effects and the determinants of demographic trends. From the point of view of planning, changes in the composition of consumption expenditures are among the more significant consequences of alterations in the population. An analysis of household expenditure patterns, discussed below, reveals that in addition to the level of total expenditure per household, the proportion spent on food and non-food items will depend upon household size and composition as well as upon its urban/rural location. A decrease in family size will decrease the proportion of total expenditure going to food. Conversely, urban families will devote a larger proportion of their total expenditure to non-food items than food items. This information can be used to project future levels and patterns of consumption and to identify the proportion of changes associated with specific socio-economic and demographic variables. A simulation model based on data for Pakistan and the Philippines indicates that demographic factors are very important in explaining shifts in the composition of consumption expenditures; and, therefore, planners should give greater weight to these factors in projecting future levels and patterns of consumption.

Despite major advances in agricultural technology, hunger continues to affect at least 500 million people. Projections indicate that almost 50 per cent more food must be grown in the year 2000 to maintain even the current inadequate nutritional levels. However, the ability of a country to produce food in perpetuity is limited by soil and climate, as well as by the crops planted and the technology employed. Accordingly, there are critical levels of population that can be fed from any specific land area.

The Food and Agriculture Organization of the United Nations and the United Nations Fund for Population Activities, in collaboration with the International Institute for Applied Systems Analysis, has initiated a project to quantify the limits of long-term food-producing (population-supporting) capacity. The results for the countries are presented herein.

Population-supporting capacities were calculated for each climatic zone and were totalled at the country level to arrive at country potentials, which were then compared with current population data and the United Nations medium-variant population projections for the year 2000. This procedure was used to identify countries where land resources are insufficient to supply the food needs of current or projected populations. The computations indicate that the African continent as a whole has sufficient land for self-sufficiency, given only a low level of input, and could feed 50 per cent more people than are projected for the year 2000. However, this achievement would require a massive movement of food or population between and within countries because of extreme differences in land resources.

Despite the rapid growth in the gross domestic product of the developing countries during the period from 1960 to 1975, the disparity between rich and poor countries, measured in terms of gross domestic product per capita, has increased. Measured in 1970 prices, the gap between

the developing and developed economies grew from $1,425 per capita in 1960 to $2,417 in 1975, with the result that the 34 economically more developed countries, with but 28 per cent of total population, accounted for 80 per cent of the world's gross domestic product in 1975. Furthermore, these inequalities are closely paralleled by disparities in energy consumption and levels of health and education.

When countries are grouped by gross domestic product per capita, there appears to be a consistent association between that variable and basic demographic indicators. All but a few countries with a gross domestic product per capita below $350 in 1975 had a total fertility rate above 5.0. On the other hand, all countries (excluding Ireland, Israel and certain petroleum-exporting countries) that had a level above $1,400 had a total fertility rate below 2.5. All but a few countries having a gross domestic product per capita in excess of $1,400 had a life expectancy at birth exceeding 70 years; and with but one exception, Sri Lanka, the countries with a level below $200 had a life expectancy of less than 55 years.

Although demographic factors alone are not sufficient to explain observed disparities in levels and changes in gross domestic product per capita and other indicators of well-being, the findings presented below are generally consistent with the view that socio-economic disparities both perpetuate and are perpetuated by high fertility and rapid population growth. The pattern of socio-economic and demographic change indicates that economic disparities between countries might have been narrowed between 1960 and 1975 had population increased less rapidly in developing countries.

Chapter X

RELATIONSHIP BETWEEN FERTILITY, MORTALITY AND SOCIO-ECONOMIC VARIABLES IN DEVELOPING COUNTRIES*

Many countries are concerned with devising socio-economic policies and programmes that will serve to reduce levels of fertility and mortality, thus completing a process of demographic transition from high to low levels of fertility and mortality and thereby achieving a more desirable age structure. Conceptual analyses suggest that socio-economic and demographic factors are linked by an intricate network of extremely complex relationships. In part because of this complexity and in part because of inadequate data, it has not been possible fully to sort out the direct and indirect demographic effects of alternative socio-economic policies.

Full-scale cross-national studies have been impeded by the absence of the necessary observations for many developing countries. As a preliminary step, a study was undertaken by the United Nations Secretariat which involved an analysis of the association between the levels and trends in fertility and the levels and trends of 12 social and economic variables during the period from 1960 to 1975.[1] The analysis was done for 49 countries and involved only simple correlations between the gross reproduction rate and 12 socio-economic variables. The present study analyses the relationships between levels of fertility, mortality and 10 socio-economic variables for a larger group of developing countries (85), with the purpose of determining the strength of the observed associations between the socio-economic variables and both fertility and mortality.

The study is divided into two phases. In the first phase, simple linear correlations are calculated in order to measure the degree of association between the variables. In the second, multiple regression analysis is used to determine the degree to which alternative combinations of socio-economic factors are associated with levels of fertility and mortality. The choice of variables used in the second phase of the study was guided by the results of the first phase.

A. Choice of variables and data used

The variables included in this study were chosen on the basis of a hypothesized causal linkage with fertility and mortality, subject to the availability of appropriate data.

Two indicators of fertility were utilized: the crude birth rate; and the gross reproduction rate. The former rate is the fertility indicator for which data are most widely available. Furthermore, it has the advantage of not being distorted by age misstatements. However, the crude birth rate is not a pure fertility variable, because it is the resultant of the interaction between fertility and age structure. It can therefore be misleading as an indicator of fertility differentials when age structure is not uniform among the countries being studied.

The other fertility indicator being considered, the gross reproduction rate, is independent of age structure and in this sense better suited for a study of the correlates of fertility. The major difficulty associated with using this measure is that it must be computed from data on fertility classified by the age of the mother. Often those data are not available in developing countries or, when available, are distorted by misstatements of maternal age.

Two indicators of mortality were considered: life expectancy at birth; and the infant mortality rate. Both measures reflect the force of mortality without being dependent on age structure. The crude death rate was not used because it is significantly influenced by age structure.[2] Life expectancy at birth is generally recognized as the best summary measure of mortality conditions in a country. However, this measure can be distorted by misstatements of age and is extremely sensitive to differences in infant and child mortality.

The infant mortality rate refers only to deaths of children under one year of age and thus fails to reflect all other mortality differentials among countries. Furthermore, reliable estimates for infant mortality are usually more difficult to get than for life expectancy at birth. But unlike the latter measure of mortality, the infant mortality rate is less sensitive to misstatements of age.

The explanatory variables used in this study fall into four broad categories. They are indicators of education, the status of women, incomes and urban/rural distribution.

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* Prepared by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat.

[1] *World Population Trends and Policies: 1979 Monitoring Report*, vol. I, *Population Trends* (United Nations publication, Sales No. E.79.XIII.4), pp. 172–180. The 12 social and economic variables included two mortality variables: life expectancy at birth; and the infant mortality rate.

[2] For example, Austria had a female crude death rate equal to 12.4 per 1,000 for a life expectancy at birth equal to 75.1 years, while at the same time, Hong Kong, which had a nearly identical life expectancy at birth, 75.0 years, had a female death rate equal to only 4.5 per 1,000. On the other hand, the Coloured population of South Africa had a female crude death rate very similar to that of Austria, 12.3, but had a life expectancy at birth of only 55.8 years. "Measures of fertility, mortality, and reproduction of female populations", *Population Index*, vol. 4, No. 2 (April 1979), pp. 350–353.

Education

Two indicators of education were utilized: the proportion literate among the total population aged 15 years and over; and the school enrolment ratio at the primary and secondary levels.

The first of these indicators, the proportion of the population over 15 that is literate, measures in a very crude way the level of education of the adults in a country. This factor should affect levels of fertility because literate parents may perceive the cost of children to be higher and may have greater knowledge of methods of family planning. For these reasons, it is to be expected that a negative relationship exists between levels of fertility and levels of adult literacy.[3]

As literate persons are more likely to be aware of effective health practices and are more likely to have the financial resources to purchase health services, it is to be expected that there would also be a negative relationship between levels of mortality and levels of adult literacy.[4]

The school enrolment ratio measures the proportion of the children of both sexes of primary-school and secondary-school age who actually attend school. School attendance may affect fertility because it may represent a direct economic cost to the parents as well as a loss of the productive services of the child. Therefore, parents who send their children to school may desire fewer children. Furthermore, school attendance may result in a delayed age of marriage. For these reasons, it is expected that the relationship between school enrolment and fertility is inverse.[5]

The relationship between school enrolment and mortality is less direct. However, it is reasonable to expect that parents having a greater investment in their children would have the means and incentive to provide them with better medical care and nutrition. Furthermore, it is reasonable to believe that adult literacy is closely associated with school enrolment of children. Because of these indirect and direct relationships, it is expected that an inverse relationship exists between the enrolment ratio and mortality.[6]

Status of women

Four indicators of the status of women were utilized: the ratio of the proportion of females literate to the proportion of males literate aged 15 years and over; the ratio of the female school enrolment ratio to the male school enrolment ratio; the proportion of women aged 15-19 years ever married; and the proportion of women within the non-agricultural economically active population.

In recent years, the status of women has been recognized as an important determinant of fertility.[7] If women can achieve high status in society by means other than having children, fertility may be reduced. Because maternal and infant mortality is directly related to fertility, it is expected that would be an inverse relationship between mortality and the indicators of female status.

Because most modern contraceptive methods are female-oriented, it is to be expected that for any given level of general literacy, societies with higher levels of female literacy will have lower fertility. The higher level of female literacy would also indicate a higher level of opportunity cost associated with child-rearing. For these reasons, it is expected that fertility will be inversely related to the ratio of the proportion of females literate to the proportion of males literate among persons over 15 years of age.

As the age at first marriage is generally higher for males than for females, secondary school enrolment is likely to be a more important factor in delaying the marriage of females than males. Furthermore, there is a direct relationship between current female school enrolment and female literacy. Thus, for any given over-all school enrolment ratio, it is expected that fertility would be negatively associated with the ratio of the female school enrolment rate to the male school enrolment rate.

The proportion of ever-married women aged 15–19 years is both an indicator of the status of women and a direct factor influencing levels of fertility. When this proportion is high, marriage takes place at an early age, often without the informed consent of the young woman. In addition, since a younger age at marriage implies an earlier onset of sexual activity, it is to be expected that fertility will vary directly with the proportion of women aged 15–19 who have ever married.[8]

The proportion of the non-agricultural economically active population who are women is an indicator of the relative participation of females in the modern or market sectors of the economy. Since it is more difficult to combine child-rearing with work in the modern sector, women engaged in non-agricultural activities are likely to perceive children as having a higher opportunity cost. Furthermore, women in this sector are more likely to have access to family planning information and services. For these reasons, it is expected that the relationship between

[3] Ita I. Ekanem, "A further note on the relation between economic development and fertility", *Demography*, vol. 9, No. 3 (August 1972), pp. 383–398; Frank Wm. Oechsli and Dudley Kirk, "Modernization and the demographic transition in Latin America and the Caribbean", *Economic Development and Cultural Change*, vol. 23, No. 3 (April 1975), pp. 391–419; C. G. Drakatos, "The determinant of birth rate in developing countries: an econometric study of Greece", *Economic Development and Cultural Change*, vol. 17, No. 4 (July 1969), pp. 596–603; Ghazi M. Farooq and Basan Tuncer, "Fertility and economic and social development in Turkey: a cross-sectional and time series study", *Population Studies*, vol. XXVIII, No. 2 (July 1974), pp. 263–276.

[4] Sultan S. Hashmi, "Socioeconomic determinants of mortality levels in Asia and the Pacific", *Proceedings of the Meeting on Socioeconomic Determinants and Consequences of Mortality*, El Colegio de Mexico, Mexico City, 19–25 June 1979; published jointly by the United Nations and the World Health Organization (New York and Geneva, 1979), pp. 119–136.

[5] F. W. Oechsli and D. Kirk, *loc. cit.*, Paul Boyer and Alban Richard, "Éléments d'analyse de la transition démographique", *Population*, vol. 30, Nos. 4 and 5 (July and October 1975), pp. 825–847.

[6] S. S. Hashmi, *op. cit.*

[7] *Report of the United Nations World Population Conference, 1974: Bucharest, 19–30 August 1974* (United Nations publication, Sales No. E.75.XIII.3), para. 32(b).

[8] G. M. Farooq and B. Tuncer, *loc. cit.*

fertility and the proportion of women within the non-agricultural population would be inverse.[9]

Income

Two types of income variables were used in this analysis: the gross domestic product per capita; and the share of income received by the poorer 40 per cent of the population.

Inasmuch as children are a source of satisfaction and may also provide services and old-age security, it is reasonable to assume that families with higher incomes would choose to have more children as well as more material possessions. On the other hand, persons with higher incomes may have higher aspirations for their children, involving significantly greater costs to the parents. Furthermore, high-income families are more likely to have access and the means to acquire modern methods of contraception. Thus, the direction of the relationship between fertility and gross domestic product per capita cannot be determined on the basis of a priori analysis.[10]

The relationship between gross domestic product per capita and mortality is less ambiguous. Persons with higher incomes are likely to have better nutrition, more sanitary living conditions and greater access to modern health services, both preventive and curative, than persons with lower incomes. Thus, it is to be expected that there would be an inverse relationship between gross domestic product per capita and mortality.[11]

The share of income received by the poorer 40 per cent of the population is an indicator of the inequality of the distribution of income within a country. For any given level of gross domestic product per capita, a higher level of this indicator implies a higher average level of income for the poorer 40 per cent of the population. If the relationship between fertility and income per capita is inverse but non-linear, then a lower level of fertility can be expected from a given level of gross domestic product per capita, if it is more equally distributed.[12] For this reason, it is expected that the relationship between fertility and the share of income received by the poorer 40 per cent of the population will be inverse.

Much evidence has been advanced to demonstrate that the relationships between per capita income and various causes of death are non-linear.[13] Thus, for any given level of per capita income, lower levels of mortality are likely to be associated with a greater portion of income going to the poorer 40 per cent of the population, implying a negative relationship between the variables.

Urban/rural distribution

Two indicators of the urban/rural distribution of the population were used. They are the proportion of population living in urban areas and the proportion of economically active males engaged in non-agricultural activities.

Families living in urban areas are less likely to be able to derive productive services from children and are more likely to be engaged in occupations that conflict with the demands of child-rearing. Thus, the net cost of children is likely to be higher in urban areas. Furthermore, urban families are likely to have easier access to contraceptive information and services. Therefore, it is expected that the relationships between fertility and the proportion of the population living in urban areas will be inverse.[14]

The relationship between the proportion of the population that is urban and mortality is more ambiguous. Urbanization may be associated with a variety of environmental problems and may facilitate the spread of communicable diseases. However, urban populations are likely to have easier access to health information and health services; and this situation is especially true in developing countries. For this reason, it is expected that the direction of the relationship between the proportion of the population that is urban and levels of mortality is inverse.[15]

The proportion of active males engaged in non-agricultural activities is an indicator of the distribution of the population between rural and urban areas on the assumption that occupation is highly correlated with location. Because it is easier to employ children in agricultural than many non-agricultural activities, the value of children and hence fertility should be inversely related to the proportion of active males engaged in non-agricultural activities.[16] For reasons cited in relation to the proportion of the population that is urban, it is expected that the relation between mortality and the proportion of economically active males engaged in non-agricultural activities is negative.[17]

Data used

To the greatest extent possible, especially with regard to demographic variables, this study uses data based on actual observations to the exclusion of data based on projections or models. For this reason, the number of countries for which appropriate data was available was often quite small. The number of countries for which data on a particular variable was available ranged from a maximum of 85 countries in the case of the crude birth rate to a minimum of 39 countries in the case of the share of gross domestic product going to the poorer 40 per cent of the population.

Though the data are generally drawn from United Nations publications, it must be kept in mind that their

[9] *Ibid.*

[10] David Heer, "Economic development and fertility", *Demography*, vol. 3, No. 2 (May 1966), pp. 423–444; F. W. Oechsli and D. Kirk, *loc. cit.*; and P. Boyer and A. Richard, *loc. cit.*

[11] Samuel H. Preston, *Mortality Patterns in National Populations: with Special Reference to Recorded Causes of Death* (New York, Academic Press, 1976), pp. 62–88.

[12] Robert Repetto, *Economic Equality and Fertility in Developing Countries* (Baltimore, Maryland, Johns Hopkins University Press, 1979), p. 54.

[13] S. H. Preston, *op. cit.*, chap. 2.

[14] I. I. Ekanem, *loc. cit.*; C. G. Drakatos, *loc. cit.*

[15] S. S. Hashmi, *op. cit.*

[16] Avery M. Guest, "The relationship of the crude birth rate and its components to social and economic development", *Demography*, vol. 11, No. 3 (August 1974), pp. 457–472.

[17] S. S. Hashmi, *op. cit.*

quality and reliability are uneven. It should also be noted that the data do not all refer to the same year. For all variables and all countries, the data include the observation that is closest to the year 1975. In some cases, the observation may date as far back as the early 1960s. This fact is especially important to consider in view of numerous studies indicating that there has been a structural change in the relationships between socio-economic variables and fertility and mortality in recent decades.[18]

Table 65 indicates the number of countries for which information was available, the average value of each variable and its standard deviation.

TABLE 65. NUMBER OF COUNTRIES FOR WHICH DATA WERE AVAILABLE AND AVERAGE VALUES AND STANDARD DEVIATIONS OF THE VARIABLES

Variable		Number of countries	Average value	Standard deviation
No.	Name			
1.	Crude birth rate (per 1 000)	85	41.5	8.9
2.	Gross reproduction rate	83	2.85	0.65
3.	Life expectancy at birth (years)	59	51.7	12.5
4.	Infant mortality rate (per 1 000)	43	110.9	55.4
5.	Proportion literate aged 15 and over (percentage)	47	51.8	26.1
6.	School enrolment ratio (percentage)	81	55.2	25.1
7.	Female/male literacy ratio (percentage)	47	64.8	33.1
8.	Female/male school enrolment ratio (percentage)	77	74.6	24.6
9.	Females aged 15-19 ever married (percentage)	64	30.6	19.9
10.	Females in non-agricultural labour (percentage)	45	24.9	12.0
11.	Gross domestic product per capita (dollars)	70	347	303
12.	Share of the poorer 40 per cent (percentage)	39	123	4.2
13.	Proportion urban (percentage)	72	33.7	21.5
14.	Males in non-agricultural activities (percentage)	45	48.3	21.9

B. CORRELATION ANALYSIS

In this phase of the study, the direction and degree of association between the variables are determined by means of simple linear correlation analysis. The purpose of this exercise is to identify those variables which will be used in the subsequent regression analysis.

Correlation among the demographic variables

Two measures of fertility and two measures of mortality are considered. To the extent that there is a high degree of correlation between the indicators of fertility (or mortality), it is reasonable to assume that both could be explained by the same set of explanatory variables.

The correlation coefficients for this portion of the analysis are shown in table 66 along with the number of countries involved in each computation. From this table it can be seen that the coefficient of correlation between the crude birth rate and the gross reproduction rate is 0.905. This results from a strong linear relation between the variables for values of the crude birth rate below 36 and a weak relationship between the variables for values above 38. (In the case of the 14 countries whose crude birth rate is between 48 and 50, the gross reproduction rate varies between 2.5 and 3.8). This may be due to significantly different age structures but is more likely to be the result of data inaccuracy. Furthermore, the degree of inaccuracy tends to be associated positively with fertility, indicating a heteroskedastic relationship.

There was a high inverse correlation (−0.85) between life expectancy at birth and infant mortality, which resulted from a strong linear relationship between mortality variables for countries with a life expectancy higher than 38 years and a very weak one for countries with a life expectancy of 38 years or less. (The nine countries with life expectancy levels between 35 and 38 years had infant mortality rates varying between 100 and 230 per 1,000). This result may reflect the fact that differentials in child and adult mortality are more important factors in determining life expectancy in high-mortality countries. Or it may simply reflect greater inaccuracy in computing infant mortality or life expectancy in these countries. In any event, the degree of variability is correlated with the level of mortality and the relationship is heteroskedastic.

The high degree of correlation between the two fertility variables and the two mortality variables, respectively, implies similar patterns of relationships with the socio-economic variables. However, the correlation coefficients are sufficiently below 1.00 to justify studying each variable separately.

Correlation among explanatory variables

Because many socio-economic variables are highly correlated with one another, it may be possible to omit certain variables from the regression analysis without any significant loss of explanatory power. In this portion of the analysis, groups of variables related to education, status of women, income and urban/rural location are considered separately. In the case of education, data were available for 46 countries with regard to the proportion of persons over 15 years of age who were literate and the enrolment ratio in primary and secondary grades. The coefficient of correlation between the two variables was only 0.55, which would indicate that it may be possible to measure the separate effect of each variable on fertility and mortality.

Four indicators of the status of women are considered in this analysis. Thus, six correlation coefficients relating to these variables were calculated. In five of the six cases, the number of countries for which data was available is between 40 and 50. (In the sixth case, data were available for 59 countries). In general, the ratio of female to male literacy was most closely correlated with other variables concerning the status of women. The correlation between that variable and the ratio of male to female school enrolment was 0.87. All other correlation coefficients were lower. However, a strong case could be made for omitting one or more of the variables for status of women from the regression analysis.

[18] S. H. Preston, *op. cit.*, chap. 4.

TABLE 66. CORRELATION MATRIX

Correlation coefficients	Crude birth rate (per 1 000) (1)	Gross reproduction rate (2)	Life expectancy at birth (years) (3)	Infant mortality rate (per 1 000) (4)	Proportion literate aged 15 and over (percentage) (5)	School enrolment ratio (percentage) (6)	Female/male literacy ratio (percentage) (7)	Female/male school enrolment ratio (percentage) (8)	Females aged 15-19 ever married (percentage) (9)	Females in non-agricultural labour (percentage) (10)	Gross domestic product per capita (dollars) (11)	Share of the poorer 40 per cent (percentage) (12)	Proportion urban (percentage) (13)	Males in non-agricultural activities (percentage) (14)
1. Crude birth rate (per 1 000)	85	0.90	−0.76	0.73	−0.63	−0.62	−0.41	−0.56	0.56	−0.20[a]	−0.69	−0.30	−0.55	−0.54
2. Gross reproduction rate	83	83	−0.53	0.58	−0.55	−0.51	−0.37	−0.46	0.40	−0.22[a]	−0.57	−0.42	−0.41	−0.49
3. Life expencancy at birth (years)	59	59	59	−0.85	0.80	0.62	0.72	0.72	−0.78	0.29	0.61	0.18[a]	0.72	0.67
4. Infant mortality rate (per 1 000)	43	43	40	43	−0.85	−0.41	−0.62	−0.56	0.74	−0.54	−0.42	−0.29[a]	−0.62	−0.48
5. Proportion literate aged 15 and over (percentage)	47	47	35	23	47	0.55	0.85	0.75	−0.83	0.67	0.30	0.26[a]	0.48	0.34
6. School enrolment ratio (percentage)	81	79	57	41	46	81	0.40	0.71	−0.50	0.20[a]	0.71	−0.12[a]	0.60	0.61
7. Female/male literacy ratio (percentage)	47	47	35	23	47	46	47	0.87	−0.71	0.83	0.24[a]	0.07[a]	0.28	0.11[a]
8. Female/male school enrolment ratio (percentage)	77	75	54	40	43	77	43	77	−0.62	0.64	0.57	−0.31	0.42	0.31
9. Females aged 15-19 ever married (percentage)	64	63	49	34	45	62	45	59	64	−0.51	−0.35	0.01[a]	−0.48	−0.36
10. Females in non-agricultural labour (percentage)	45	45	35	23	40	44	40	41	42	45	0.18[a]	0.01[a]	0.05[a]	−0.14[a]
11. Gross domestic product per capita (dollars)	70	69	51	38	42	68	42	64	56	38	70	−0.06	0.72	0.71
12. Share of the poorer 40 per cent (percentage)	39	39	28	16	30	38	30	35	34	27	35	39	−0.06[a]	0.41
13. Proportion urban (percentage)	72	71	52	37	47	69	47	66	61	45	60	37	72	0.77
14. Males in non-agricultural activities (percentage)	45	45	35	23	40	44	40	41	42	45	38	27	45	45[1]

[a] Not significant at the 0.05 level.

The two income variables used in this study were gross domestic product per capita and the share of income going to the poorer 40 per cent of the population. Only 39 observations were available for the latter variable and only 35 observations were available for both variables simultaneously. The coefficient of correlation between them was (−0.06), indicating that they are not linearly related and would therefore have separate effects on fertility and mortality.

Two indicators of urban/rural residence were used in this study. They are the proportion of the population that is urban and the proportion of the economically active males engaged in non-agricultural activities. Since only 45 observations were available for the latter variable, the correlation coefficient between the two was based on 45 observations. The value of the correlation coefficient (0.77) lies in the intermediate range, indicating that although each variable is likely to have a separate effect on fertility and mortality, not a great deal of explanatory power would be lost by eliminating one of these variables.

All the correlation coefficients cited in this section are significant at the 1 per cent level except the coefficient relating gross domestic product per capita and the share of income going to the poorer 40 per cent of the population.

Correlation between fertility and the explanatory variables

Since the gross reproduction rate is not influenced by differences in age structure, it might be assumed that the relationship between that rate and the socio-economic variables would be stronger than the relationship between those variables and the crude birth rate. However, this is not the case. With but one exception, the correlation coefficient between the crude birth rate and each of the socio-economic variables is equal to or larger than the correlation coefficient between the gross reproduction rate and the corresponding variable. This finding may indicate that age structure is correlated with socio-economic variables in a way that reinforces their linkage with fertility. However, this finding may simply indicate that measurements of the crude birth rate are more accurate than measurements of the gross reproduction rate because random errors will tend to reduce the size of the correlation coefficient.

Though the largest correlation coefficient between the fertility indicators and the socio-economic variables is only 0.69, the data indicate that fertility is significantly related to all but one of the socio-economic variables and that all the correlation coefficients have the expected sign. The only variable that is weakly correlated with both the crude birth rate and the gross reproduction rate (−0.20 and −0.22, respectively) is the proportion of women in the non-agricultural labour force.

Correlation between mortality and the explanatory variables

As life expectancy is a more comprehensive measure of mortality, one would expect that it is more highly correlated with the socio-economic variables than is the infant mortality rate. In all but two instances this is the case. Only one variable, the share of income going to the poorest 40 per cent of the population is not significantly correlated with either mortality indicator at the 5 per cent level. Thus, mortality is associated with all but one of the socio-economic variables and the correlation coefficients have the expected sign.

On the basis of the simple correlation analysis, it appears that mortality measures are more closely associated with socio-economic variables than are indicators of fertility. There are only two socio-economic variables for which the correlation with fertility is stronger than with mortality. One of them, income per capita, is the socio-economic variable most highly correlated with fertility while having one of the lowest correlations with mortality.

In the preceding analysis, comparisons of the relative magnitude of the correlation coefficients were rendered suspect because the groups of countries for which the correlation were computed varied with each pair of variables considered. Thus, some of the differences between the correlation coefficients were due to differences in the composition of reference groups. In order to make a more definitive comparison of the respective linkages between the demographic variables and each of the explanatory variables, a new set of correlation coefficients was computed, taking for each socio-economic variable only those countries for which information is available on all four demographic variables. The results appear in table 67.

Table 67 indicates that, as in the previous analysis, the crude birth rate is more highly correlated with the socio-economic variables than is the gross reproduction rate. To a somewhat lesser extent, life expectancy at birth is more highly correlated with the socio-economic variables than is the infant mortality rate.

In order to make a valid comparison of the strength of the association between a given demographic variable and each of the socio-economic variables, it is necessary to restrict the analysis to countries for which data are available on all variables involved. This is done in table 68, which shows that 22 cases could be considered in relation to the crude birth rate and the gross reproduction rate, 18 cases could be considered in relation to life expectancy at birth and 9 cases could be considered in relation to the infant mortality rate.

A comparison of the elements of this table with the corresponding elements of the previous table indicates that, in a number of cases, the correlation coefficients vary markedly, thus illustrating the importance of the composition of the sample of countries.

In this part of the analysis, gross domestic product per capita emerged as the socio-economic variable that is most highly correlated with the crude birth rate and with life expectancy at birth. The proportion of income going to the poorest 40 per cent, which was not significantly correlated with the demographic variables in the previous analysis, also emerged as a variable with a strong relationship with fertility. It had the largest correlation with the gross reproduction rate and the third largest with the crude birth rate.

TABLE 67. CORRELATION COEFFICIENTS: ANALYSIS OF COUNTRIES FOR WHICH DATA WERE AVAILABLE ON ALL FOUR DEMOGRAPHIC VARIABLES

Demographic variables	Socio-economic variables: Proportion literate aged 15 and over (percentage) (5)	School enrolment ratio (percentage) (6)	Female/male literacy ratio (percentage) (7)	Female/male school enrolment ratio (percentage) (8)	Females aged 15–19 ever married (percentage) (9)	Females in non-agricultural labour (percentage) (10)	Gross domestic product per capita (dollars) (11)	Share of the poorer 40 per cent (percentage) (12)	Proportion urban (percentage) (13)	Males in non-agricultural activities (percentage) (14)
1. Crude birth rate (per 1 000)	−0.72	−0.66	−0.58	−0.69	0.67	−0.49	−0.72	−0.21[a]	−0.69	−0.64
2. Gross reproduction rate	−0.62	−0.58	−0.50	−0.52	0.47	−0.46	−0.59	−0.45	−0.57	−0.60
3. Life expectancy at birth (years)	0.84	0.54	0.73	0.71	−0.85	0.53	0.60	0.02[a]	0.77	0.58
4. Infant mortality rate (per 1 000)	−0.86	−0.39	−0.79	−0.64	0.75	−0.71	−0.41	−0.33[a]	−0.62	−0.46
Number of cases	21	38	21	37	33	22	36	15	34	22

[a] Not significant at the 0.05 level.

TABLE 68. CORRELATION COEFFICIENTS: ANALYSIS OF COUNTRIES FOR WHICH DATA WERE AVAILABLE ON ALL VARIABLES INVOLVED

Demographic variables	Number of cases	Socio-economic variables: Proportion literate aged 15 and over (percentage) (5)	School enrolment ratio (percentage) (6)	Female/male literacy ratio (percentage) (7)	Female/male school enrolment ratio (percentage) (8)	Females aged 15–19 ever married (percentage) (9)	Females in non-agricultural labour (percentage) (10)	Gross domestic product per capita (dollars) (11)	Share of the poorer 40 per cent (percentage) (12)	Proportion urban (percentage) (13)	Males in non-agricultural activities (percentage) (14)
1. Crude birth rate (per 1 000)	22	−0.62	−0.57	−0.31[a]	−0.46	0.64	−0.05[a]	−0.70	−0.63	−0.70	−0.62
2. Gross reproduction rate	22	−0.63	−0.49	−0.34[a]	−0.47	0.55	−0.09[a]	−0.63	−0.69	−0.58	−0.59
3. Life expectancy at birth (years)	18	0.73	0.72	0.61	0.71	−0.68	0.41	0.76	0.47	0.70	0.58
4. Infant mortality rate (per 1 000)	9	−0.79	−0.68	−0.63	−0.83	0.68	−0.76	−0.60	−0.50[a]	−0.59	−0.10[a]

[a] Not significant at the 0.05 level.

C. MULTIPLE REGRESSION ANALYSIS

In the second section of this study, simple linear correlation analysis is used to estimate the gross relationship between each of the demographic and socio-economic variables, considered in pairs. However, the observed associations may have been influenced by other variables operating through the pair being analysed. This section examines the way in which the socio-economic variables as a group are related to the crude birth rate, the gross reproduction rate and life expectancy at birth. The separate effect of each variable also is estimated by means of a multivariate analysis. Selected sets of social and economic variables are related to the crude birth rate, the gross reproduction rate and life expectancy at birth. The determinants of the infant mortality rate are not analysed because of the paucity of observations on that variable.

In order to increase the number of countries for which data on all social and economic variables were available, three socio-economic variables were eliminated from the study: the ratio of the female proportion literate to the male proportion literate; the proportion of women in the non-agricultural labour force; and the proportion of active males engaged in non-agricultural activities.

Single-equation, linear multiple regression coefficients were estimated relating various combinations of the social and economic variables to each of the remaining demographic variables.

Data from 21 countries[19] were used in the analysis since only these countries had observations on all the demographic and socio-economic variables. The sample is therefore not random, having been chosen on the basis of data availability; and it cannot be assumed that the coefficients calculated from these data are unbiased estimates of the corresponding relationships in all developing countries. Quite the contrary, there is reason to believe that the sample countries differ in significant ways from the majority of developing countries. Table 69 presents the mean values of the variables included in this study for the 21 countries. Compared with the corresponding values for the original sample, cited in table 65, per capita income is 51 per cent higher, the proportion of the population in urban areas is 27 per cent higher, the school enrolment ratio is 24 per cent higher, the crude birth rate is 13 per cent lower and the life expectancy is 7 per cent higher. Taken as a whole, these countries are more developed than most developing countries.

Fertility

When the seven remaining socio-economic variables are included simultaneously as independent variables,

[19] Those countries are Argentina, Chad, Chile, Costa Rica, Ecuador, El Salvador, Gabon, Hong Kong, Indonesia, Malaysia, Mexico, Panama, Peru, Republic of Korea, Senegal, Thailand, Tunisia, Turkey, United Republic of Tanzania, Uruguay, and Zambia.

TABLE 69. MEAN VALUES OF THE VARIABLES USED IN THE STUDY OF FERTILITY AND MORTALITY, BASED ON 21 DEVELOPING COUNTRIES

Variables	*Mean value*
1. Crude birth rate (per 1 000)	36.0
2. Gross reproduction rate	2.47
3. Life expectancy at birth (years)	55.3
5. Proportion literate aged 15 and over (percentage)	58.1
6. School enrolment ratio (percentage)	68.7
8. Female/male school enrolment ratio (percentage)	85.5
9. Females aged 15–19 ever married (percentage)	27.8
11. Gross domestic product per capita (dollars)	52.3
12. Share of the poorer 40 per cent (percentage)	12.6
13. Proportion urban (percentage)	42.8

they explain (in a statistical sense) 79 per cent of the variability in the crude birth rate and 71 per cent of the variability in the gross reproduction rate. However, in both cases, only one regression coefficient is significant at the 5 per cent level, that pertaining to the share of gross domestic product going to the poorer 40 per cent of the population. This result is due to the high degree of multicollinearity in the independent variables.

The simple linear correlations between the independent variables are shown in table 70. In general, the degree of correlation between them is only moderate. However, five pairs of variables produced correlation coefficients of 0.75 or greater:

(*a*) Proportion of the population aged 15 years and over that is literate and the ratio of male to female school enrolment (0.77);

(*b*) Proportion of the population aged 15 years and over that is literate and the proportion of women aged 15–19 ever married (−0.83);

(*c*) The school enrolment ratio and the ratio of male to female school enrolment (0.79);

(*d*) The school enrolment ratio and per capita gross domestic product (0.85);

(*e*) The proportion of women aged 15–19 ever married and the proportion urban (−0.75).

In order to reduce the degree of multicollinearity, the elements of these pairs were not considered simultaneously in any of the regression equations. As a result, the correlation coefficient between independent variables never exceeded 0.70.

Gross domestic product per capita is highly correlated with the school enrolment ratio but the two variables refer to quite different phenomena and therefore should be studied individually.[20] It was for this reason that separate sets of equations were calculated for each of these variables. Table 71 shows the beta coefficients[21] relating gross domestic product per capita and the other socio-economic variables to the crude birth rate. It clearly indicates that the beta coefficients are all significantly greater than zero and that the direction of the relationships are in accordance with a priori expectations. When the independent variables are considered in groups of three, the highest regression coefficients are attained when the share of the poorer 40 per cent in total income is included. Furthermore, the coefficient of determination is reduced from 0.78 to 0.68 when that variable is excluded from the analysis.

Table 72 shows the beta coefficients relating the school enrolment ratio and other socio-economic variables to the crude birth rate. Though all coefficients have the

[20] It is likely that gross domestic product per capita acts upon the school enrolment ratio rather than the reverse since the literacy rate, which reflects previous school enrolment rates, is not highly correlated with gross domestic product per capita.

[21] Beta coefficients are standardized regression coefficients obtained when all variables are transformed so as to have a mean of zero and a standard deviation of unity. Beta coefficients are independent of the original units in which the variables are measured and thus their magnitude can be compared directly.

TABLE 70. SIMPLE LINEAR CORRELATION COEFFICIENTS FOR THE VARIABLES USED IN THE STUDY OF FERTILITY AND MORTALITY, BASED ON DATA FOR 21 DEVELOPING COUNTRIES

	Variables									
Variables	*Crude birth rate (per 1 000) (1)*	*Gross reproduction rate (2)*	*Life expectancy at birth (years) (3)*	*Proportion literate aged 15 and over (percentage) (5)*	*School enrolment ratio (percentage) (6)*	*Female/male school enrolment ratio (percentage) (8)*	*Females aged 15–19 ever married (percentage) (9)*	*Gross domestic product per capita (dollars) (11)*	*Share of the poorer 40 per cent (percentage) (12)*	*Proportion urban (percentage) (13)*
1. Crude birth rate (per 1 000)	1									
2. Gross reproduction rate	0.94	1								
3. Life expectancy at birth (years)	−0.73	−0.55	1							
5. Proportion literate aged 15 and over (percentage)	−0.60	−0.47	0.87	1						
6. School enrolment ratio (percentage)	−0.66	−0.51	0.48	0.48	1					
8. Female/male school enrolment ratio (percentage)	−0.84	−0.46	0.69	0.77	0.79	1				
9. Females aged 15–19 ever married (percentage)	0.63	0.40	0.86	−0.83	−0.47	−0.63	1			
11. Gross domestic product per capita (dollars)	−0.68	−0.60	0.38	0.31	0.85	0.64	−0.26	1		
12. Share of the poorer 40 per cent (percentage)	−0.40	−0.58	0.27	0.29	0.09	−0.06	−0.15	0.03	1	
13. Proportion urban (percentage)	−0.69	−0.52	0.75	0.63	0.57	0.56	−0.75	0.55	0.15	1

TABLE 71. BETA COEFFICIENTS OF INDEPENDENT VARIABLES USED AS DETERMINANTS OF THE CRUDE BIRTH RATE, BASED ON DATA FOR 21 DEVELOPING COUNTRIES, EXCLUDING SCHOOL ENROLMENT RATIO

Gross domestic product per capita	*Share of the poorer 40 per cent of the population*	*Females aged 15–19 ever married*	*Proportion literate aged 15 and over*	*Proportion urban*	*Female/male school enrolment ratio*	R^2
−0.56	−0.32	0.44				0.78
−0.56	−0.28		−0.35			0.71
−0.46	−0.32			−0.38		0.70
−0.41	−0.41				−0.40	0.70
−0.55		0.48				0.68
−0.55			−0.44			0.63
−0.67	−0.38					0.60

TABLE 72. BETA COEFFICIENTS OF THE INDEPENDENT VARIABLES USED AS DETERMINANTS OF THE CRUDE BIRTH RATE, BASED ON DATA FOR 21 DEVELOPING COUNTRIES, EXCLUDING GROSS DOMESTIC PRODUCT PER CAPITA

School enrolment ratio	*Share of the poorer 40 per cent*	*Females aged 15–19 ever married*	*Proportion urban*	R^2
−0.55	−0.40	0.31[a]		0.72
−0.50	−0.39		−0.34[a]	0.72
−0.70	−0.46			0.65

[a] Not significantly different from zero at the 0.05 level of significance.

expected sign, only the coefficients of the school enrolment ratio and the share of income going to the poorer 40 per cent of the population are significantly different from zero.

Table 73 shows the results of a similar analysis using the gross reproduction rate as the dependent variable. Four equations were fitted involving gross domestic product per capita, the share of income going to the poorer 40 per cent of the population and one other socio-economic variable. The introduction of the third variable adds little to the coefficient of determination and the coefficients of those variables are not significantly different from zero. The coefficients of the first two variables were significant and had the expected sign. Two equations were fitted involving the school enrolment ratio. That variable also proved to be significantly different from zero.

Although it is not possible to generalize these findings to other developing countries, the results do suggest that when the effects of other variables are taken into account, the proportion of income going to the poorer fraction of the population is significantly associated with reduced levels of fertility. This analysis does not permit the drawing of any conclusions as to cause and effect because the variables may interact with one another in a complex way or they may reflect the effects of other variables not included in this study. In any event, it would seem profitable to explore further the linkage between fertility and the distribution of benefits of development among households.

Mortality

The analysis of the factors determining life expectancy at birth involved the same set of variables as was considered above. However, the regression results are quite different. When all seven socio-economic variables are included in the regression equation, the coefficient of determination (R^2) is 0.86. Thus, a large part of the variance in life expectancy between countries is "explained" by these seven variables. However, due to multicollinearity, none of the beta coefficients is significant at the 5 per cent level.

Table 74 shows the beta coefficients for regression coefficients based on two or three variables. In every case, the coefficients of the proportion of females aged 15–19 ever married and the proportion literate are significantly different from zero. Though these two variables can explain 82 per cent of the total variance, it must be remembered that a number of combinations of other variables explain approximately the same proportion of the variance.

TABLE 73. BETA COEFFICIENTS OF THE INDEPENDENT VARIABLES USED AS DETERMINANTS OF THE GROSS REPRODUCTION RATE, BASED ON DATA FOR 21 DEVELOPING COUNTRIES

Gross domestic product per capita	*Share of poorer 40 per cent*	*Females aged 15–19 ever married*	*Proportion urban*	*Proportion literate aged 15 and over*	*Female/male school enrolment ratio*	*School enrolment ratio*	R^2
−0.53	−0.53	0.18[a]					0.70
−0.49	−0.54		−0.17[a]				0.69
−0.53	−0.51			−0.16[a]			0.69
−0.45	−0.57				−0.21[a]		0.69
−0.56	−0.58						0.67
	−0.59		−0.16[a]			−0.48	0.67
	−0.59					−0.57	0.65

[a] Not significantly different from zero at the −0.05 level of significance.

TABLE 74. BETA COEFFICIENTS OF THE INDEPENDENT VARIABLES USED AS DETERMINANTS OF LIFE EXPECTANCY AT BIRTH, BASED ON DATA FOR 21 DEVELOPING COUNTRIES

Females aged 15–19 ever married	*Proportion literate aged 15 and over*	*Gross domestic product per capita*	*School enrolment ratio*	*Proportion urban*	*Female/male school enrolment ratio*	*Share of poorer 40 per cent*	R^2
−0.43	0.48	0.2[a]					0.84
−0.43	0.50		0.03[a]				0.82
−0.43	0.51						0.82
	0.67			0.32			0.82
−0.65					29[a]	19[a]	0.81

[a] Not significantly different from zero at the 0.05 level of significance.

Conclusions

The regression analysis is consistent with the results of the correlation analysis in that the socio-economic variables taken as a whole can explain a larger part of the variance in life expectancy at birth than the variance in the crude birth rate or the gross reproduction rate. The maximum coefficient of determination is equal to 0.86 in the case of mortality and 0.79 in the case of fertility when the same group of 21 countries is considered.

In the case of both fertility and mortality, a number of different groupings of the socio-economic variables provide comparable results in terms of the coefficient of determination. On the basis of these data and simple regression analysis, it is not possible to identify a specific linear model as being a clearly superior explanation of the relationship between socio-economic factors and fertility and mortality, respectively.

The fact that a number of linear models are nearly equivalent in terms of statistical explanatory power highlights the need for new theoretical constructs which would make it possible to identify the relative importance of various socio-economic variables in explaining fertility and mortality differences.

The analysis did indicate that gross domestic product per capita, the share of income going to the poorer 40 per cent and the school enrolment ratio were statistically significant determinants of fertility and that the proportion literate and the proportion of females aged 15–19 and the proportion urban were statistically significant determinants of mortality.

Although the results of this study cannot be generalized to other developing countries and the findings may be greatly influenced by the choice of a linear single equation model, the results are suggestive that over-all socio-economic variables provide a better explanation of mortality than fertility. Furthermore, economic variables appear to be more significant in the case of fertility and social variables more significant in the case of mortality. In particular, the proportion of income going to the poorer 40 per cent appears to be a significant factor in fertility but not in mortality. When comparable data for the majority of developing countries become available, it would be useful to investigate whether these findings apply to the larger body of countries. If this should prove to be the case, it would then be useful to try to identify the specific causal links that explain these phenomena.

Chapter XI

MORTALITY DIFFERENTIALS*

From both an analytical and a policy perspective, the study of differential mortality is a matter of very considerable importance. Analytically, it may aid demographic researchers and epidemiologists, in their search for the determinants of mortality and ill health. From a policy point of view, knowledge of differentials in mortality provides a basis for measuring health inequalities among and within communities and for identifying those population groups whose lives can be improved by changes in government and health policy.

In spite of the importance of this topic for researchers and policy-makers, data are scarce for developed and developing countries alike. This chapter is intended merely to assemble and summarize the information that is currently available at the United Nations on social, economic and geographical differentials. As in previous chapters, findings are discussed in separate sections for the developing countries of Africa, Latin America and Asia and for the developed countries.

A. Developing countries

Africa

Northern Africa

The quality of information on mortality levels in Africa is the least reliable among the less developed regions. Even for Northern Africa, the information is mainly based on survey data. Of the six countries of Northern Africa, Algeria, Egypt, the Libyan Arab Jamahiriya, Morocco and Tunisia have life expectancies around 50–55 years at birth, whereas for the Sudan, life expectancy is around 45 years. Infant mortality levels vary from 90 to 160 per 1,000 live births, the highest being in Morocco.

Little information exists on differentials in mortality. Results for Algeria, the most studied of the Northern African countries, are presented here. A study[1] of Algerian mortality for the period 1969–1971 indicates that infant mortality is highest for sparsely settled rural areas (152 infant deaths per 1,000 live births) and that the rate decreases with every increase in population density, reaching a low of 100 in the metropolitan zone. Within all but the sparsely settled rural category, infant mortality was lower among households with a literate head. This study also showed that the rural/urban differential is much higher for the second and third year of life than for infancy, possibly indicating higher risks due to infection, poor nutrition after weaning and a more limited access to medical care in rural areas.

A survey[2] of infant mortality in northern Algeria in 1969–1971, classifying families by the occupation of the head of the household, indicates that differences in urban infant mortality rates vary from 93 among professional and technical workers to 112 among artisans and labourers, and 177 among urban farmers. Rural mortality varies from 119 among service and transport workers, and 122 among vendors and office workers to over 150 among other occupational groups. Very noticeable is the high rate of infant mortality among children of all occupational groups. Even families of urban professional and technical workers exhibited infant mortality rates of 93 per 1,000.

Estimates of the mortality of children aged 1–4 years for Northern Algeria indicate similar differentials by occupation of household head.

Sub-Saharan Africa

Estimates of mortality in early childhood based on retrospective data show that in the early 1970s the probability of dying in the first two years of life varies from 115 per 1,000 live births in the United Republic of Tanzania to 316 in Sierra Leone and 347 in Malawi. However, little reliance should be placed on these figures as they are subject to various types of errors.[3] Available figures also indicate the presence of exceptionally large regional differences in mortality within many countries of sub-Saharan Africa. The figures given in table 75 indicate substantial urban/rural differences, mortality in urban areas being substantially less than that in rural areas. Data on socio-economic variations in mortality during early childhood are available for several sub-Saharan countries. The estimates for the United Republic of Tanzania (table 76) are broadly representative of findings in other countries of Africa. They indicate that children of mothers with from 9 to 13 years of schooling have lower mortality levels than those whose mothers have had little or no education. Mortality estimates by occupation of head of the household show that the children of those working in agricultural jobs have higher mortality than other groups.

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* Prepared by a consultant, S. A. Meegama, on the basis of substantive research undertaken by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat.

[1] *Levels and Trends of Mortality Since 1950* (United Nations publication, Sales No. E.81.XIII.3).

[2] *Ibid.*

[3] *Ibid.*

TABLE 75. ESTIMATED NUMBER OF CHILDHOOD SURVIVORS DURING THE FIRST TWO YEARS OF LIFE AND ASSOCIATED INFANT MORTALITY RATE AND LIFE EXPECTANCY AT BIRTH, SELECTED COUNTRIES OF AFRICA

Region, country and area type	*Period*	*Estimated survivors at age 2 years (per 1 000 live births)*	*Associated infant mortality rate (per 1 000 live births)*	*Estimated life expectancy at birth (years)*
EASTERN AFRICA				
Kenya				
Nairobi	1962	890	90	54
Provincial average	1962	825	140	45
Nairobi	1969	905	80	57
Provincial average	1969	880	110	50
United Republic of Tanzania				
Large urban/rural range	1973	920/880	60/100	61/52
WESTERN AFRICA				
Ghana				
Urban/rural range	1968–1969	...	100/150	51/41
Urban/rural range	1971	...	95/130	53/45
Ivory Coast				
First agricultural sector	1957–1958	760	180	37
Abidjan	1963	770	180	37
Liberia				
Urban/rural range	1971	...	125/170	46/44
Senegal				
Rural	1962–1968	638	220	29
Dakar	1964–1965	...	75	59
	1968			
Togo				
Lomé	1961	...	115	48
Rural average	1961	720	210	33
Upper Volta				
Rural	1960	...	200	45
Ouagadougou (urban)	1961–1962	...	130	34

Source: *Levels and Trends in Mortality Since 1950*. (United Nations publication, Sales No. E.81.XIII.3).

TABLE 76. CHILD MORTALITY ACCORDING TO CHARACTERISTICS OF PARENTS, UNITED REPUBLIC OF TANZANIA, 1973

Characteristic	*Probability of dying, (x 1 000) before age:*		
	Two years[a]	*Three years*[b]	*Five years*[c]
Mother's education (years)			
0	113	126	151
1–4	106	107	131
5–8	83	59	74
9–13	41	29	28
Occupation of household head			
Professional	80	62	75
Clerical/sales	82	85	118
Other non-agricultural	101	100	135
Agricultural self-employed	114	128	150
Agricultural paid	94	118	169

Source: Howard R. Hogan and Shiraz Jiwani, "Differential mortality", *The Demography of Tanzania: An Analysis of the 1973 National Demographic Survey of Tanzania*, Roushdi A. Henin, Douglas Ewbank and Howard Hogan, eds., vol. 6 of *1973 National Demographic Survey of Tanzania* (Dar es Salaam, Bureau of Statistics and University of Dar es Salaam, 1977), pp. 212–213.

[a] Based on reports of women aged 20–24.
[b] Based on reports of women aged 25–29.
[c] Based on reports of women aged 30–34.

Surveys[4] made in 1973 in the city of Ibadan and the Western and Lagos states of Nigeria confirm the strong differentials in child mortality by the mother's educational levels but they also show that the father's occupation has a significant impact on mortality.

Examination of data from this same survey indicate that residence also has an impact on child mortality, even when controlled for the mother's educational level. Children of mothers with primary-school education have a child mortality rate of 37 in the cities of Ibadan and Lagos, compared with 51 in the villages, while the corresponding figures for mothers with secondary or higher education is 25 and 46. Mortality in the two cities among children of mothers who are not educated is higher than or similar to that in the village. The differentials would seem to indicate either a lack of medical services or the presence of some other factor affecting mortality in the rural setting, which has an effect even among children born to mothers who have secondary or higher education. However, differences in mortality according to the mother's educational level were the largest revealed in the survey and were not substantially diminished by controlling for such factors as type of marriage, father's occupation, father's education, family planning practice and urban/rural residence. Dynamics in family relationships that result in greater power for the wife and thus the

[4] J. C. Caldwell, "Education as a factor in mortality decline: an examination of Nigerian data", *Proceedings of the Meeting on Socioeconomic Determinants and Consequences of Mortality*, El Colegio de Mexico, Mexico City, 19–25 June 1979, published jointly by the United Nations and the World Health Organization (New York and Geneva, 1979), pp. 172–192.

ability to challenge traditional practices of child care, as well as increasing child-centredness by educated mothers, have been suggested[5] as reasons for the strong relation between maternal education and child mortality.

A report[6] reviewing studies of the relation between mother's level of education and infant and child mortality has provided the following summary of educational differences in early childhood mortality in Africa:

		Proportion of children ever born dying by age 2 years, according to mother's level of education		
Country	*Year*	*No education*	*Primary education*	*Upper primary and above*
Ethiopia	[a]	0.179	0.137	0.012
Gambia	1973	0.275	0.194	0.118
Ghana	1971	0.106	0.148	0.102
Sierra Leone	[a]	0.217	0.137	0.103
Zambia	[a]	0.174	0.164	0.093

[a] No date available.

Except for the data on Ghana, significant differentials in early childhood mortality by mother's level of education are indicated.

Asia

National mortality levels in Asia vary widely with Hong Kong in East Asia having the highest expectation of life, 73 years, and Israel, Kuwait and Singapore all having life expectancies over 65. Figures for China also indicate a substantial mortality decline. At the other extreme, such countries as Afghanistan, Bangladesh, India, Indonesia and Nepal all have a life expectancy under 50 years. These differences in the main reflect a great disparity in mortality during infancy and in early childhood. Infant mortality varies from 12.0 per 1,000 in Hong Kong and Singapore, to an estimated level of over 200 in Afghanistan. Child mortality also varies, from 1 to 1.5 per 1,000 in Hong Kong and Singapore to between 4 and 6 in Malaysia and Sri Lanka, and above 25 in Afghanistan, Bangladesh and India.[7]

Data for several countries indicate the presence of urban/rural or regional differences. In India, data from the sample registration system[8] indicate that around 1970 the average level of infant mortality in the rural areas in the sample was about 50 per cent higher than in urban areas. However, the urban rate in some states was higher than that in rural areas in other states. The recorded urban rates range from 11 to 134 per 1,000 births and the rural rates ranged from 27 to 173. No studies are available that explain the urban/rural differentials within a state. However, one factor, among many others, could well be urban/rural differentials in the availability of health services. For example, for India as a whole, there was one physician per 1,400 people in urban areas, while the corresponding figure for rural areas was one per 12,000. Estimates[9] available for Iran, Iraq and the Syrian Arab Republic indicate similar urban/rural differentials in infant mortality. On the other hand, there do not appear to be marked differentials between urban/rural infant and child mortality in Sri Lanka, although urban post-neonatal mortality appears to be slightly higher than rural. The mortality rates of infants and children living on estates in Sri Lanka are much higher than in either urban and rural areas. One study indicates that maternal and child welfare services are much weaker in the estates than in the rest of the country.[10]

The urban/rural differential noted for many of these countries could be due to the class structure of the different populations or to environmental factors, or could reflect varying access to medical facilities. The data available do not permit the complete disentangling of the effects of the various factors but an example of the pattern of interaction found through such an analysis is seen in the urban/rural estimates of mortality according to mother's education and father's economic status, made in Indonesia in the late 1960s. The figures are based on a survey[11] of estimates of mortality relating to children under age 5 years during the period 1965–1967. With two exceptions, the highest childhood mortality occurred in the lowest educational and economic categories, while the lowest mortality was in the highest educational categories. Although, in many instances, the urban/rural differentials in Indonesia by educational level were small, mortality among children of rural mothers in the highest educational category was higher than in the corresponding category in urban areas, indicating the presence of other factors raising mortality levels in rural areas.

Few attempts have been made to analyse differential mortality by factors other than mother's educational level and socio-economic status. An analysis of mortality differentials in Sri Lanka[12] based on data collected in the World Fertility Survey indicates that when controlled for other variables, the mother's level of education was not a significant factor affecting neonatal mortality. Rather, it was shown to be strongly influenced by age of mother, birth order, husband's educational level or occupation and environmental conditions. Neonatal mortality ranged from 23 per 1,000 live births among children whose mothers' age at time of birth of the child was between 20 and 34 years, where the husband had more than a primary education and the house had toilet facilities; while it was 63 among mothers who were aged less than 20 or over 34 years, and where the husband had no education and the house had no lavatory facilities. In the case of post-neonatal mortality, the level of which is strongly influenced by environmental conditions, it was

[5] *Ibid.*

[6] Susan H. Cochrane, "Educational differences in mortality of children", Washington, D.C., World Bank, April 1980 (mimeographed).

[7] *Levels and Trends in Mortality Since 1950.*

[8] *Ibid.*

[9] *Ibid.*

[10] S. A. Meegama, *Socio-Economic Determinants of Infant and Child Mortality in Sri Lanka: An Analysis of Post-War Experience*, World Fertility Survey Scientific Report No. 8 (Voorburg, The Hague, International Statistical Institute, 1980)

[11] Universitas Indonesia, Fakultas Ekonomi, Lembaga Demografi, Indonesian Fertility-Mortality Survey 1973, Preliminary Report (Jakarta, 1974).

[12] S. A. Meegama, *op. cit.*

found that the availability of lavatory facilities had a significant influence on the level of rural post-neonatal mortality in Sri Lanka, while the influence of the husband's level of education, taken as a surrogate for the economic level of the household, was very much less. The analysis also showed that the mother's level of literacy when controlled by other variables, had no influence on post-neonatal mortality in the context of Sri Lanka. The same survey, however, found that the three variables—husband's education, mother's literacy, and availability of lavatory facilities—all had a significant influence on the level of child mortality.

Estimates of differential neonatal and post-neonatal mortality based on World Fertility Survey data[13] are also available for Bangladesh, Indonesia and Jordan; and they indicate differences in neonatal and post-neonatal mortality by the mother's education for the early 1970s, although care should be taken in interpreting these estimates as they are based on small samples:

Country	*Period*	*Neonatal mortality rate*	*Post-neonatal mortality rate*
Bangladesh	1970–1974	76.1	59.0
Indonesia	1970–1974	46.0	43.4
Jordan	1970–1974	29.2	38.2

Latin America

The quality of statistics on differential mortality available for some of the countries of Latin America is somewhat better than that of data available for many countries of Africa and Asia. They demonstrate that there are sharp mortality differentials among countries within Latin America. Life expectancy at birth varies from 69 years for both Argentina and Uruguay to 47 years in Bolivia and 46 years in Haiti. As in most less developed regions, there are great mortality variations within countries; furthermore, mortality in the metropolitan areas of Latin America is generally lower than in the rural areas. Even within Argentina, where mortality is quite low, significant differentials in life expectancy are found between regions, although they are less marked than in the past. During the period 1969–1971, life expectancy at birth at Buenos Aires was 66.2 years, while it was only 59.5 years at Noroeste. Available figures for Brazil, Chile, the Dominican Republic and Peru also indicate the presence of such regional differentials.[14] A characteristic of mortality patterns in these countries is that the contrasts in mortality between regions are most marked during early childhood. The estimates of mortality for Peru, based on retrospective data given in table 77, indicate large differences in infant and child mortality between regions with metropolitan Lima having the lowest level, but these wide differences in life expectancy at birth give way to homogeneity in expectations of life by age 15. In Argentina and Chile, life expectancy at age 15, based on registration statistics, is more uniform among regions than is life expectancy at earlier ages.[15]

[13] Eduardo E. Arriaga, "Direct estimates of infant mortality differentials from birth histories", paper presented at the World Fertility Survey Conference, London, 7–11 July 1980.

[14] *Levels and Trends in Mortality Since 1950.*

[15] *Ibid.*

TABLE 77. ESTIMATES OF SEVERAL MORTALITY PARAMETERS FOR PERU, 1974–1976

Region of country	*Infant mortality rate,* $_1q_0$[a]	*Childhood mortality rate,* $_4q_1$[b]	*Life expectancy at:*	
			Birth	*Age 15*
Costa	58.6	42.2	58.3	50.6
Resto Costa	74.9	17.4	57.1	50.6
Selva	115.5	50.0	53.6	50.8
Sierra	154.9	78.0	48.0	48.2
Metropolitan Lima	41.0	35.2	59.4	50.1

Source: Dirección General de Censos y Encuestas Demográficas, *Encuesta Demográfica Nacional del Peru*, fasc. No. 2 (Lima, 1978).

[a] Probability of dying between birth and age 1 year.

[b] Probability of a child aged 1 year dying before age 5.

Although aggregate metropolitan and urban mortality in Latin America is lower than that in rural areas, there are significant mortality differentials within urban and rural areas. An indication of the differentials in urban and rural mortality by mother's level of education is shown in table 78. Very sharp differentials exist even in such countries as Costa Rica, where inequality in the distribution of some of the factors that affect childhood mortality are believed to be lower than in most other countries of Latin America.[16] In urban Guatemala, the probability of dying before age 2 varies from 25 per 1,000 among children born to women with 10 or more years of education to 163 among women who have had no education.[17] Cuba, on the other hand, has the lowest differentials in early childhood mortality by the mother's level of education.[18] The variation in mortality by education is small, the probability of dying before age 2 being 29 per 1,000 among children with mothers who had seven years of education and 46 among mothers with no education.

The estimates of mortality given in table 78 show that there are great variations in both urban and rural mortality according to the mother's education and that urban/rural differentials for most countries tend to be smaller when controlled by that variable. If health systems were less available and poorer in quality in rural areas, it would have been logical to expect rural mortality levels to be significantly higher than urban levels even when controlled by the mother's education. It would thus seem that for the less well-educated in Latin American communities, environmental sanitation and access to medical services are lower, whether they live in urban or rural areas.

Little information is available concerning the differentials in cause of death among social classes in Latin America. One investigation of post-neonatal mortality in Chile shows that much of the difference between children

[16] Hugo Behm, *La mortalidad en los primeros años de vida en los países de América Latina: Costa Rica, 1968–1969*, CELADE Series A, No. 1024 (San José, Costa Rica, 1976).

[17] Hugo Behm and Ernesto Vargas, *La mortalidad en los primeros años de vida en los países de América Latina: Guatemala, 1968–1969*, CELADE Series A, No. 1037 (San José, Costa Rica, 1978).

[18] Jacques Vallin and Hugo Behm, "Mortality differentials among human groups", paper prepared for the International Union for Scientific Study of Population Seminar on Biological and Social Aspects of Mortality and the Length of Life, Fiuggi Terme, Italy, May 1980.

TABLE 78. PROBABILITIES OF DYING BEFORE AGE 2 (X 1,000), BY RURAL/URBAN RESIDENCE AND LEVEL OF EDUCATION, SELECTED COUNTRIES OF LATIN AMERICA

	Mother's education (years)					
	None	1–3	4–6	7–9	10 or more	12 or more
Bolivia, 1975						
Total	245	209	176	110[a]	...	...
Urban	212	205	166	100[a]	...	...
Rural	255	208	181	144[a]	...	...
Ratio rural/urban	1.20	1.01	1.09	1.44	...	...
Chile, 1970						
Total	131	108	92	66	46	...
Urban	125	104	89	65	47	...
Rural	136	113	105	79	[b]	...
Ratio rural/urban	1.09	1.09	1.18	1.22		
Colombia, 1973						
Total	126	95	63[c]	42[d]	32[e]	31
Urban	122	86	57[c]	42[d]	30[e]	29
Rural	129	104	85[c]	46[d]	65[e]	[b]
Ratio rural/urban	1.06	1.21	1.49	1.10	2.17	
Costa Rica, 1973						
Total	125	93	70	51	33	...
Urban	92	83	58	54	32	...
Rural	123	96	79	40	37	...
Ratio rural/urban	1.34	1.16	1.36	0.74	1.16	...
Dominican Republic, 1975						
Total	163	131	108	83	55	...
Urban	171	135	104	82	49	...
Rural	159	130	112	83	[b]	...
Ratio rural/urban	0.93	0.76	1.08	1.01		
Ecuador, 1974						
Total	176	134	101	61	46	...
Urban	173	125	89	58	44	...
Rural	176	138	113	75	61	...
Ratio rural/urban	1.02	1.10	1.27	1.20	1.39	...
El Salvador, 1971						
Total	158	142	111	58	30	...
Urban[f]	184	136	98	37[a]	...	...
Rural[g]	156	144	118	60	...	...
Ratio rural/urban	0.85	1.06	1.29	1.62	...	...
Guatemala, 1973						
Total	169	125	85	58	26	...
Urban	163	113	77	60	25	...
Rural	170	132	105	39[a]	...	...
Ratio rural/urban	1.04	1.17	1.36	0.65	...	...
Honduras, 1971						
Total	171	129	99	60	35	...
Urban	167	121	84	50	33	...
Rural	171	132	114	85	[b]	...
Ratio rural/urban	1.02	1.09	1.36	1.36		
Nicaragua, 1971						
Total	168	142	115	73	48	...
Urban	185	145	114	69	50	...
Rural	163	138	120	[b]	[b]	...
Ratio rural/urban	0.88	0.95	1.05			
Paraguay, 1972						
Total	104	80	61	45	77	...
Urban	106	89	58	45	24	...
Rural	103	78	62	41	[b]	...
Ratio rural/urban	0.97	0.88	1.07	0.95		
Peru, 1972						
Total	...	207[h]	36[i]	102[j]	77[k]	70[l]
Urban	...	176[h]	127[i]	99[j]	76[k]	69[l]
Rural	...	223[h]	156[i]	120[j]	97[k]	101[l]
Ratio rural/urban	...	1.27	1.23	1.21	1.28	1.46
Cuba[m]	46	45	34	29	...	...

TABLE 78 (*continued*)

Sources: The following reports entitled *La mortalidad en los primeros años de vida en países de la América Latina* (all the reports are in CELADE Series A): Hugo Behm, Kenneth Hill and Augusto Soliz, *Bolivia, 1971–1972*, No. 1025 (San José, 1977); Hugo Behm and Mónica Correa, *Chile, 1965–1966*, No. 1030 (Santiago, 1977); Hugo Behm and José Olinto Rueda, *Colombia, 1968–1969*, No. 1032 (San José, 1977); Hugo Behm, *Costa Rica, 1968–1969*, No. 1024 (San José, 1976); Hugo Behm and Francisco De Moya, *República Dominicana, 1970–1971*, No. 1028 (San José, 1977); Hugo Behm and Luis Rosero, *Ecuador, 1969–1970*, No. 1031 (San José, 1977); Hugo Behm and Ana E. Escalante, *El Salvador, 1966–1967*, No. 1026 (San José, 1977); Hugo Behm and Ernesto Vargas, *Guatemala, 1968–1969*, No. 1037 (San José, 1978); Hugo Behm and Domingo A. Primante, *Honduras, 1969–1970*, No. 1038 (San José, 1978); Hugo Behm and Domingo A. Primante, *Nicaragua, 1966–1967*, No. 1036 (San José, 1977); Hugo Behm and Fulvia Brizuela, *Paraguay, 1967–1968*, No. 1027 (San José, 1977); and Hugo Behm and Alfredo Ledesma, *Peru, 1967–1968*, No. 1029 (San José, 1977). For Cuba, Jacques Vallin and Hugo Behm, "Mortality differentials among human groups", paper prepared for the International Union for the Scientific Study of Population Seminar on Biological and Social Aspects of Mortality and the Length of Life, Fiuggi Terme, Italy, May 1980.

[a] Seven or more years of instruction.
[b] Not calculated because the women in the group had fewer than 100 children.
[c] From four to five years of instruction.
[d] From six to eight years of instruction.
[e] From 9 to 11 years of instruction.
[f] Urban El Salvador.
[g] Remainder of El Salvador.
[h] Less than three years of instruction.
[i] Did not complete primary schooling.
[j] Primary level completed.
[k] Secondary education not completed.
[l] Secondary or higher education completed.
[m] Provisional.

of blue-collar workers and white-collar workers is due to diarrhoeal and respiratory diseases or due to conditions induced by malnutrition (see table 82 in chap. XII).

B. DEVELOPED COUNTRIES

It has generally been assumed that mortality differentials by social class in the developed countries would gradually lessen as available health technology and health care systems, as well as compulsory health insurance schemes, were expanded to cover larger segments of the population. The improvements in sanitation, the availability of protected water-supplies, the general improvement in the clothing of the mass of the people, and the reduction in malnutrition—key factors to which large-scale reductions in mortality have conventionally been ascribed—were all expected to contribute to a lessening of mortality differentials by social class.

The results of these efforts can be judged by examining the course of mortality levels in the developed countries during the past few decades. Unfortunately, long-term statistics on mortality differentials are available only for England and Wales, where death rates by occupation have been calculated since 1921.

Early-age mortality

Table 79 shows the trend in infant mortality for the period 1921–1971, by occupation. Mortality declined sharply among all groups between 1921 and 1971, but there was no narrowing of the gap between social groups. In 1971, infant mortality among unskilled households was, as it had been in 1921, approximately 2.5 times greater than that among professional households. Similar results appear for France and the United States of America. A study[19] by the Institut national de la statistique et des études économiques (INSEE), conducted in France for the period 1950–1970, shows that the gap between the extreme ends of the occupational hierarchy are approximately of the same order as in England and Wales. Infant mortality among professional and senior managerial staff in the period 1966–1970 was 12.2 per 1,000 births, while unskilled workers had an

[19] Solange Héméry and Marie-Claude Gérard, "La mortalité infantile en France selon le milieu social", *International Population Conference, Liège, 1973* (Liège, International Union for the Scientific Study of Population, 1973), vol. III, pp. 171–184.

TABLE 79. INFANT MORTALITY RATES, BY "SOCIAL CLASS", ENGLAND AND WALES, SELECTED YEARS, 1921–1971

	"Social class"							*Mortality rate index for unskilled where the rate for professional equals 1.00*
			Skilled					
Period	*Professional*	*Managerial and lower professional*	*Skilled non-manual*	*Skilled manual*	*Partially skilled*	*Unskilled*	*Total*	
1921.....	38.4	55.5	76.8		89.4	97.0	79.1	2.53
1930–1932.....	32.7	45.0	57.6		66.8	77.1	61.6	2.36
1949–1953.....	18.7	21.6	28.6		33.8	40.8	29.5	2.18
1970–1971.....	11.6	13.6	14.5	16.9	19.5	30.7	17.6	2.65

Sources: For 1921—1949–1953, United Kingdom, Office of Population Censuses and Surveys, *Occupational Mortality: the Registrar General's Decennial Supplement for England and Wales, 1951*, Part II, vol. I, *Commentary* (London, HM Stationery Office, 1958); for 1970–1971, Office of Population Censuses and Surveys, *Occupational Mortality: the Registrar General's Decennial Supplement for England and Wales, 1970–1972*, Series DS, No. 1 (London, HM Stationery Office, 1978).

infant mortality rate of 30.4. Available figures[20] on infant mortality differentials in the United States show a ratio of 2.2 for the period 1964–1966 between the highest and lowest groups as classified by income and the mother's education: the mortality rate was 37.3 where the household income was below $3,000 and the mother had less than nine years of schooling, while the rate was 16.7 where the household income was above $5,000 and the mother had at least 13 years of education.

A survey[21] of social and biological effects on perinatal mortality in England and Wales, Australia and New Zealand, sponsored by the World Health Organization (WHO), also shows a clear social class gradient by father's occupation.

The INSEE study in France, which is based on a linkage of birth certificates and death certificates for a sample of births commencing in 1950, also permits an analysis of mortality by age of infant according to social class. The ratio of neonatal mortality among unskilled workers to that of professionals remained stable at around 2 during the period 1956–1970, while the ratio of post-neonatal mortality between the two occupational groups appears to have shown a significant downward shift. Considering that post-neonatal mortality is almost entirely due to preventable causes, both the decline in post-neonatal mortality and the narrowing of the gap between the two groups indicate a greater equality between classes of those social factors which affect health and mortality. This reduction in the ratio of post-neonatal mortality between classes is also seen in the figures for Scotland[22] for the period 1939–1976. Although for neonatal mortality the ratio between the unskilled and professionals has remained from 1.5 to 2, the ratio for post-neonatal mortality has declined from 6 to 3.5 in the period 1939–1976.

The effect of social factors on post-neonatal mortality in the United States is seen in a study[23] of hunger and malnutrition in that country. Comparing post-neonatal mortality of counties with the highest and lowest percentage of poor families, it found that in almost every state the post-neonatal rate in the poorest county dramatically exceeds the post-neonatal rate for the most affluent county.[24]

Significant geographical differentials were also found in the United Kingdom. In a survey[25] of Great Britain conducted in 1958, the investigators found that perinatal mortality was highest in the north and north-west of England, Wales and Scotland. These areas were characterized by dependence on heavy industry and mining, a high proportion of people living in substandard housing, poor nutrition and a high proportion of poor families. The perinatal mortality rate was lowest for the southern zone dominated by London and for the south-east. This was the most prosperous part of Great Britain, with the best-nourished people and the smallest proportion of poor families. It might be added that these differentials between the regions prevailed also for infant mortality and for mortality among adult males.[26]

There is little information on socio-economic differentials in child mortality for age groups 1–4, 5–9 and 10–14 in the developed countries except for the information in the decennial supplement on England and Wales, based on the 1971 census.[27] It indicates that among males mortality in the professional social class is approximately half that in the unskilled class, although the differential is a little less for females.

Adult mortality

Statistics on adult mortality available for every developed country indicate that adult males in non-manual occupations experience lower mortality than those in manual occupations.[28] The differential is highest among the younger age groups and with increasing age there is a steady narrowing of the gap.

The data on adult mortality by "social class" available for England and Wales for the period 1921–1971 indicate the presence of differentials at each census by social class, although the magnitude of the difference is less than that for infants and children. However, due to changes in classification and the composition of social groups, it is not possible to state with certainty whether these differentials decreased or increased over the period.[29] In France, a longitudinal survey based on a sample of French adult males aged 30–69 in 1954 has been carried out by INSEE by linking death certificates to census returns.[30] Mortality differentials by occupational groups for the period 1955–1971, as presented in table 80, indicate no reduction in such differentials over time and a surprisingly high differential for age group 40–55, where the mortality of unskilled workers is approximately three times that of professional groups. In England and Wales in 1970–1972, there was a gap of over five years in life expectancy at age 15 between own-account farmers (58.6) and labourers (53.3).

In the United States, social-class differentials are reflected in the statistics on mortality rates by colour. In

[20] United States of America, National Center for Health Statistics, *Infant Mortality Rates: Socio-economic Factors*, Vital and Health Statistics, series 22, No. 14 (Rockville, Maryland, 1972).

[21] *Report on an International Comparative Study sponsored by the World Health Organization: Social and Biological Effects on Perinatal Mortality* (Budapest, 1978), vol. 1, chap. 8.

[22] Scotland, Registrar General, *Annual Report, 1976, Part 1—Mortality Statistics* (Edinburgh, HM Stationery Office, 1977).

[23] *Hunger, U.S.A.: A Report by the Citizen's Board of Inquiry into Hunger and Malnutrition in the United States* (Boston, Beacon Press by arrangement with New Community Press, 1968).

[24] *Ibid.*, p. 34.

[25] Dugald Baird, "Perinatal mortality", *Lancet*, vol. I for 1969, No. 7593 (8 March 1979), pp. 511–515.

[26] A. J. Fox, "Prospects for measuring changes in differential mortality", *Proceedings of the Meeting on Socioeconomic Determinants and Consequences of Mortality*, El Colegio de Mexico, Mexico City, 19–25 June 1979, published jointly by the United Nations and the World Health Organization (New York and Geneva, 1979), p. 550, table 18.

[27] United Kingdom, Office of Population Censuses and Surveys, *Occupational Mortality: the Registrar General's Decennial Supplement for England and Wales, 1970–1972*, Series DS, No. 1 (London, HM Stationery Office, 1978).

[28] *Levels and Trends in Mortality Since 1950.*

[29] For comment on problems involved in making such a comparison, see A. J. Fox, *op. cit.*, pp. 9–10.

[30] J. Vallin, "Facteurs socio-économiques de la mortalité dans les pays developpés, *Proceedings of the Meeting on Socioeconomic Determinants and Consequences of Mortality*, p. 281.

1977, the average life expectancy of a white person was 73.8 years, in contrast to 68.8 years for all other persons.[31]

Any attempt to work towards reducing social differentials in mortality has to be based on an understanding of the incidence and impact of various diseases on different social classes. Data on Australia, England and Wales, France, Japan and New Zealand indicate that there is a social-class differential in deaths from malignant neoplasms, with manual workers exposed to higher risks than in other occupations. Suicide and accidents also show strong social-class differentials.[32]

Some aspects of these differentials are seen in the data for France. Statistics on social-class differentials in mortality by disease are available for France in the INSEE study on adult mortality.[33] Table 81, on the mortality of males aged 45–54 years, shows a marked disparity in the mortality of unskilled workers and professionals by cause of death. Although the death rate from cardio-vascular diseases is not very different for the two groups, the probability of death from cancer among unskilled workers is more than twice that among professionals. Perhaps most notable is the inequality in the proportion of deaths due to causes such as alcoholism, accidents and suicide, which have traditionally been ascribed to social causes. The death rate due to alcoholism and cirrhosis of the liver among unskilled workers is more than 10 times that among professionals. It might also be noted that over 40 per cent of the deaths of male unskilled workers aged 45–54 years is due to accidents, suicide, alcoholism and cirrhosis of the liver, while the

[31] United States of America, Department of Health, Education and Welfare, National Center for Health Statistics, *Vital Statistics of the United States, 1977: Life Tables*, vol. II, sec. 5 (Hyattsville, Maryland, 1980), pp. 5–13, table 5.3.

[32] *Levels and Trends in Mortality Since 1950.*

[33] J. Vallin, *op. cit.*

TABLE 80. RECENT TRENDS IN PROBABILITY OF DEATH OF MALES BETWEEN 40 AND 55 YEARS AND BETWEEN 55 AND 70 YEARS, BY "SOCIAL GROUP", FRANCE,[a] 1955–1960—1966–1971

	Probability of death					
	Between 40 and 55 years			*Between 55 and 70 years*		
Social group	*1955–1960*	*1961–1965*	*1966–1971*	*1955–1960*	*1961–1965*	*1966–1971*
Teachers, senior management and professions	6.1	5.6	5.1	24.5	24.0	23.9
Lower management, technicians, Catholic clergy	7.5	7.2	7.2	28.0	29.3	27.1
Farmers, craftsmen and tradesmen, foremen, skilled workers in the public sector and office workers	9.6	9.2	9.3	32.1	32.8	30.5
Skilled workers in the private sector, semi-skilled workers and farm workers	12.2	12.3	11.6	37.2	38.8	38.5
Unskilled workers	16.8	16.2	16.7	43.0	43.1	45.0
France as a whole	11.7	10.9	11.8	35.6	35.4	35.0
Ratio of rate for unskilled workers to the rate for teachers, senior management and professions	2.75	2.89	3.27	1.75	1.80	1.88

Source: J. Vallin, "Facteurs socio-économiques de la mortalité dans les pays developpés, *Proceedings of the Meeting on Socioeconomic Determinants and Consequences of Mortality*, El Colegio de Mexico, Mexico City, 19–25 June 1979, published jointly by the United Nations and the World Health Organization (New York and Geneva, 1979), p. 282, table 8.

[a] French males born in France only.

TABLE 81. ANNUAL PROBABILITY OF DEATH FOR MALES AGED 45–54 YEARS, BY CAUSE OF DEATH, SENIOR MANAGERS AND UNSKILLED WORKERS, FRANCE,[a] 1966–1971
(Deaths per 100,000)

	Cause of death								
Occupational category	*Cardio-vascular diseases*	*Cancer*	*Suicide*	*Transport accidents*	*Other accidents*	*Tuberculosis*	*Alcoholism and cirrhosis of the liver*	*Other causes and undetermined causes*	*Total for all causes*
Unskilled workers (1)	183.6	291.9	93.7	117.1	186.1	36.7	227.2	319.3	1 455.6
Senior management (2) and professions	132.3	127.1	18.7	36.7	33.3	3.9	20.8	106.8	479.6
Ratio (1)/(2)	1.39	2.30	5.01	3.29	5.59	9.41	10.90	2.99	3.03

Source: J. Vallin, "Facteurs socio-économiques de la mortalité dans les pays developpés, *Proceedings of the Meeting on Socioeconomic Determinants and Consequences of Mortality*, El Colegio de Mexico, Mexico City, 19–25 June 1979, published jointly by the United Nations and the World Health Organization (New York and Geneva, 1979), p. 293, table 12.

[a] French males born in France only.

corresponding figure for professionals is only a little over 20 per cent.

Similar factors appear to be responsible for differentials in death among younger and older adults in France. Among younger adults, differentials are primarily due to the classical social causes, such as alcoholism, accidents and suicide, which account for 62 per cent of the excess death rate. Among the older adults, although these factors account for 45 per cent of the excess, cancer accounts for an additional 27 per cent.

Conclusions

The previous pages have highlighted available information on differential mortality within both the less developed and the more developed regions. The purpose of the report was simply to provide a comparative description of these data. However, even fulfilling this limited goal proved to be only partially successful. The reasons were not only the paucity of data but measurement problems, differences in socio-economic and geographical variables used for classifications and variations in definitions and interpretations of the data.

Nevertheless, the available information often points clearly to large differentials in mortality both among and within countries of the less developed and more developed regions. Research studies in developing countries have established differentials in early childhood mortality by educational level of the mother, but little attempt has been made to study and understand how maternal education influences the complex of factors determining the level of infant and child mortality. Differentials in the use of ante-natal and post-natal health services, adoption of hygienic practices, length of breast-feeding, age at weaning and use of trained midwives or hospitals for deliveries of babies may very well explain educational differentials in early childhood mortality. But these factors are not well measured and reasons for possible differential adoption are not well understood. In the developing countries, data on differential mortality among ages above childhood are nearly non-existent, but differentials apparently appear to exist among adults also, although evidence from Peru indicates that they may not be as large as those among children.

Within the more developed regions, many countries provide evidence, as measured by various variables, of social-class differentials in mortality, of large and at times unchanging dimension. However, few countries have tabulated the necessary data by cause of death, limiting the opportunities systematically to investigate and understand the reasons for such differentials.

Chapter XII

HEALTH, POPULATION AND DEVELOPMENT*

The perception of development, as a goal for human communities, gradually widened its focus during the 1970s. The purely economic perception, as typically expressed in terms of gross national product per capita, is increasingly seen as a grossly inadequate measure of human aspirations and achievements. In the first place, information about the national aggregate or per capita product reveals nothing about the distribution of this product among the various groups of the population. Even more fundamental, however, is the increasing recognition that the degree of production and consumption of goods and services is only one aspect of the quality of life and it should not be considered to the exclusion of all other aspects in the debate on what kind of future humankind should be working towards. Such goals include the promotion of human dignity and welfare, and the radical elimination of poverty as the greatest obstacle to national and international progress and peace. Many forces have been at work to bring about this change of perception of the nature of socio-economic development, but one of the most important has undoubtedly been the increasing importance assigned to health.

A. Current situation

Health is not only a desirable goal in itself; it is also increasingly being recognized as a means and, indeed, an indispensable component, if not a prerequisite, of social and economic development. The many vital links between health and development are thus seen as interacting phenomena with far-reaching implications. One such implication is the realization that the provision of health services is only one of many contributions to health development, that the improvement of the health status of populations requires a wide range of mutually supportive policy measures and cannot be restricted to health policy in the more narrow traditional sense. The attainment of health targets is dependent on appropriately defined progress on the economic front, on social policy measures directed towards greater equity, on improvements in the physical and sanitary environment, on the availability of adequate food supply, on implementation of appropriate population policies and also on political and institutional changes enlisting the active co-operation of the public. Hence, there is new emphasis on health development as an integral component of national and international development strategies.

But the situation remains less happy than might have been expected a decade ago. About 800 million people in the developing countries live in conditions of abject deprivation, with incomes too low to ensure basic nutrition and with little access to essential health services. At least 450 million people have less food than is necessary for healthy functioning and survival; even more lead a precarious existence on the brink of hunger. Perhaps less than one third of the people in developing countries have safe water and adequate sewage disposal. Housing conditions and educational opportunities are unsatisfactory in many urban areas. The number of illiterate adults is increasing. About 300 million adults are unemployed. As concerns morbidity, there has been a significant increase or resurgence of certain communicable diseases, schistosomiasis being an example of an increase and malaria of a resurgence. Little progress can be reported with regard to tuberculosis or sexually transmitted diseases, though the conquest of smallpox appears to have been completed during the period under review. Cardio-vascular disease and cancer continue to be the greatest disease problems of the developed countries, with many middle-income countries moving into the same situation. Most of these data are approximations because there is a lack of basic information from a large part of the world, but they do suffice to paint a realistic picture of the enormous problems that have to be overcome if there is to be a breakthrough in efforts to improve the health status of the world population.

At the same time, the cost explosion in health care in a number of developed countries has been partially responsible for a re-examination of the relationships between the growing volume of expensive health care—particularly hospital in-patient care—and improved health indices. There is a growing consensus that additional expenditure on health care, at least in the developed countries, is not bringing about a commensurate improvement in health. Furthermore, a pattern of spending that is heavily biased towards technically sophisticated in-patient care is now seen as inappropriate, even in economically advanced countries. In low-income countries, the issue is still more clear-cut.

In the search for alternative approaches, that of primary health care has emerged as the most important means whereby the health sector can improve the health status of the population and thus make an effective contribution to over-all socio-economic progress. These principles were eventually incorporated in the more comprehensive statement on primary health care to be found in the Declaration of Alma-Ata prepared in September 1978 at the International Conference on

* Prepared by the World Health Organization. This chapter draws heavily on material from the *Sixth Report on the World Health Situation, 1973–1977* (Geneva, 1980).

Primary Health Care.[1] In many ways that Conference represented the culmination of the search initiated in 1973 for an "alternative approach" to the basic health services. It also laid the foundation for initiating a social revolution in community health, with the explicit intent of achieving the goal of all peoples of the world attaining, by the year 2000, a level of health that will permit them to lead a socially and economically productive life.[2] The practical application of these principles of primary health care differs significantly between countries and considerable variations can be observed in the speed with which national primary health care programmes are being implemented. Nevertheless, common principles are pursued, particularly the requirements of active community participation, support to family self-care, intersectoral approaches as part of over-all development plans and the maximum use of local, human and other resources, the use of appropriate technologies, and priority for prevention and health promotion elements, such as education concerning prevailing health problems, nutrition, maternal and child health care, family planning, an adequate supply of water and basic sanitation, and immunization, among others.

In order to be able to monitor the progress towards the global goal of "health for all", considerable emphasis is now being placed on the evaluation of the development process in general and social progress, including health improvements, in particular. Ways of measuring the impact of health action on the improvement of health status are being given increasing priority, along with indicators for health care generated from information for managerial use at all levels of the health care system. An example of such an indicator is the proportion of low birth-weight babies (i.e., those weighing less than 2,500 grams). Because low birth weight is the single most important determinant of the chances for healthy survival and development of the new-born and because the frequency of low birth weight is closely associated with adverse environmental conditions, this indicator reflects one very important linkage between socio-economic conditions and health. However, health-related socio-economic data cover a wide spectrum of information, most of which is collected outside the health sector and often without any co-ordination with the health administration. Their usefulness for the health sector may therefore be limited and many areas of presumed interaction with health remain largely undocumented and unquantified.

B. Population Growth and Change

Among all the interactions between health and development, some of the most important are those where population growth and change are intermediate variables. For example, the age/sex distribution of a population is largely the result of trends in fertility and mortality in the past; both of these trends—and especially the latter—have been strongly influenced by the health status of the population and the changes occurring in this status. Conversely, the current age/sex distribution is a strong determinant of the actual health status and health care needs of the population because the disease spectrum and the consequent needs for care vary so much with sex and age. Hence, the European countries, which have experienced low and decreasing rates of fertility and mortality for several decades, now have increasingly top-heavy population pyramids, with rapidly growing age groups above 65 years and, in particular, above 80 years, most of whom are women. Combined with the almost total disappearance of the infectious diseases once common in childhood and with the increase of the age-specific incidence of some non-communicable diseases, such as cancer and cardio-vascular disease, the changing age/sex distribution has brought about very radical changes in the amount and nature of the demand/need for health care. Similar changes are already beginning to be felt in many developing countries and projections indicate that they will accelerate in the years to come.

The trends in fertility and mortality are the main determinants of population growth, a demographic variable of key importance for economic growth and social development. In a substantial number of developing countries, rapid population growth is seen as a matter of serious concern and programmes to reduce the rate of growth receive high priority. Family planning is one of the important operational elements of such programmes, usually under the responsibility of the health authorities, who in most countries actively promote family planning as a health measure. It is now generally recognized that family planning can favourably influence the health, development and well-being of the family, particularly mothers and children, through: (*a*) avoidance of unwanted pregnancies and the occurrence of wanted births that might otherwise not have taken place; (*b*) a change in the total number of children born to a mother; (*c*) achievement of an optimal interval between pregnancies; and (*d*) changes in the time at which births occur, particularly the first and the last, in relation to the ages of the parents and especially that of the mother. In addition to the positive health effects of family planning, the ability of women to control their own fertility has opened a new set of options for women and is seen as an essential prerequisite of their achievement of full, equitable participation in social and economic development.

In the 1970s, there was a steady improvement in fertility control methods and their application. New types of intra-uterine device, various steroidal preparations, new approaches to female sterilization and easier, safer methods of pregnancy termination are now an important part of maternal and child health and family planning services; and appropriate training programmes are necessary.

In rural areas, new approaches are being tested in order to extend coverage and improve the quality of maternal and child health and family planning programmes. Some of these are large-scale programmes; others are local adaptations. The common aim is to have maternal and child health and family planning care available to virtu-

[1] *Report of the International Conference on Primary Health Care*, Alma-Ata, Union of Soviet Socialist Republics, 6–12 September 1978, jointly sponsored by the World Health Organization and the United Nations Children's Fund (Geneva, World Health Organization, 1978).

[2] *Ibid.*

ally every household. Finding a way to do this will be a major concern of health authorities over the next 10–20 years.

According to a recent world-wide survey, the percentage of sexually active women of reproductive ages practising family planning nearly doubled in some regions during the first half of the 1970s; and it was estimated that, in 1976, 34 per cent of the sexually active couples of reproductive ages throughout the world[3] were using some form of contraceptive method regularly. A comparison of rates of use of contraceptive methods by persons attending health care services in 1971 and 1976 indicates a significant increase over that period. Among couples practising family planning, the percentage of those using oral contraceptives or intra-uterine devices and of persons undergoing sterilization increased. However, there are wide differences within and between countries; for example, an estimated 53 per cent of sexually active women of reproductive ages practised family planning in the Western Pacific region, whereas in Western Africa, the figure was only 3 per cent. A series of fertility surveys in all parts of the world showed a large proportion of women who wanted no more children, yet did not practise contraception. Inadequate contraceptive information and services were seen as among the main reasons for failure to meet the national population growth reduction targets set by some countries with high fertility levels and large populations.

Some of the most important new health programmes are to be found in the area of family health, which is a particularly significant area because it is in the context of the family that the health needs of its members can be met most effectively and in ways that are easily acceptable. A sharp decrease in the early childhood mortality rates, which are currently very high, is considered an essential prerequisite to lowering fertility rates in those areas of the world where this is considered a priority or medium-term goal. About 17 million children under 5 years of age died in 1978. If all the countries of the world had had the same early childhood mortality rates as those of Northern Europe, there would have been only 2 million such deaths. Viewed in the light of global resources and knowledge, this reflects the lack of a world-wide commitment to closing the health gap between countries. Stark inequalities in health are also often found between population groups within a country; as exemplified by the data given in table 82, showing the levels and ratios of post-neonatal mortality among children of white-collar workers and blue-collar workers, respectively, in Chile in 1972–1973. The latter group had, on the aggregate, mortality three times as high as the former.

In the 1970s, changing patterns of social and economic development and the possibility of planning the timing and spacing of children had an important impact on family structures and functioning. The changes influence women's and men's economic and social roles as well as the patterns of childbearing and child-rearing and hence the health of the family. The changes in traditional family

TABLE 82. POST-NEONATAL MORTALITY: CAUSES OF DEATH ACCORDING TO FATHER'S OCCUPATIONAL GROUP, CHILE, 1972–1973

Causes of death	Mortality per 100,000 births among children of: White-collar workers (1)	Blue-collar workers (2)	Ratio (1)/(2)
Reducible mortality	937	3 243	3.5
Infectious aetiology	385	1 233	3.2
Respiratory diseases	462	1 683	3.6
Malnutrition	41	227	5.6
Accidents	49	100	2.0
Non-avoidable mortality	120	124	1.0
Ill-defined causes	136	589	4.3
Other causes	71	128	1.8
TOTAL	1 263	4 083	3.2

Source: Erica Taucher, *Mortalidad infantil en Chile: tendencias, differenciales y causas* (Santiago, Latin American Demographic Centre, 1978).

structures in some areas have left many women without adequate alternative support mechanisms—a situation that has implications for women's health as well as the health of the family as a whole. In this connection, mention should be made of the world-wide trend away from breast-feeding, with its serious consequences for infant health.

In general, the priority health problem of mothers and children and the high levels of mortality and morbidity derive, to a large extent, from the synergistic effects of malnutrition, infection and uncontrolled fertility, which are themselves consequences of poor environmental and socio-economic conditions, including the unavailability of health care. It has become increasingly clear that activities and programmes in all developmental sectors, not only the health sector, are essential to improve health, particularly that of mothers and children. Within the health sector, experience in different countries has shown that activities and programmes in family, maternal and child health are more successful when they are closely linked with other essential tasks, such as education on prevailing health problems, nutrition programmes and communicable-disease control activities, including immunization; and when a multidisciplinary integrated approach, ensuring the effective participation of individuals, families and communities, is adopted.

C. OUTLOOK

The latter part of the 1970s was not altogether favourable for world health, and various studies of prospective economic trends undertaken by the United Nations system draw attention to the economic constraints under which the health sector may have to operate in the next decades. At the same time, it will be necessary for developing countries to profit from the experience of the developed countries so as to avoid certain undesirable aspects of development, such as air, water and soil pollution, and energy problems, with which a number of countries are currently struggling.

Nevertheless, in the coming decades a number of factors will combine to increase health care costs. They

[3] The survey did not include China and the Union of Soviet Socialist Republics.

include growing health consciousness, producing an increased demand for high-quality treatment services, extension of coverage of health care programmes so as to remove all physical and financial barriers to its ready access and utilization, introduction of environmental control measures to eliminate or at least reduce potential health hazards, and progress in biomedical research and health technology.

Numerical projections of changes in health status have up to now largely been limited to projections of mortality. It can be argued that such mortality projections, which are mainly demographic in nature, are only of limited usefulness for health planners, especially in countries with already relatively low mortality levels. Nevertheless, life expectancy at birth, despite its limitations, has often proved extremely useful as a single measure of the level of health of a population, particularly when viewed from the broader perspective of socio-economic development strategy. In developing countries, it may be anticipated, barring unforeseen developments, that by the year 2000 the majority of their populations will have a mean life expectancy at birth of at least 65 years; and the infant mortality will only rarely be in excess of 50 per 1,000 live-born children. Thus, the current gap in life expectancy at birth between developed and developing countries, which is estimated to be of the order of 15–18 years, will be almost halved by the end of this century, provided satisfactory progress is made in those social, economic and politico-institutional areas that influence mortality. It should be borne in mind, however, that today the gap in life expectancy at birth between the group of the least developed of the developing countries and the remainder of the developing countries is of a magnitude of about 10 years. The least developed countries will therefore have to achieve much greater gains if current inequalities are to be drastically reduced.

Chapter XIII

CAUSES AND CONSEQUENCES OF INTERNAL MIGRATION IN DEVELOPING COUNTRIES*

The economic development of today's industrialized countries in most cases involved a continuous transfer of economic activity from agriculture to industry and services and of people from rural to urban areas. As industries expanded, new urban employment opportunities were created, while technological progress in agriculture reduced the demand for labour in rural areas. As a result, rural-urban migration is regarded as having been an unavoidable and indeed a necessary element of past economic development. However, the current shift in population distribution in developing countries is unprecedented in its speed. In the view of many, this massive rural-urban population movement has been the major cause of growing levels of unemployment and underemployment in the cities. Since urbanization has been proceeding much faster than industrialization, it is widely argued that the flow of migrants to the city should be slowed.

However, policies to slow migration cannot be formulated in the abstract. Governments considering programmes and implementing policies that influence population redistribution must first examine the causes and consequences of migration. They must also examine why economic development sets in motion a complex of forces that leads to the movement of both capital and labour towards favoured locations and the concentration of social and economic activities in cities, in particular, large cities. This examination should facilitate the formulation of appropriate policies to deal with the causes and consequences of internal migration in socially desirable ways.

A. Basic causes of rural-urban migration[1]

Much has been written on the determinants of migration. The most popular explanation among economists is the expected-income model, which in its simplest form postulates that an individual or family would migrate if the expected income from moving was greater than the sum of the expected income from staying and the costs of moving. The overwhelming conclusion of most migration studies using this approach is that people migrate primarily for economic reasons.[2] The greater the difference in economic opportunities between urban and rural regions, the greater the flow of migrants from rural to urban areas.

However, the difficulties with this approach are twofold: first, it gives little attention to the role of non-economic factors in the mobility decision; and secondly, it abstracts from the structural aspects of the economy. A better understanding of the causes of migration requires an analysis of those macro-economic factors which generate rural-urban differentials within a framework of structural change where a given mode of production is substituted for another as a result of specific economic processes.

In most developing countries, low agricultural incomes and agricultural unemployment and underemployment are major factors pushing migrants towards areas with greater job opportunities. A recent study of several countries in Asia takes note of increasing unemployment and the declining rural income of the rural poor.[3] Population pressure, resulting in a high man/land ratio, has been widely hypothesized to be among the important causes of poverty and rural out-migration. With a given mode of production, there is a certain labour force that can be productively employed in agriculture. Unless the non-agricultural sectors in the rural areas can take up the surplus, these people must move to the cities to be gainfully employed.

But rapid population growth is certainly not the only cause of increasing rural unemployment and poverty. Equally important causes are the low rate of investment in agriculture, fragmentation of land ownership, inequalities in the distribution of land and other productive assets, allocative mechanisms which discriminate in favour of the owners of wealth and a pattern of investment and technical change that is biased against labour.[4]

Most countries in Africa, Latin America and Asia are characterized by highly unequal distributions of land ownership. Although some type of land reform has taken place in many countries, progress towards redistribution has not yet resulted in a sizeable reduction in inequality in land ownership except in a few countries. Unequal distribution of land may encourage large-scale oper-

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* Prepared by the International Labour Organisation.

[1] This section is largely based on A. S. Oberai, "An overview of state policies and internal migration in Asia", Population and Labour Policies Programme Working Paper WEP2-21/WP 88, Geneva, International Labour Office, May 1980.

[2] For a review of studies using this approach, see Michael P. Todaro, *Internal Migration and Economic Development* (Geneva, International Labour Office, 1976).

[3] Azizur Rahman Khan and others, *Poverty and Landlessness in Rural Asia*, A World Employment Programme Study (Geneva, International Labour Office, 1977).

[4] See, for example, Guy Standing and Fred Sukedo, "Labour migration and development in Guyana", *International Labour Review*, vol. 116, No. 3 (November-December 1977), pp. 303-313; and Keith Griffin, *Land Concentration and Rural Poverty* (London, Macmillan, 1976).

ational farming with adverse consequences for manpower absorption and the distribution of rural income.

The structure of the capital and labour markets in many countries is also such that an unequal distribution of income arising from an unequal distribution of productive assets is reinforced by the operations of the price mechanism. Those who have access to the organized capital market are able to obtain financial capital for investment on relatively favourable terms. This ability introduces a strong bias in favour of investment in the capital-intensive methods of production and commercialization in agriculture. Technical assistance is concentrated on the large farmers and research programmes are often oriented towards their needs. Even the labour market operates to the advantage of the rich, monopolistic elements, being often associated with a high degree of concentration of land ownership.

As a result, large land-owners get richer, while small-scale farmers who cannot afford to adopt the new technology are left behind. Because of the increased productivity of large farmers, agricultural prices fall and the incomes of small farmers drop. Many small farmers are then forced to sell their land to the large land-owners and to compete with wage labour for work.

Thus, an unequal pattern of land ownership has resulted in increased landlessness and near-landlessness. As the pool of landless and near-landless enlarges, new forms of serfdom may emerge based on debt.[5] The increasing commercialization also affects the landless through changes in the modes of wage payment and, in particular, the increase of monetary rather than share payments. This change speeds the breakdown of traditional village social and economic relationships and many of the landless decide to migrate to the more prosperous rural areas, while others abandon the countryside and move to the city in search of non-agricultural jobs which are viewed as offering higher pay, more benefits and greater opportunities for occupational mobility. They have little incentive to continue working in agriculture where employment conditions are far from satisfactory and the majority are casual workers not having any permanency of status.

While the forces listed above have led to rural-rural or rural-urban migration among the very poor, the promotion of schools in rural areas has done much to stimulate out-migration by rural youth, who have received primary or secondary education. Some of them migrate to improve their education and skills, while others become dissatisfied with the prospect of rural life.

A few studies tend to support the hypothesis that migrants are attracted to cities in search of better entertainment or "bright city lights".[6] Educational opportunities, medical services, cultural and entertainment activities and many other facilities are not present in the villages or are available on a very modest scale. A number of other factors, such as the presence of friends and relatives in urban areas who often provide initial help and financial security and the desire of migrants to break away from the traditional constraints of inhibiting rural social structures, have also been cited as likely determinants of migration.

National policies also exercise a powerful influence on redistributing population among different regions and between rural and urban areas. Among them are industrial location and foreign trade policies, credit allocation, public investment and subsidy or pricing policies giving preferential treatment to economic activities that are concentrated in a few cities and regions. The implicit anti-agricultural bias in most import-substitution policies tends to encourage concentration of industries in large metropolitan areas. Of major significance, however, is the place accorded to rural development and the farm sector in the national growth strategy. In many developing countries, if the agricultural sector is supported at all, it is often with the objective of getting maximum growth in agricultural output with a given amount of capital investment. Such a strategy generally favours medium-sized or large land-holding farmers. Moreover, investment in agriculture may lead to increasing inequalities and reinforce the political and economic dominance of those farmers who can adopt practices that reduce the employment generating potential of agricultural growth.

Until recently, Governments have also placed the majority of public and social service investment in urban areas, particularly major urban areas.[7] Similar investments have been neglected in the rural areas. At times, Governments have also engaged in deficit spending in order to provide jobs for the urban unemployed, which has had an inflationary impact on prices and wages in the urban areas. The minimum urban wage for unskilled labour has tended to rise much faster than the minimum or current agricultural wage, in part because the urban wage earners have often succeeded in pressuring firms or the Government into raising their wages. As a result, the income differential between urban and rural unskilled workers has been increasing and has encouraged further migration.

Many developing countries also provide their young people with an education that reinforces urban cultural values so that the rural youths, after having gone through the educational system, refuse to stay in rural areas.

B. Consequences of internal migration

To analyse the economic and social effects of migration, it is necessary to separate the over-all effects on rural and urban areas from the micro-level effects at the individual household level and to distinguish between different effects on different groups or classes in the rural and urban areas.

[5] For details, see Peter Peek and Guy Standing, "Rural-urban migration and government policies in low-income countries", *International Labour Review*, vol. 118, No. 6 (November–December 1979), pp. 747–762.

[6] Sally Evans Findley, *Planning for Internal Migration: A Review of the Issues and Policies in Developing Countries*, International Statistical Programs Center Research Document No. 4 (Washington, D.C., United States Department of Commerce, Bureau of the Census, 1977).

[7] See, for example, Pamela Briggs, "Some economic interpretations of case studies of urban migration in developing countries", World Bank, Urban and Regional Economics Division, Staff Working Paper No. 151, Washington, D.C., March 1973.

Consequences for migrants themselves

Until a few years ago, much of the literature on the consequences of migration for individual migrants was characterized by a pessimistic view about the opportunities available to urban migrants in their places of destination. Their difficulties in adjusting to an urban environment and culture, their economic disadvantages compared with the native population, their inability to move upward in the cities, and their frustration were a constant theme. But many empirical studies in recent years have shown that the pessimistic view was highly exaggerated.

Studies in Brazil, Chile, Colombia, India, Indonesia, Mexico, Nigeria, the Sudan and the other countries show that migrants on the whole appear to have increased their private (and/or household) welfare as a result of migration in spite of high and rising levels of urban unemployment.[8] These studies also show that, by and large, migrants experience upward occupational mobility or improvement in job status, often reaching and in some cases even surpassing the levels attained by residents of the place of destination. A number of studies by the International Labour Organisation (ILO) on the integration of migrants have produced mixed results; in Brazil and the Sudan, migrants were disadvantaged at the time of arrival in urban areas, but eventually they attained economic status comparable with that of urban residents having the same personal characteristics; however, this did not appear to be the case in and around the Caribbean region.[9]

There is also some evidence that many of the migrants share part of their benefits with rural relatives through cash remittances. A recent survey of the migration literature quotes evidence from several household surveys in different countries suggesting that the migrants do send home remittances regularly.[10] In some cases these remittances raise the average income of out-migrant households by 10–30 per cent.[11]

Thus, if one considers only the migrants themselves in the cities or the members of their family remaining in the rural areas, policies to curb migration may not be appropriate. However, large concentrations of population and economic activities in a few cities entail numerous social costs and lead to a breakdown of services and related urban problems. Similarly, migration to the cities does not leave the rural areas unaffected; the selectivity of the migration process may not only draw away the most dynamic elements of the rural society but could divert national investment resources towards the towns. Thus, even though the individuals may benefit from migration, this does not mean that the community will eventually benefit once the direct and indirect social costs and benefits are taken into account.

Consequences of migration for rural areas[12]

In a dualistic model of development, rural out-migration has two immediate effects. First, a sizeable surplus is generated in the industrial sector which provides the necessary physical and working capital for development. Secondly, a declining labour/land ratio is conducive to changes in rural production techniques. In addition, the transfer of labour into the more productive, urban activity eventually generates a growing demand for rural output and thus alters the rural/urban terms of trade, raising agricultural prices in relation to those of urban goods. The increase in agricultural prices in turn is likely to stimulate agricultural production and raise rural incomes. Remittances from urban areas are also likely to raise rural incomes and not only may increase levels of consumption but may encourage technological change that further raises rural incomes. This result, however, depends upon the size and frequency of remittances and the use to which remittances are put.

But the net effect on rural incomes will depend upon the ability of the rural community to adapt and change traditional divisions of labour and upon the type of technological change that follows rural out-migration. The increased demand for agricultural production together with the reduced supply of labour may push up the agriculture wage rate. The rising cost of agricultural labour will provide a stimulus for the large farmers to adopt labour-saving technology. Migration may thus foster as well as reflect greater inequality in the distribution of land, through the demise of small family farms and the increased ability of large farmers to save and shift towards relatively higher land/labour and capital/labour ratios. If so, total output may even fall, because the output per acre tends to be greater on small farms, as many studies have shown, even though the productivity of labour and machinery tends to be higher on the larger farms.[13]

Rural out-migration will also influence the distribution of income in rural areas. A priori, it is difficult to state unequivocally whether migration tends to equalize the household income distribution in rural areas since it will depend upon the period over which an assessment is made and upon whether both indirect and direct effects are considered. Above all, it will depend upon the type of

[8] See, for example, S. E. Findley, *op. cit.*, p. 24; and Lorence Y. L. Yap "Internal migration in less developed countries: a survey of the literature", Urban Poverty Task Force Paper, Washington, D.C., World Bank, 1975.

[9] See A. S. Oberai, "Migration, unemployment and the urban labour market: a case study of the Sudan", *International Labour Review*, vol. 115, No. 2 (March–April 1977) pp. 211–223; and Peter Peek and P. Antolinez: "Rural-urban migration and the urban labour market: the case of San Salvador", *World Development*, vol. 5 (April 1977).

[10] Oded Stark, "Rural-to-urban migration and some economic issues: a review utilizing findings of surveys and empirical studies covering the 1965–1976 period", World Employment Programme Working Paper WEP/2–21/WP38, Geneva, International Labour Office, 1976.

[11] See, for example, A. S. Oberai and H. K. Manmohan Singh: "Migration, remittances and rural development: findings of a case study in the Indian Punjab", *International Labour Review*, vol. 119, No. 2 (March–April 1980).

[12] For effects of migration on rural areas, see A. S. Oberai, "Determinants of rural-urban migration and its implications for rural areas with special reference to ILO research", *Conference on Economic and Demographic Change: Issues for the 1980s, Helsinki, 1978; Solicited Papers* (Liège, International Union for the Scientific Study of Population, 1978), pp. 2.1–2.14; see also Jacques Gaude and Peter Peek, "The economic effects of rural-urban migration", *International Labour Review*, vol. 114, No. 3 (November–December 1976), pp. 329–338.

[13] A. R. Khan and others, *op. cit.*

household that predominates in the migration flows. If remittances go to relatively prosperous farmers, who can, as a result, introduce technological innovations leading to higher output and incomes, migration will tend to increase inequality in income and land ownership and may induce further migration. If however, it is the very poor who migrate as whole families, then the beneficial effect on rural wages may reduce rural income disparities.

Effects of migration on rural areas

Micro-economic studies have focussed on the amount and use of remittances which migrants send home and on the effect of migration on the rural production process. Some authors have also drawn inferences from micro-economic data about the distribution of income.

Evidence concerning the scale of urban-rural remittances in relation to rural income is conflicting. Some empirical studies suggest that they are sizeable, while others find that migrants send hardly any remittances at all.[14]

The evidence on the use of migrants' remittances is much more limited. A recent study in the Indian Punjab found that a significant proportion of households receiving remittances had used them for productive investment.[15] This finding was particularly true for cultivating households, which had investment opportunities in the rural areas. Another study of a village in Uttar Pradesh in India found that remittances had facilitated a shift to crops entailing higher risk and demanding greater investment.[16] A study of small farmers in Kenya and Uganda[17] concluded that urban-rural remittances constituted a significant source of working capital. On the other hand, a study of peasants in Asia showed that remittances did not have a significant impact on the switch from traditional rice to cash crops.[18] Other authors[19] doubt whether remittances are used productively, though without providing much empirical evidence.

On the basis of data from household surveys, several authors have drawn inferences about the effect of rural-urban migration on income distribution. Some[20] conclude that not only do rural/urban income disparities increase but the income distribution within the rural areas becomes more concentrated. Others,[21] using a micro-economic framework, argue that rural-urban migration will lead to greater equality in income distribution both within and between rural and urban areas.

The net effect of the departure of labourers on the rural production process is also unclear. It has been suggested that it is largely the young, able and ambitious who are motivated to leave the rural areas, which are thus deprived of their most dynamic people, those most likely to adopt technical innovations, for example. Indeed, the evidence from most migration surveys does seem to indicate that the typical migrant is in his twenties. However, no evidence exists that technological innovations are therefore less likely to be introduced. Similarly, whether migration leads to an increase in the labour supply of remaining family members or to the adoption of labour-saving technology remains a matter for speculation in the absence of empirical and analytical studies.

Lastly, the limited empirical evidence available on internal terms of trade does not support the theoretical contention that rural-urban migration will increase the demand for rural output in relation to the demand for industrial output.[22] Several authors characterize the observed migration as a shift from rural to urban underemployment. The low productivity of these migrants in the urban informal sector means they do not represent a growing demand for rural production. Further, the urban informal activity is unlikely to generate significant forward and backward linkages of benefit to rural production. Several others have drawn similar conclusions that the nature of the rural-urban population transfer in recent years is not suited to generate an urban industrial-led development effort.[23]

The evidence concerning the effects of migration at the household level or for the rural community is rather limited, in part because most surveys have been designed to elicit information on its determinants. Moreover, most studies have analysed migration only at the micro-economic level.

Studies that investigated the consequences of migration at the macro-economic level have been carried out in Brazil, Morocco, the Philippines and the Republic of Korea.[24] The Moroccan study concludes that higher rates

[14] Michael Lipton, "Migration from rural areas of poor countries: the impact on rural productivity and income distribution", paper prepared for the International Bank for Reconstruction and Development Research Workshop on Rural-Urban Labor Market Interactions, Washington, D.C., February 1978.

[15] A. S. Oberai and H. K. Manmohan Singh, *loc. cit.*, p. 240.

[16] S. R. Simon, "Changes in income consumption and investment in an eastern Uttar Pradesh village, 1954 to 1964–5, Ithaca, New York, Cornell University, 1966; unpublished doctoral dissertation.

[17] A. R. Waters: "Migration, remittances, and the cash constraint in African smallholder economic development", *Oxford Economic Papers*, November 1973, pp. 435–454.

[18] This study is quoted in O. Stark, *op. cit.*, p. 48.

[19] M. Lipton, *op. cit.*, and W. R. Böhning: "Some thoughts on emigration from the Mediterranean basin", *International Labour Review*, vol. 113, No. 2 (March 1975), pp. 251–277. Their presumption that migrants' remittances do not have a positive effect on rural production has been questioned on analytical grounds. See Keith Griffin: "On the emigration of the peasantry", *World Development*, vol. 4 (May 1976), pp. 353–361.

[20] S. R. Simon, *op. cit.*; and M. Lipton, *op. cit.* See also Ram D. Singh: "Labour migration and its impact on employment and income in a small economy", *International Labour Review*, vol. 116, No. 3 (November–December 1977), pp. 331–341.

[21] O. Stark, *op. cit.*; and A. S. Oberai and H. K. M. Singh, *loc. cit.*

[22] Derek Byerlee and Carl H. Eicher, "Rural employment, migration and economic development: theoretical issues and empirical evidence from Africa", *Agricultural Policy in Developing Countries*, Nural Islam, ed. (London, Macmillan, 1974).

[23] See, for example, Henry Rempel and R. A. Lobdell, "The rural impact of rural-urban migration", Geneva, International Labour Office, 1976 (mimeographed).

[24] Two of these reports concern migration specifically. See Michael T. Mertaugh, "The causes and effects of rural-urban migration in Morocco, 1960–70", Ann Arbor, Michigan, University of Michigan, 1976; unpublished doctoral dissertation; and Lorene Y. L. Yap, "Internal migration and economic development in Brazil", *Quarterly Journal of Economics*, vol. 90, No. 1 (February 1976), pp. 119–137. The other two studies are based on large-scale models of the economics of the Philippines and the Republic of Korea; these models were not constructed to study migration only but other factors as well. Both studies are referred to in Irma Adelman and others, "The political economy of egalitarian growth", Geneva, International Labour Office, 1976

of rural-urban migration lead to an increase in total real income; and that, as a result of these higher rates, the share of urban goods produced in the traditional sector increases and the growth rate of agricultural output declines. Unfortunately, owing to a lack of data, this study does not examine the effect of migration on income distribution. The study of migration in Brazil finds that it has been a positive factor in the post-war development. A lower rate of migration would have resulted in a declining growth rate of per capita production. More importantly, the study also shows that increasing the rate of migration equalizes the distribution of income between the urban and rural sectors. According to the author[25], this result derives from the fact that increased migration raises agricultural productivity while also stimulating industrial growth, and that a higher rate of migration increases the agricultural wage faster than the urban wage. At the same time, the urban population expands faster than the rural, so that the per capita income in the urban sector does not rise as rapidly. This conclusion, as the author points out, refers only to wage income, not to profit income. Depending upon the ownership of profits, migration may ultimately produce an increased disparity between rural and urban incomes.

Studies on the Philippines and the Republic of Korea both reach the conclusion that lower rates of rural-urban migration worsen the rural/urban distribution of income, including profits. On the other hand, they show different results with respect to the distribution of income within the rural sector. The study on the Republic of Korea finds that rural incomes are more equally distributed as a result of migration, while that on the Philippines concludes that migration leads to a less egalitarian distribution of rural income, but that the increased rural inequality is outweighed by increased equality in urban areas.[26]

It is clear from the foregoing discussion that no definitive statement can be made on whether rural-urban migration is beneficial or harmful to rural development. Further research is required in this area. Nevertheless, the results of macro-economic studies suggest that the evaluation of the economic and social impact of rural-urban migration must be made in a general equilibrium framework in order to capture the migration effects on the rural sector as well as on the urban sector.[27] In other words, conclusions drawn from studies based on partial cause-and-effect relationships may be misleading, especially where there are feedback effects.

Consequences of migration for urban areas

The economic effects of migration on the receiving cities are even more difficult to unravel. These effects are primarily determined by assessing differences in various economic indicators before and after migration. The measures most often used are changes in the employment levels, occupational structure, income levels, industry mix, savings and capital accumulation levels and government revenue and expenditure levels. However, this method of analysis is not conclusive for separating changes due to over-all population growth from those due solely to migration. Some studies have therefore attempted to resolve this issue by comparing how non-migrants and migrants have fared economically over time.

Many observers have expressed fears that migration is a major cause of rising urban unemployment, fragmentation of the urban labour market into traditional and modern sectors, overcrowded housing and a relative shortage of public amenities. The growing presence of migrants in urban areas, particularly if they are unemployed, has not only economic and social implications but political repercussions in both the areas of origin and destination. Migrants unable to find adequate employment or any employment at all are forced to live in squatter settlements or inner-city slums lacking even the most basic facilities. The pressure on the residential land causes land speculation and excessive rents and generally tends to depress the levels of living in the urban areas.

Such fears may not, however, be justified. A priori, it is not possible to conclude that unemployment will rise, since it will depend upon whether migrants contribute more to the supply of labour or to the demand for labour.[28] In fact, there are several means by which migrants may directly or indirectly raise employment. First, they may lower wage rates in urban areas and this may lead to an expansion of employment. Secondly, the increased supply of unskilled and semi-skilled labour may stimulate more rapid industrialization and industrial investment. Thirdly, their consumption patterns are more likely to be oriented towards goods produced by relatively labour-intensive methods of production. And lastly, they may provide dynamic elements in the urban informal sector, providing entrepreneurship, skills and small-scale working capital. For these reasons, unemployment may not rise as a result of migration.

Several studies have shown that migrants have lower rates of unemployment than natives.[29] But low unemployment rates among migrants may or may not lead to increased unemployment among natives. If jobs taken by migrants are those which natives do not take, native unemployment levels may be unaffected.

Migration into large cities may also have some effect on wage levels as well as on technological change. Under

(mimeographed). A detailed account of each study can be found, respectively, in G. B. Rodgers, M. J. D. Hopkins and R. Wéry, *Population, Employment and Inequality: BACHUE-Philippines* (Farnborough, Saxon House, 1978); and Irma Adelman and Sherman Robinson, *Income Distribution Policies in Developing Countries* (Stanford, California, Stanford University Press, 1976).

[25] L. Y. L. Yap, *loc. cit.*, p. 136.

[26] For further details of the macro-economic analysis, see Jacques Gaude, "Causes and repercussions of rural migration in developing countries: a critical analysis", World Employment Programme Research Working Paper WEP/10-6/WP10, Geneva, International Labour Office, 1976 (restricted document).

[27] A linear programming model, Bicoa, is being developed for the economy of Ecuador as part of the migration and employment research programme at the International Labour Organisation. For details, see P. A. Cornelisse, J. Gaude and P. Antolinez: "The Bicoa model: a socio-economic model of causes and effects of rural-urban migration in the Sierra of Ecuador", World Employment Programme Research Working Paper. WEP10-6/WP21, Geneva, International Labour Office, 1978.

[28] A. S. Oberai, "An overview of state policies and internal migration in Asia".

[29] See S. E. Findley, *op. cit.*

perfect free-market conditions, the excess labour in the urban employment markets should lower wage rates, as workers compete with one another for available positions. However, labour markets do not operate entirely on the basis of demand and supply principles.[30] But to the extent that wages are flexible downward, technical change is more likely to be labour-using for any given cost of capital. However, if capital goods are imported and the exchange rate overvalues local currency, capital goods will be relatively cheap and rural-urban migration may not lead to the introduction of labour-using technical change.[31]

Some studies have postulated economies of scale resulting from the massive entry of migrants into urban areas. First, their numbers may bring a city into a size range that allows more efficient provision of services. Secondly, the migrant addition to the labour force may result in greater specialization and increased labour productivity. This specialization of the labour force, along with improved city services, may result in higher levels of productivity for firms, permitting those operating in larger cities to become more specialized and to adopt larger scale operations.

Most studies agree that there are economies of scale associated with supplying services to concentrated populations. However, differences of opinion arise when researchers attempt to define the optimal city size.[32]

The net economic impact of migration on the urban areas largely depends upon the types of migrants involved and upon their characteristics. Since the youngest and most productive individuals tend to migrate, one may expect that they will benefit their destination areas by increasing the proportion of the labour force in prime working ages. Further, if migrants bring skills that are needed in the areas of destination, these areas will benefit in so far as they are able to utilize skilled manpower educated at the expense of the areas of origin.

Aside from the contribution to urban growth, migration can have other demographic impacts. Because migration is generally selective for younger persons, it would tend to lower the crude death rates. Younger migrants may also increase the share of persons in their early working years, swelling the younger, less experienced portion of the labour force. If migration is not heavily male-selective, young migrant women may also increase the proportion of urban women in the peak childbearing years. Such changes in the age and sex composition of the population can have important implications for urban unemployment rates, crude birth rates and crude death rates.

Several studies have found negative statistical association between urbanization and fertility, which has led many observers to conclude that rural-urban migration has a depressing effect on the national fertility rate. The issue turns on the question whether the fertility of female migrants would have been higher had they remained in a rural area. Research on the topic has usually involved comparing migrants with rural women of similar characteristics; and for the most part, the latter have more children at an equivalent duration of marriage.

For example, a recent study in the Indian Punjab shows that families in urban areas desire as well as have a smaller number of children than those in rural areas.[33] The study further shows that migrants to the urban areas have slightly higher fertility than the natives but lower fertility than those who stay in rural areas. In the rural areas, out-migrants and returned migrants have lower fertility than non-migrants. It has also been observed in the Punjab study that migrants tend to marry at a later age and separation has the effect of lowering their completed family size.

[30] Alan Simmons, Sergio Diaz-Briquets and Aprodicio A. Laquian, *Social Change and Internal Migration: A Review of Research Findings from Africa, Asia and Latin America* (Ottawa, International Development Research Centre, 1977).

[31] See, for example, J. Gaude and P. Peek, *loc. cit.*

[32] S. E. Findley, *op. cit.*

[33] For details and discussion of the mechanisms through which migration influences fertility, see A. S. Oberai and H. K. Manmohan Singh, "Migration, urbanisation and fertility: the case of Indian Punjab", Geneva, International Labour Office, 1980 (mimeographed).

Chapter XIV

DETERMINANTS OF LABOUR FORCE PARTICIPATION*

The size of the labour force is a reflection of the size and age/sex composition of the population, the proportion of various groups who are "economically active" and the statistical ambiguities associated with measuring economic activity. The labour force is some proportion of the "working-age population", which is measured by reference to some age determined by statistical convention. In developed countries, typically those under the age of 14 are excluded, whereas in agrarian developing countries, the age of 10 or under is often selected. Having chosen an age threshold, measuring the labour force requires a conceptualization of the labour force participation rate. This process, in turn, requires identification of employment; and, more problematically, unemployment and various types of non-wage-earning types of economic activities, such as unpaid family or non-family labour force work and self-employment. As there is no national consensus with regard to these definitional ambiguities, any review of patterns and determinants of labour force participation must be tentative.[1] In that context, this chapter reviews patterns of participation and identifies the principal demographic and socio-economic determinants of activity patterns.

A. AGE/SEX PATTERN OF LABOUR FORCE PARTICIPATION

In low-income agrarian economies, most people contribute to subsistence from an early age, even if the regularity and intensity of work are low compared with those experienced by adult workers in economies where wage labour has become the norm and industrialization has progressed extensively. The extent of child labour force participation has been chronically understated by conventional census and survey data, but according to a world-wide estimate by the Bureau of Statistics of the International Labour Organisation (ILO), some 55 million children were employed in 1975; and subsequent analysis suggested that this figure was too low by a considerable margin.[2]

Children tend to work in areas of peasant farming, though they have also been employed extensively on plantations, in "informal" streetside activities, as "sweated" labour in small-scale manufacturing and in a wide-ranging set of tasks from mining to construction work and carpet-making. The determinants of their involvement in economic activity are found in the structure of production; the extent of poverty, which makes child labour essential for families to have a chance of survival; the growth of mass unemployment, and the widespread illiteracy and lack of schooling found in many parts of the world.[3] Although the process is protracted and uneven, economic growth and industrialization, with their associated shift to higher levels of school enrolment and the formalization and standardization of work relationships, lead to a decline in child labour force participation rates. However, it has to be recognized that despite extensive legislation designed to prevent it and widespread international condemnation of various practices associated with it, child labour persists in many guises in many parts of the world and can be expected to continue for many years to come.

Males

Most males over 14 years of age participate in the labour force, the exceptions being those still undergoing some form of schooling, those who have retired, the relatively small proportion who cannot secure work because of physical or mental disadvantages and some unemployed men who become discouraged from seeking employment in any form of economic activity. The final category overlaps with the other three. For example, many elderly workers "retire" earlier than intended because they cannot find employment once they become unemployed, a common feature in industrialized countries, whereas some youths indulge in "informal" studying as a second-choice activity because they cannot secure employment, a phenomenon that is widespread in both developing and developed countries. These caveats aside, the aggregate "crude" labour force participation rate of males tends to decline logistically with economic growth and industrialization, being highest in low-income agrarian countries, with fairly rapid decline at first in the youngest and eldest age groups followed by periods in which there are only slight additional declines. Age-standardized activity rates for men have been fairly similar in industrialized countries, though they have been relatively low in the socialist countries of Eastern Europe due to late labour force entry and reasonably early

* Prepared by the International Labour Organisation.

[1] For review of the Statistical ambiguities, see Guy Standing, *Labour Force Participation and Development* (Geneva, International Labour Office, 1978), pp. 25–54; and Richard B. Anker, *Research on Women's Roles and Demographic Change: Survey Questionnaire for Households, Women, Men and Communities with Background Explanations* (Geneva, International Labour Office, 1980).

[2] International Labour Organisation, *Year Book of Labour Statistics, 1977* (Geneva, 1978); and International Labour Organisation, *Children at Work* (Geneva, 1979).

[3] For analyses of the social, economic and cultural determinants of child labour force participation, see Gerry Rodgers and Guy Standing, ed., *Child Work, Poverty and Underdevelopment* (Geneva, International Labour Office, 1981).

retirement.[4] In general, however, the pattern has been for most men to spend their adult years in the labour force; a pattern much less common for women.

Females

Any generalization about the patterns or trends of female labour force participation is likely to be misleading. But very briefly, in low-income countries, there seems to have been a fourfold pattern. In some countries, women's labour force participation is low in both rural and urban areas; this has been the case in most Arab Muslim countries. In others, the recorded participation rates have been relatively low in rural areas and much higher in urban areas; this pattern has been quite common in Latin America.[5] In a third group of countries, rural activity rates have been very high, whereas urban rates of participation have been much lower; this pattern has been fairly common in sub-Saharan Africa and India. Lastly, there have been countries where recorded female labour participation activity has been high in both rural and urban areas; this pattern is characteristic of a number of countries in Eastern South Asia.

With industrialization, some observers have detected a U-shaped pattern, with female labour force participation declining at first and then rising at later stages of industrialization. But given the diversity of patterns in developing countries, such a generalized trend is highly dubious. It is clear that women in the developed countries have been gradually drawn back into the labour force in recent years. Furthermore, in the socialist countries of Eastern Europe, age-standardized female activity rates have been consistently high, higher, on the average, than in the other developed countries or in developing countries, although higher rates have been recorded in a few of the latter groups.

There has been no common age pattern that describes female labour force participation. In some countries, the activity rate reaches a peak in age group 15–19, some in age group 20–24 and some in age group 50–54; and in some countries, such as the United States of America, there have been two peaks, one before the onset of childbearing and another some years later.[6] Over-all female labour force participation has risen dramatically in recent years in a number of developed countries; and the age pattern has become much more like that of males in those countries, primarily because married women have become more regular and committed labour force participants. This trend is expected to continue.

B. Socio-economic determinants of female labour force participation

The extent to which women have participated in the labour force has been influenced by economic, cultural and demographic factors. At the macro level, the structure of the economy; the extent and incidence of poverty, sickness and malnutrition; the prevailing social and production relations, the class structure, the inequality of income and wealth, and the corresponding structure of the labour market have interacted in their impact on patterns of participation and the sexual division of labour. At the micro-behavioural level, the impact of socio-economic factors is transmitted through household and personal characteristics which act as constraints and incentives to economic activity. The most recent economic and sociological research has focused on the latter factors, much of it conducted in terms of the "new home economics". However, forms of individual choice must be seen as secondary to the influence of structural factors.

The industrial/occupational structure has been cited as influencing the sexual division of labour and the level of female labour force participation, but while women have tended to predominate in tertiary activities, and men in manufacturing and agriculture, it remains a fact that women have predominated in many farming systems, notably in large parts of Africa, where their role has been intensified by the rural migration of a large proportion of the male population. The shift to wage labour in agriculture tended to squeeze women out of farming, although they were occasionally required to do seasonal, casual, relatively low-income tasks. Mechanization has also weakened their position.[7] However, technological explanations of female labour force participation would be inadequate, for women have been found to work in all types of industry and all occupations to a widely varying degree. That does not mean that the nature of the job has not been a significant factor, only that crude occupational/industrial explanations are inadequate. One major determinant of women's economic activity is clearly the level of aggregate demand, for in times of depression and rising unemployment there has been a widespread tendency for women to be pushed to the margin of the work force, replaced by men in some jobs and discouraged from attempting to get any employment by the high level of unemployment and the low wages being offered.

An associated factor has been the relative incomes available to men and to women. In many developing countries, wide differentials have developed between "prime age" adult male workers and youths, and between adult men and women. Such differentials have developed for various reasons; but one effect has been to encourage a greater division of labour between age/sex groups, with the result that women have tended to withdraw from the labour force.

The influence of incomes on labour force participation reflects in part the need for purchasing power and in part the incentive to work. In many developing countries, workers have been driven into the labour force by the need for cash to pay taxes or debts, or for subsistence goods formerly produced in the home that are now purchased. But within the higher income families, the

[4] John D. Durand, *The Labour Force in Economic Development: A Comparison of International Census Data, 1946–1966* (Princeton, New Jersey, Princeton University Press, 1975), pp. 50–51.

[5] Latin America comprises the Caribbean, Middle America, Temperate South America and Tropical South America.

[6] On the different age patterns, see G. Standing, *op. cit.*, pp. 16–24; and J. D. Durand, *op. cit.*, pp. 37–44.

[7] Ester Boserup, *Woman's Role in Economic Development* (London, Allen and Unwin; and New York, St. Martin's Press, 1970).

need for the income of members other than the main income-earner is reduced; and in both developed and developing countries, there has been a strong tendency for women whose husbands have relatively high incomes to have a relatively low propensity to participate in the labour force. This tendency has been widely documented in both groups of countries. For example, numerous studies in the United States of America have reported some type of inverse relationship.[8] However, it is notable that as women have become less of a "secondary" labour force and as the incomes of men and women have become more equal, the strength of the inverse relationship has declined. This decline was predicted long before it was apparent in the data, for one study conducted in 1962 suggested that the positive elasticity of women's labour force participation with respect to a change in women's wage rates was about four times as great as the negative effect of an equivalent rise in the husband's income.[9] A related aspect of research in the United States has been the suggestion that proportionate increases in the after-tax market wage opportunities of both the husband and the wife lead the wife to allocate relatively more time to non-labour market activities during the middle years of her life, probably to child-rearing, and to allocate relatively more time to labour force activities before and after that stage.[10]

In developing countries, studies in Chile, Israel, Jamaica, Peru, the Philippines, Puerto Rico, Sri Lanka and the Sudan—among others—have found inverse relationships between men's income and female participation, in spite of data shortcomings.[11] But some studies have failed to find such a relationship, notably one in Kenya, where, controlling for various personal, household and labour market variables, the labour force participation of married women was positively related to a variable measuring family income per equivalent adult, less the woman's contribution.[12] This finding was attributed in part to labour force contacts and to the access to jobs by women from relatively high-income families. Other studies, including one conducted in the Philippines and another in Singapore, have found no statistically significant relationship.[13] So, empirically, the inverse relationship between household income and female labour force participation remains in question.

The impact of women's income is much clearer. If wages improve for women or if income-earning opportunities emerge, their labour force participation will be greatly enhanced. This result has emerged from studies in Chile, Jamaica, Peru, Puerto Rico, Sri Lanka, Thailand and Yugoslavia, among others. And there is little doubt that this factor is a primary determinant of female labour force participation almost everywhere.

It is commonly assumed that increased schooling encourages greater labour force participation and that as, or if, female education levels begin to catch up with those of men, female labour force participation will increase. This result seems likely but the causal process is again not very clear. The question is whether that occurs because discrimination against women in wage employment declines or whether it is merely the result of greater access to jobs requiring education. At the individual level, the relationship between schooling and the probability of labour force participation is also unclear. Schooling may raise the "opportunity cost" of inactivity and thus induce labour force participation, or it may merely increase employment opportunities, or it may influence the labour supply by increasing income aspirations. None of these hypotheses stands up to critical scrutiny when trying to explain a straightforward positive relationship.[14] One factor is that relatively educated women tend to be married to relatively educated men earning relatively high incomes. But more fundamentally, when few women have such levels of schooling, access by such educated women to jobs predominantly occupied by men is restricted by various forms of discriminations. Moreover, women with fairly high levels of schooling who, because of discrimination or some other constraint, would be obliged to accept work below that for which they are qualified or to which they feel entitled are quite likely to withdraw from the labour force.

Empirically, some statistical studies of women's work behaviour have reported a straightforward positive relationship between some index of education and some measure of the probability of labour force participation. These have included studies conducted in Argentina, Chile, Costa Rica, Egypt, Ghana, Jamaica, Kenya, Mexico, Nigeria, Papua New Guinea, the Philippines, Puerto Rico, Singapore, Sri Lanka, the Sudan, Thailand and Venezuela.[15] But in some of these studies, the effect has been non-linear or has only been observed beyond some threshold level of schooling.[16] In many studies, the nature of the variable used to assess the impact of schooling has not allowed for the possibility of identifying a non-linear relationship. This was so in one analysis of

[8] See, for example, William G. Bowen and T. A. Finegan, *The Economics of Labour Force Participation* (Princeton, New Jersey, Princeton University Press, 1969).

[9] Jacob Mincer, "Labour force participation of married women: a study of labour supply, *Aspects of Labor Economics*, H. G. Lewis, ed. (Princeton, New Jersey, National Bureau of Economic Research and Princeton University Press, 1962), pp. 63–105.

[10] T. Paul Schultz, *Estimating Labour Supply Functions of Married Women* (Santa Monica, California, Rand Corporation, 1975), p. 79.

[11] These studies are reviewed in G. Standing, *op. cit.*, pp. 74–88; and G. B. Rodgers, "Female labour force participation in Peru: an analysis using the World Fertility Survey", Population and Employment Working Paper No. 96, Geneva, International Labour Office, 1980.

[12] Richard B. Anker and James C. Knowles, "A micro-analysis of female labour force participation in Africa", *Labour Force Participation in Low-Income Countries*, Guy Standing and Glen Sheehan, eds. (Geneva, International Labour Office, 1978), pp. 137–169.

[13] A. J. Harman, *Fertility and Economic Development of Families in the Philippines* (Santa Monica, California, Rand Corporation, 1970); and Eng Fong Pang, "Labour force growth, utilisation and determinants in Singapore", *Labour Force Participation in Law-Income Countries*, pp. 215–237.

[14] Guy Standing, "Education and female labour force participation", *International Labour Review*, vol. 114, No. 3 (November–December 1976), pp. 281–297.

[15] G. Standing, *Labour Force Participation and Development*, pp. 146–163.

[16] Waldomiro Pecht, "Participation of married women in the urban labour market in selected Latin American countries: Chile, Costa Rica, Ecuador and Venezuela", *Labour Force Participation in Low-Income Countries*, pp. 27–41.

women's economic activity in urban Chile, where women with a secondary-school education had the lowest average rate of labour force participation of all education groups.[17] Other studies have either found no particular association or even an inverse relationship; thus, expectations that with increased education, female labour force participation will be increased should be tempered by caution. It seems likely that schooling will lead many more women to enter the labour force, but this result will depend upon their ability to secure the types of jobs to which they feel entitled and capable of performing. High levels of unemployment and persistent discrimination will greatly reduce that positive effect.

Fertility

It has long been hypothesized that there is a strong interrelationship between fertility and female labour force participation; and in developing countries, great policy significance has been attached to the desirability of raising female labour force participation, in order to reduce fertility and thus population growth. This view has recently been given renewed attention in a study[18] of the socio-economic determinants of fertility based on World Fertility Survey data from 20 countries, which supports the statistical significance of the relationship between a wife's work status since marriage and current fertility. However, the causal relationship between work and fertility remains far from clear. Low recent fertility may increase the likelihood of work, so that the statistically observed relationship between work status since marriage and recent fertility may be largely an effect of fertility on work. Recent research by the United Nations Secretariat on the determinants of current contraceptive use,[19] using World Fertility Survey data, casts doubt on the idea that the association between women's work and fertility is due primarily to deliberate limitation of fertility by working women. A statistically significant relationship between current contraceptive use and current work status (defined in the same three groups as the study cited above) was found in only four countries—Indonesia, Kenya, Malaysia and Peru—out of 17 investigated, after other variables were controlled. Earlier studies had tested numerous variants of this view, with occasional findings that raise questions about the supposed causal relationship, especially bearing in mind that many types of job and work status involve little incompatability between childbearing or child-rearing and labour force participation. Furthermore, women's economic activity means that families are better able to afford the costs of having children.

There are also theoretical difficulties with simple hypotheses suggesting that fertility reduces female labour force participation. Various studies have attempted to determine when fertility is most likely to constrain female labour force participation and to identify factors that influence the strength of the underlying relationship. Not surprisingly, it appears that if women work for "intrinsic reasons", in other words, out of interest in the work rather than primarily out of necessity, the constraining influence tends to be relatively weak. But even this effect is theoretically questionable, in so far as women working out of necessity will have even greater need once they have had children. Three factors seem most likely to have a systematic influence on the relationship between fertility and female labour force participation. First, in societies where the family size norm is large, young women will typically be excluded from most "career" jobs and even from job training; the discrimination arises from the expectation that women will experience a series of pregnancies that will make them into secondary, intermittent labour force participants. Thus, indirectly, the high level of societal fertility would tend to reduce the level of female economic activity, at least in wage employment, by reducing the range of jobs open to women and by reducing their opportunity incomes. Conversely, if the fertility norm is low, job opportunities for women would tend to open up; and then employers and governmental organizations might be more likely to institutionalize the child-caring role during the working day, thus reducing the constraining influence of fertility on women's employment.

Secondly, in rural low-income areas in particular, high levels of fertility imply the existence of a source of child labour which can be substituted for that of women. In those circumstances, effective restriction of child labour would allow greater female labour force participation and encourage lower levels of fertility, primarily by increasing the costs of childbearing. So, in these cases, rising female labour force participation would be correlated with declining fertility.

Thirdly, the child-care constraint on female economic activity will depend, of course, upon the availability and cost of alternative child-care arrangements, which will depend upon the extent to which the extended family or kinship network is operative. For higher income households, it will also depend upon the availability and supply price of domestic servants, which is mainly a function of the female opportunity income in agriculture. Where that income is low, rural emigration of women will be substantial, as has been the case in most of Latin America, as well as in a number of other countries; in these circumstances, the labour force participation of women in high-income households is unlikely to be constrained much by the presence of young children.[20]

These are only some of the main factors that theoretically can be expected to influence the strength of any inverse relationship between fertility and female labour

[17] Nadia Youssef, *Women and Work in Developing Societies* (Berkeley, California, University of California, Institute of International Studies, 1974), p. 58. One difficulty with this finding was the lack of control variables used.

[18] G. Rodriguez and J. G. Cleland, "Socio-economic determinants of marital fertility in twenty countries: a multivariate analysis, paper presented to the World Fertility Survey Conference, London, 7–11 July 1980.

[19] *Variations in the Incidence of Knowledge and Use of Contraception: Comparative Analysis of World Fertilty Survey Results for Twenty Developing Countries* (ST/ESA/SER.R/40).

[20] In addition to the studies cited below, see the descriptive studies in S. Kupinsky, ed., *The Fertility of Working Women* (New York, Praeger Publishers, 1977).

force participation. Given the diversity of institutional factors that impinge on the underlying causal relationships, it is perhaps not surprising that empirical research has continued to yield somewhat conflicting results.

In developed countries, most notably the United States of America, numerous studies have found an inverse correlation between indices of fertility and indices of women's work. This correlation was also found in Canada, Czechoslovakia, England, the Federal Republic of Germany, Hungary and Sweden. Unfortunately, most of these studies have left the causal relation and even the direction of the inverse correlation unclear. A formidable body of econometric evidence, from the United States and other developed countries, has suggested that, controlling for other personal and household factors, the presence of children has depressed female labour force participation. But interestingly, there is some evidence that, in the United Kingdom and the United States at least, the influence of children on female labour force participation has been declining.[21]

In developing countries, the inverse relationship has not been observed nearly so uniformly, in part, it is supposed, because of the higher degree of "role compatability" between fertility and female economic activity in rural, non-wage-based production. Some studies have reported a negative effect of fertility, including analysis of census or survey data from Argentina, Brazil, Chile, Papua New Guinea, the Philippines, Puerto Rico, Singapore, Thailand and Yugoslavia.[22] However, some of these studies showed only a correlation, not a clear unidirectional relationship. Other analyses failed to find any statistical relationship.[23] And others have even suggested a positive relationship, notably in areas dominated by subsistence agricultural activity, where the incompatability between having children and contributing to family production is minimal. In studies of rural areas of Ghana, Kenya and Nigeria, there was indeed some suggestion of a positive relationship, if any.

A negative relationship is apparently much more likely in urban areas and it is significant that in a few countries different effects have been observed in rural and urban areas. With regard to the latter areas, several studies have reported negative relationships—in Costa Rica, Kingston in Jamaica, Khartoum in the Sudan, Turkey and Venezuela—as well as in a few other countries. However, the difficulty of attributing a causal explanation has persisted and researchers have been concerned with identifying the factors that determine the extent to which fertility reduces the probability of different types of female labour force participation. Besides the differential effects of type of job and type of work status and the impact a period of "interruption" of employment would have on lifetime earnings, the effect of schooling on the relationship is worth considering. If schooling is taken as an indicator of access to particular types of work and of the extent of labour force commitment, an increase in education can be regarded as weakening the negative effect of fertility on female labour force participation. Although evidence is sparse, it is perhaps significant that in a study of the determinants of labour force activity of women at Santiago, Chile, the more educated women tended to have a higher participation rate than the less educated women for each level of fertility; and that, in particular, an increase in family size appeared to have a proportionally greater effect on participation the higher the level of schooling. Rather more significantly, a survey of Polish women showed that the proportion of female workers back at work within six months of having a child was highest among the highly skilled.[24] This pattern appears likely to be general whenever any prolonged interruption of employment would have a pronounced negative effect on the women's future as well as current earnings potential.

Migration

The other demographic factor that is closely related to the level and pattern of labour force participation is population mobility. One can distinguish different types of effects involved in that context. First, there is the impact of out-migration, typically by men leaving rural areas for seasonal or for longer periods. That pattern tends to raise the female labour force participation in rural areas, as women have to take over an even larger proportion of rural production. Secondly, there is the impact of women's migration on their own labour force participation; and thirdly, there is the effect on participation rates in the areas of in-migration and out-migration.

Research has only really shed light on the relationship between migrant status and labour force participation, in part because of the methodological difficulties involved in studying the other, macro relationships. Because most adult migration is for "economic reasons", except when in connection with retirement, it is to be expected that migrants have a relatively high propensity to participate in the labour force, both in relation to those who remain in the area of out-migration and in relation to those in the in-migration area. Although not all observers agree, there is evidence that this is indeed the case. In Peru, one analysis found that female migrants to Lima had a noticeably higher participation rate than non-migrants in the city; similar studies found much the same in Chile, Colombia and Puerto Rico.[25] Outside Latin America, the research findings have been less clear. A study of migrants to Bombay found that migrants in each age group had a higher participation rate than non-migrants; but in a

[21] Robert H. Weller, "Wife's employment and cumulative family size in the U.S., 1970 and 1960", *Demography*, vol. 14, No. 1 (February 1977), p. 6; and J. S. Wabe, "Labour force participation in the London metropolitan region", *Journal of the Royal Statistical Society*, series A, vol. 32, part 2 (1969), pp. 245–264.

[22] For a review of these studies, see G. Standing, *Labour Force Participation and Development*, pp. 184–205.

[23] See, for example, Peter Peek, "Family composition of married female employment: the case of Chile", *Labour Force Participation in Low-Income Countries*, pp. 51–74; and A. J. Harman, *op. cit.*

[24] Magdalena Sokołowska, "Some reflections on the different attitudes of men and women towards work", *International Labour Review*, vol. 92, No. 1 (July 1965), pp. 35–50.

[25] See, for instance, Juan C. Elizaga, *Migraciones a las areas metropolitanas de América Latina*, CELADE Series E, No. 6 (Santiago, 1970).

somewhat similar though more tentative Sri Lanka study, migrant status did not appear to have any effect on participation.[26] The result in Sri Lanka may have been due to the lack of control variables in the analysis and the necessary combination of rural and urban areas, but it should be noted that this is not the only study to have found little or no association. However, in general, the theoretical reasons are strong for expecting a positive relationship between migrant status and the propensity of women to be in the labour force. What is less clear is the effect of increasing labour migration on the participation rates of groups within particular areas. A priori, increasing population mobility can be expected to result in the reallocation of labour from areas where there are relatively few labour force opportunities to areas where more labour is required, and thus a positive relationship at the societal level is to be expected. It also seems likely that one effect of migration is the substitution of migrant workers for certain groups of "secondary" or relatively "marginalized" workers, such as youths, the elderly and certain groups with physical disadvantages. Certainly, research in developed countries strongly suggests that in recent decades women workers have been steadily displacing these other groups; and with high rates of unemployment, this type of substitution process seems likely to continue in both developed and developing countries, even though the groups adversely affected are not likely to be the same in all countries.

[26] These and other studies are summarized in G. Standing, *Labour Force Participation and Development*, pp. 207–221. See also Nadia Youssef and others, *Women in Migration: A Third World Focus* (Washington, D.C., International Center for Research on Women, 1979).

Concluding remarks

In the developed countries, labour force growth in recent years has been largely due to the post-1945 "baby boom" and to the increasing rate of female labour force participation, notably among married women, which combined have more than offset the declining participation rate of men over 50 years of age.[27] In developing countries, the recorded rates of labour force growth have been partially statistical, in the sense that many activities conventionally regarded as outside the labour force have been replaced by non-domestic work, notably but by no means only, by wage employment. But more fundamentally the growth has been due to the rapid expansion of the working-age population and the growth of female labour force participation.[28]

Growing unemployment can be expected to slow the rate of growth, but it will be many years before any reduction in the birth rates will in itself lead to a decrease in the number of new labour force entrants. Increasing levels of schooling and population mobility will probably increase the labour supply, while declining levels of fertility will possibly increase the availability of women workers prepared to take labour force activity. Meanwhile, the prospects of translating the high rates of labour force growth into high rates of labour force absorption in productive and rewarding employment are bleak indeed.

[27] *Economic Survey of Europe in 1977, Part II. Labour Supply and Migration in Europe: Demographic Dimensions, 1950–1975 and Prospects* (United Nations publication, Sales No. E.78.II.E.20); and *The Economic Role of Women in the ECE Region* (United Nations publication, Sales No. E.80.II.E.6).

[28] International Labour Organisation, *Labour Force Estimates and Projections, 1950–2000*, vol. V, *World Summary* (Geneva, 1977).

Chapter XV

DEMOGRAPHIC ASPECTS OF CHANGES IN CONSUMPTION LEVELS AND PATTERNS*

Development strategies that involve shifting the emphasis of investment from agriculture to non-agricultural activity are often based on an appeal to Engel's law, which states that food expenditures will occupy a declining portion of household budgets as income rises and that non-food expenditures will therefore increase in relative importance.

However, an application of Engel's analysis in its simplest form may lead to less than optimal policy decisions. By focusing strictly on income elasticities of demand, a number of other relevant features of the development process are being ignored, particularly demographic change.

It is generally recognized that development is a multifaceted process which includes, but goes far beyond, an increase of per capita income. From the demographic point of view, it also involves an alteration in the rate of population growth and in the number and composition of households, as well as their rural/urban location. In order to project future patterns of demand properly, it is therefore necessary to incorporate demographic factors into the analysis.

According to a study[1] by the Food and Agriculture Organization of the United Nations (FAO), population growth accounted for two thirds of the increase in the demand for food in developing countries while one third can be attributed to the growth in income. Although smaller proportions of increases in income are spent on food in developed countries, it is likely that population growth has a comparable effect on food demand in those countries.

Population growth is generally accompanied by changes in the number, size and age structure of households. All of these factors have an impact on consumption patterns, as does the rural/urban distribution of the population.

Rural-urban migration is likely to influence consumption expenditures because of the rural/urban differences in consumption levels and patterns. Furthermore, in rural areas, food-grains are cheaper in relation to other commodities and are often produced at home. These factors, together with the greater variety and abundance of manufactured goods in urban areas, lead to substantial differences between rural and urban consumption patterns. There are also significant differences in the types of food consumed in the two areas. Dietary surveys[2] undertaken in developing countries indicate that the share of animal protein in total protein intake is substantially higher in urban than in rural sectors.

In order to illustrate the relative importance of population factors in determining consumption patterns, this study derives a set of coefficients based on an analysis of consumption expenditures at the household level.[3] These values are then used to make heuristic projections of increases in the aggregate consumption expenditures of two selected countries, given assumed values for per household expenditure, age structure, number of households and rural-urban migration rates.

Section A presents estimates of the sensitivity of household consumption patterns to changes in economic and demographic factors respectively. Section B then presents a scenario analysis which illustrates and decomposes the effects of projected economic and demographic conditions on consumption. The final section is devoted to a comment on the results of the study.

A. Economic-demographic factors affecting household consumption

The point of departure for this analysis is the household[4], the basic decision-making unit in relation to consumption. In particular, household consumption functions were estimated for rural and urban areas, using as their arguments household budget and household size. The statistical results are presented in this section.

The data used to estimate the household consumption functions were taken from surveys of Pakistan in 1971/72

* Prepared by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat.

[1] Food and Agriculture Organization of the United Nations, *Provisional Indicative World Plan for Agricultural Development: A Synthesis and Analysis of Factors Relevant to World, Regional and Agricultural Development*, vol. I (Rome, 1970), vol. I, pp. 12–13.

[2] "The impact of urbanization on food demand", *Monthly Bulletin of Agricultural Economics and Statistics*, vol. 22, No. 9 (September 1973), p. 5.

[3] This procedure is consistent with suggestions made by the Population Commission at its twentieth session, held from 29 January to 9 February 1979. For report of the session, see *Official Records of the Economic and Social Council, 1979, Supplement No. 2* (E/1979/22), appendix.

[4] The household was used as the unit of analysis in the case of Pakistan and the family was used as the unit of analysis in the case of the Philippines. The household is a socio-economic unit composed of individuals who live together and share food and other essentials for living. The family consists of that part of a household who are related by kinship. It would not include domestic servants, boarders or guests. See *Manual VIII. Methods of Projecting Households and Families* (United Nations publication, Sales No. 73.XIII.2), p. 5. For purposes of exposition, however, the term "household" is used to describe the unit of analysis in both countries.

and the Philippines in 1971.[5] Prior to the analysis, the data were grouped according to income level. To facilitate inter-country comparisons, the data were put on an annual basis and converted into dollars of 1971 purchasing power.[6]

Using generalized least-squares regression analysis, eight linear consumption functions were estimated for rural and urban households in each country. In each case, four equations were fitted to the data. The dependent variables were: "food" and "non-food"; "cereal" and "non-cereal" food expenditures.

Table 83 presents the estimated regression coefficients for household budget and household size. In the case of the Philippines, household size was disaggregated by age group.

The household rather than the individual was adopted as the unit of analysis because many consumer expenditures, such as those for home rentals, are not divisible among individuals and therefore must be assigned to the household as a unit. Total household expenditure was used as a proxy for permanent household income, which is generally considered to be a more appropriate explanatory variable in consumption analysis than is current income.[7]

Income

The economic interpretation of these parameters is quite straightforward. The coefficients of the household budget variable may be thought of as marginal propensities to consume with respect to a unit increase in the household budget. Thus, an increase of $1 in the total household expenditure in the urban areas of Pakistan is predicted to be associated with a 75 cent increase in non-food expenditure.

The effect of income, as proxied by total household budget, has been widely discussed in the literature.[8] The findings here are consistent with generally accepted theory in that the marginal propensity to consume with regard to non-food items is consistently higher than that with regard to food items. Likewise, the marginal propensity to consume with regard to non-cereal foods is consistently higher than that with regard to food expenditures.

Household size and age composition

Households vary considerably in size and age composition, and these differences affect patterns of con-

[5] Ministry of Finance, Planning and Development, Statistical Division, *Pakistan Household Income and Expenditure Survey, 1971/72* (Lahore, 1973); and Bureau of the Census and Statistics, *Philippines Family Income and Expenditures: 1971*, Survey of Households Bulletin Series No. 34 (Manila, 1973).

[6] The exchange rates used referred to the end of the year or the average of two years without taking into account the possible monthly variation of exchange rates. The exchange rates per dollar were the mid-point rates of the years covered by the study, namely, 4.793 Pakistan rupees (1971), 11.031 Pakistan rupees (1972) and 6.43 Philippine pesos (1971), *Statistical Yearbook, 1976* (United Nations publication, Sales No. E/F.77.XVII.1), pp. 695–697.

[7] See S. J. Prais and H. S. Houthakker, *The Analysis of Family Budgets*, 2nd ed., abridged (Cambridge, Cambridge University Press, 1971), chap. 7.

[8] See Food and Agriculture Organization of the United Nations, *Income Elasticities of Demand for Agricultural Products* (Rome, 1972).

TABLE 83. COEFFICIENTS OF THE ESTIMATED REGRESSION EQUATIONS RELATING HOUSEHOLD (FAMILY)[a] EXPENDITURE TO HOUSEHOLD BUDGET, HOUSEHOLD SIZE AND ITS AGE STRUCTURE, BY COMMODITIES IN URBAN AND RURAL AREAS, PAKISTAN, 1971–1972 AND PHILIPPINES, 1971[b]

Items	Urban				Rural			
		Household (family) size				Household (family) size		
	Household (family) budget	Total	Age under 18	Age over 18	Household (family) budget	Total	Age under 18	Age over 18
			(dollars per person)				(dollars per person)	
Pakistan, 1971–1972								
Non-food	0.75	−30.59	-	-	0.66	−20.21	-	-
Food	0.25	30.59	-	-	0.34	20.21	-	-
Non-cereal	0.24	18.96	-	-	0.26	11.57	-	-
Cereal	0.01	11.63	-	-	0.07	8.64	-	-
Philippines, 1971								
Non-food	0.73		−60.32	−66.32[c]	0.65		−34.33	−50.97
Food	0.27		60.32	66.32[c]	0.35		34.33	50.97
Non-cereal	0.23		43.24[c]	53.09[c]	0.29		14.68	28.06
Cereal	0.04		17.08	13.22[c]	0.05		19.66	22.91

[a] The unit used is the household for Pakistan and the family for the Philippines.

[b] In the present study, the regression analysis was carried out on grouped means rather than on original individual observations. Therefore, the appropriate method of regression analysis is generalized least squares. This application of generalized least squares to the grouping of observation implies that the observation of each grouped mean is weighted by the appropriate frequency in each income class. For further discussion, see J. Johnston, *Econometric Methods*, 2nd ed. (New York, McGraw-Hill Book Co., 1972), pp. 228–237.

All the equations estimated have good fits, with adjusted R^2 in the range of 0.94 and 0.98. These high values are to be expected when, as in the present case, data used are grouped means.

[c] Not statistically significant at the the 5 per cent level. All of the insignificant parameters appear to be in equations estimated for urban areas of the Philippines (1971), in which family size is subgrouped by age structure, with ages under and over 18 years.

sumption in two ways. Adding a person to the household reduces the spending capacity per person, given an unchanging budget,[9] while it raises total household requirements for goods and services.

The coefficients of household size represent a combination of two effects, which have been termed by Houthakker[10] the "specific" and "income" effects. The former effects refers to the increased requirements for various commodities due to an increase in household size. Because of "economies of scale in consumption", the increase in requirements is less than proportionate to the increase in household size. Because the coefficient refers to the influence of family size when total expenditure is given, an increase in family size reduces the level of total expenditure per capita. This effect Houthakker refers to "metaphorically" as the income effect. Ideally, it would be useful to isolate these two effects of increased family size but it is not possible within the framework of this linear model. Thus, the total effect of an increase in family size must be viewed as the resultant of these two effects. If the specific effect is stronger than the income effect, the coefficient will be positive; if the income effect is stronger, the coefficient will be negative. Thus, the coefficient for food is positive, indicating that the specific effect is dominant; whereas the coefficient for non-food is negative, indicating that the income effect dominates. Since total expenditures are divided into these two groups and must remain constant regardless of household size, the absolute values of the coefficients are equal and they have the opposite sign. In practical terms, this result implies that an increase in family size may increase a household's need for non-food items (though less than proportionately due to economies of scale). However, the increase in family size will also cause an increase in the demand for food items, forcing the family to spend less on non-food items. That the effect of reduced income per capita is greater in the case of non-food items than food items is consistent with Engel's law.

In other words, as reported in table 83, an increase in household size will result in an increased expenditure on food at the expense of expenditure on non-food items. This result is consistent with Engel's law, which states that the proportion of total expenditures devoted to food items will increase as expenditure per capita decreases; and, as noted above, an increase in household size will reduce food expenditure per capita. The results of the analysis also indicate that an increase in household size will have a greater effect on non-cereal than cereal expenditures.

Because people in different age groups have different needs, the age structure of households will also affect consumption patterns.[11] For instance, a child's food requirements are generally less than those of an adult. However, children require relatively more education and health services.

The data for the Philippines make it possible to disaggregate households according to age structure, thereby facilitating the estimation of separate coefficients for the number of persons under and over 18 years of age. Although many of the parameters are not statistically significant, the signs and most of relative magnitudes are consistent with a priori expectations. Specifically, the addition to food expenditures is greater in the case of persons over the age of 18 than in the case of younger persons.[12] This result reflects the greater food requirements of adults.

Urbanization

In many developing countries, urbanization is proceeding at a rapid pace. This structural change in the composition of the population is likely to result in a shift from consumption patterns typical of rural subsistence economies to consumption patterns typical of urban market economies. This shift can be described by the difference in the parameters of the rural and urban consumption functions. That difference which can be interpreted as the effect of urbanization on consumption may be due to such factors as advertising, quantity discounts and the availability of new products in urban areas.

The differences between the rural and urban parameters are consistent with Engel's law. Given that urban budgets were about twice as large as rural budgets in the Philippines and 1.5 times larger than rural budgets in Pakistan, it was to be expected that the marginal propensity to consume food would be greater in rural areas than in urban areas. Table 83 confirms that this was the case in both countries.

Because the total expenditure per household is greater in urban households, the coefficients of household size were absolutely greater in the former group than the latter. That is to say, the addition of a person to an urban household will tend to have a more pronounced effect on the pattern of consumption than the addition of a person to a rural household.

B. Decomposition of increments in total expenditure into economic and demographic effects

In this section of the study, a framework for integrating micro functions into the macro-economic analysis developed by Kelley[13] is used to simulate the impact of a hypothetical set of changes in the economic and de-

[9] This analysis makes the assumption that total household expenditure is independent of household size.

[10] Hendrik S. Houthakker, "An international comparison of household expenditure patterns, commemorating the centenary of Engel's Law", *Econometrica*, vol. 25, No. 4 (October 1957), p. 544.

[11] A common method of taking age structure into account is to construct adult consumer "equivalent" scales, in which the consumption expenditure attributed to each household member is expressed as a proportion of a "standard" adult member.

[12] This finding has been confirmed in numerous studies, for example, J. Benus, J. Kmenta and H. Shapiro, "The dynamics of household budget allocation to food expenditures", *The Review of Economics and Statistics*, vol. LVIII, No. 2 (May 1976), pp. 129–138. See also Howard Howe, "Cross section application of linear expenditure systems—responses to socio-demographic effects", *American Journal of Agricultural Economics*, vol. 59, No. 1 (February 1977), pp. 141–148; and Robert A. Pollak and Terence J. Wales, "Estimation of complete demand systems from household budget data: the linear and quadratic expenditure systems", *American Economic Review*, vol. 68, No. 3 (June 1978), pp. 348–359.

[13] Allen C. Kelley, "Demand patterns, demographic change and economic growth", *The Quarterly Journal of Economics*, vol. LXXXIII, No. 1 (February 1969), pp. 110–126.

mographic characteristics of Pakistan and the Philippines for the purpose of generating an heuristic projection of their aggregate expenditures on food and non-food items. The purpose of this exercise is to calculate the proportions of the total change in consumption accounted for by changes in the economic and demographic variables, respectively, and thereby to demonstrate the significance of the latter.

Once projected, changes in the composition of consumption can be decomposed into four additive elements which are attributed to changes in: (*a*) the number of households; (*b*) average household size; (*c*) rural/urban location (migration); (*d*) per household expenditure.

In the case of the Philippines, the change in consumption is assumed to have occurred between the years 1971 and 1976. In the case of Pakistan, the change in consumption is assumed to have occurred in the five year period from 1971/72 to 1976/77.

In order to make the simulations, the regression coefficients derived from fitting the micro-level consumption functions, described above, were used in conjunction with assumed changes in the relevant economic and demographic variables. These changes are shown in table 84. Though the assumed changes are purely hypothetical, they were chosen so as to approximate the actual values of the variables in the two countries during the respective projection periods.

The projected increments in total consumption expenditure for Pakistan and the Philippines are shown in table 85. It shows that incremental food consumption, measured in dollars of 1971 purchasing power, would have been $543 million and incremental non-food consumption would have been $571 million in the Philippines between 1971 and 1976. The total increase would therefore have been $1,113 million. In the case of Pakistan, the increase in food consumption would have been $599 million and incremental non-food consumption would have been $723 million between 1971/72 and 1976/77. The total increase would therefore have been $1,322 million.

Table 85 also indicates the proportion of the total change in food, non-food and aggregate consumption, respectively, that can be attributed to each of the four elements on the assumption that the other three elements remain constant.

Thus, if household size were to change without affecting the number or location of households or the level of expenditure per household, there would be no change in aggregate consumption expenditure; however, there would be a marked shift from non-food to food consumption. Since the assumed changes in household size were much smaller in the case of the Philippines than in the case of Pakistan, the household size effect on consumption patterns was much less pronounced.

If the number of households were to change without affecting the size, location or average expenditure per household, then the projected increase in the number of households would have a major impact on the level of consumption and a most significant impact on the composition of consumption expenditures as well. In both Pakistan and the Philippines, 62 per cent of the aggregate change in consumption expenditure was attributable to the projected increase in the number of households. Although it is the most important factor in

TABLE 84. ASSUMED CHANGES IN SOCIO-ECONOMIC AND DEMOGRAPHIC VARIABLES, PAKISTAN, 1971/72–1976/77; AND THE PHILIPPINES, 1971–1976

Variable	Total change		Annual rate of change (percentage)	
	Pakistan	Philippines	Pakistan	Philippines
Household size[a]				
Urban	0.14	-	0.5	-
Rural	0.18	-	0.6	-
Household size, age under 18[a]				
Urban	-	−0.15	-	−0.1
Rural	-	0.045	-	0.3
Household size, age over 18[a]				
Urban	-	−0.025	-	−0.2
Rural	-	0.03	-	0.2
Number of households[a] (thousands)	1 626	1 148	2.8	3.2
Rural-urban migrants (thousands)	151	220	0.4[b]	1.0[b]
Household expenditure (dollars)				
Urban	49	44	1.8	1.6
Rural	33	86	1.8	1.6

[a] The unit used is the household in the case of Pakistan and the family in the case of the Philippines.
[b] Of rural households.

TABLE 85. PROJECTED PROPORTIONS OF THE INCREMENTS OF HOUSEHOLD CONSUMPTION EXPENDITURE ACCOUNTED FOR BY ECONOMIC AND DEMOGRAPHIC FACTORS, PAKISTAN, 1971/72–1976/77; AND THE PHILIPPINES, 1971–1976

(*Percentage of the total increment*)

Effects accounted for by:	Incremental food consumption	Incremental non-food consumption	Incremental total consumption
Pakistan			
Household size[a]	8	−7	0
Number of households	68	55	62
Rural-urban migration	1	3	2
Household expenditure	23	49	36
Total percentage	100	100	100
Total increment (millions of dollars)	543	571	1 113
Philippines			
Household size[a]			
Age under 18	1	−1	0
Age over 18	1	0	0
Number of households[a]	73	53	62
Rural-urban migration	7	10	9
Household expenditure	20	37	29
Total percentage	100	100	100
Total increment (millions of dollars)	599	723	1 322

[a] The unit used is the household for Pakistan and the family for the Philippines.

the increase of both food and non-food expenditure, the number of households is more significant in the case of the former than the latter. This result is largely due to the fact that the projected increase in per household incomes has a greater impact on incremental non-food consumption than food consumption, as would be expected from Engel's law.

If the rural/urban proportion of households were to change as a result of internal migration without affecting the number and size of households or the levels of per household expenditures in rural or urban areas, respectively, then the projected rural-urban migration would result in increased aggregate expenditure in both Pakistan and the Philippines. The effect of migration is smaller in the former country than the latter due to the fact that the proportion of rural households assumed to migrate to urban areas annually is 0.4 per cent in the case of Pakistan and 1.0 per cent in the case of the Philippines.

This methodology involves the implicit assumption that rural-urban migration will raise total national expenditure as rural households adopt urban expenditure patterns immediately upon arrival in urban areas. Consistent with Engel's law, this rural-urban shift would result in a shift in the composition of consumption in the direction of non-food expenditures.

When all three demographic factors are taken together, they account for 64 per cent of the increase in aggregate consumption in the case of Pakistan and 71 per cent of the change in aggregate consumption expenditures in the Philippines. The remainder would be attributed to the effect of increases in the average level of household expenditure in rural and urban areas, respectively. The contribution of this factor to the total increase in expenditure was 36 per cent in the case of Pakistan and 29 per cent in the case of the Philippines. This result reflects the fact that the assumed annual rate of growth of expenditure per household in Pakistan was 1.8 per cent, as opposed to 1.6 per cent for the Philippines.

C. Changes in patterns of consumption

Table 86 illustrates the effect of the hypothesized changes on the pattern of consumption over the projection period for both Pakistan and the Philippines.

As would be expected, the proportion going to food expenditures declined slightly in both the rural and urban areas of both countries, owing to the fact that in each of those areas, non-food expenditures were growing at almost twice the rate of food expenditures.

D. Comment on results of study

A major purpose of this study has been to demonstrate the relative importance of demographic effects on the composition of consumption expenditures, disaggregated by commodity. On the basis of plausible scenarios of economic and demographic trends in two developing countries, it would appear that both economic variables, such as household budget, and demographic variables, such as household size and its age structure, play a significant role in determining consumption behaviour.

Using a macro-economic framework, the simulation model based on a plausible set of assumptions generated results that are in conformity with Engel's law in that a larger share of incremental expenditure per household is devoted to non-food than to food items. However, Engel's law does not provide a complete explanation for the shift of consumption patterns away from food expenditure. Population growth and associated changes in household size, age structure and location also affect both levels and patterns of expenditure. It was found that changes in the demographic variables considered in this study accounted for a greater proportion of the incremental change in consumption than was accounted for by the change in total expenditure per household.

In assessing the significance of these results, it must be recalled that it is a partial analysis which does not specify all of the socio-economic factors that might affect consumption, such as rural/urban price differentials.

Needless to say, the validity of the results are dependent on the accuracy of the basic data and the validity of the underlying assumptions. Among the stronger assumptions of this study was the linearity of behavioural relationships.

Lastly, it should be noted that although changes in total expenditures per household were associated with less than 40 per cent of the increment in total consump-

TABLE 86. PERCENTAGE DISTRIBUTION OF INCREMENTAL AND TOTAL CONSUMPTION EXPENDITURE PER HOUSEHOLD, PAKISTAN, 1971/72–1976/77; AND THE PHILIPPINES, 1971–1976
(*Percentage*)

	Pakistan						*Philippines*					
	Urban			*Rural*			*Urban*			*Rural*		
	Total	*Food*	*Non-food*	*Total*	*Food*	*Non-food*	*Total*	*Food*	*Non-food*	*Total*	*Food*	*Non-food*
Percentage distribution of increment per household expenditure[a]	100	33	67	100	45	55	100	24	76	100	42	58
Percentage distribution of total food and non-food expenditure per household[a]												
Base period	100	49	51	100	58	42	100	47	53	100	59	41
Projected period	100	48	52	100	57	43	100	45	55	100	58	42
Annual compound growth rate	1.8	1.2	2.3	1.8	1.4	2.3	1.6	.8	2.3	1.6	1.1	2.2

[a] The unit used is the household in the case of Pakistan and the family in the case of the Philippines.

tion expenditure, it does not necessarily follow from this result that demographic variables are more important than economic variables in determining levels and patterns of household consumption. This decomposition is based on the assumption that household size, the number of households, their geographical location and the expenditure per household can be treated as independent factors. In reality, they are mutually interacting factors. As couples marry and leave home, the number of households may increase but the average household size may decline. New households may earn less than established households so that an increase in the number of households may reduce the total expenditure per household. If there is a substantial differential between the per household expenditure levels of rural and urban areas, migration may change the level of expenditure per household in each area. In order to form a complete view of the consequences of demographic change on consumption, these interrelationships between the economic and demographic determinants would also have to be assessed.

Although further research is required to identify the mechanisms and behavioural changes involved in consumption behaviour, this study demonstrates that population factors are important in explaining shifts in the composition of consumption expenditures. For this reason, greater weight should be given to demographic factors in planning the future structure of industry.

Chapter XVI

SOME DEMOGRAPHIC CHARACTERISTICS OF WOMEN'S WORK PATTERNS AND RATES IN TEN WORLD FERTILITY SURVEY COUNTRIES*

Data from the World Fertility Survey provide a new opportunity to examine patterns and demographic characteristics of women's work in selected countries of the developing world. The core questionnaire for the Survey includes a set of questions on the extent and type of women's work which are linked to the event of first marriage. Because of the central focus on fertility, the sample was typically restricted to ever-married women. In addition, women were specifically asked about their work activities apart from housework, so unemployment was not distinguished from non-working status. For these two reasons, this sample definition prohibits strict comparison of these labour data with census data on labour force participation and occupational distribution. Unfortunately, despite a uniform definition of work supplied by the World Fertility Survey[1] some countries appear to have differed in their interpretation and application of the definition within their own questionnaires. Although the application of the recommended definition of work is likely to have improved the comparability of data for some countries in relation to previous census data, a diversity of definitions still remains. In Bangladesh, only work for cash was investigated; and in Pakistan, farm work was not included. At the other extreme, in Thailand, all unpaid farm workers were included.

Despite this lack of comparability between certain countries in over-all levels of work, there is much that can be compared, such as patterns of work by age, marital status and age of youngest child within countries, as well as fertility differentials by the nature and extent of past work. This report presents only a few very preliminary findings for 10 countries participating in the World Fertility Survey—three in Latin America and seven in Asia.[2] The choice of the countries for inclusion was dictated by the availability of a reasonably clean standard recode tape.[3]

A. Over-all patterns of labour force participation

Table 87 presents some summary statistics on the nature and extent of work among women in these 10 countries. The sample here is defined as ever-married women aged 15–49 years at the time of the survey. All the figures in the table are age-standardized because women's work rates are known to vary widely with age.[4]

The range of work rates shown in table 87 is typical of labour force data from the developing countries. The work rate is defined here as the percentage of women classified as working at the time the survey was conducted.[5] The rates range from a low of 9.8 per cent in Jordan to a high of 82.0 per cent in Thailand. This wide range has much more to do with differences in definitions than with differences in the extent of women's actual work. Unfortunately, given different cultural views of women's role, the World Fertility Survey was not able to standardize the treatment of unpaid family work even with the uniform definition of work quoted on individual country questionnaires.

Despite these definitional differences, however, the World Fertility Survey data give some information on the pattern of work before and after marriage which can be compared. The index of instability given in table 87 is designed to show the degree of turnover in the defined labour force since marriage. It is defined as the number of women who have worked since marriage divided by the number of women working at the time of the survey. If the index equals one, it means that all the women in the sample who had worked since marriage were working at the time of the interview. If the index is greater than one, it means that some women who had worked since marriage were not working then. The smaller the work rate at the time of the survey, the higher this index can potentially be. The actual percentage of women who had worked since marriage also is shown. The index of discontinuity is defined in a similar fashion as the number of women who

* Prepared by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat.

[1] The wording of the current work status question on the core questionnaire is as follows: "As you know, many women work — I mean aside from doing their own housework. Some take jobs for which they are paid in cash or kind. Others sell things, or have a small business, or work on a family farm. Are you doing any such work at the present time?".

[2] In Latin America, Colombia, Panama and Peru; in Asia, Bangladesh, Indonesia, Jordan, Pakistan, the Republic of Korea, Sri Lanka and Thailand.

[3] Problems with labour force variables for Guyana and Jamaica precluded their use at this time.

[4] The age distribution of the ever-married sample in Colombia was chosen as a standard mainly because it had a relatively typical mean age at marriage and did not show unusual extremes in the proportion of the sample aged 15–19 (which is an age group whose work rate differs substantially from the average). This decision is clearly arbitrary, but in few cases did it make any perceptible difference in the calculated rates or in inter-country differences.

[5] The classification of women's current work status is somewhat ambiguous, however, because it is unclear if the question whether the woman is "working at the present time" means today, this week, this month or this year. In most countries, the phrasing of this question was left somewhat vague, so there was room for individual differences in interpretation.

TABLE 87. AGE-STANDARDIZED[a] WORK RATES FOR EVER-MARRIED WOMEN AGED 15–49 YEARS, 10 WORLD FERTILITY SURVEY COUNTRIES

	Latin America			*East Asia*	*South Asia*					
	Colombia 1976	*Panama 1976*[b]	*Peru 1977*	*Republic of Korea 1974*[c]	*Bangladesh 1975*	*Indonesia 1976*	*Jordan 1976*	*Pakistan 1975*	*Sri Lanka 1975*	*Thailand 1975*
EXTENT OF WORK										
Over-all work rate										
1. Percentage of ever-married women working at time of survey	25.9	33.1	48.9	45.7	13.9	66.0	9.8	17.4	35.0	82.0
Index of instability										
2. Ratio of women who had worked after marriage to women working at time of survey	1.68	1.61	1.26	1.24	1.11	1.06	1.45	1.11	1.17	1.10
Percentage of women who had worked after marriage	43.6	53.2	61.5	56.6	15.4	69.6	14.2	19.4	40.8	90.2
Index of discontinuity										
3. Ratio of women who had ever worked to women working after marriage	1.54	1.44	1.35	1.37	1.05	1.08	1.69	1.12	1.27	1.07
Percentage of women who had ever worked	67.2	76.0	81.9	77.7	16.0	74.9	23.5	21.6	51.1	96.7
TYPE OF WORK[d]										
Non-agricultural work rate										
1. Percentage of all ever-married women working in non-agriculture	39.1	51.3	39.3	25.8	13.9	25.2	8.8	14.1	14.3	24.2
Gross national product (1977 dollars)	710	1 220	830	810	90	300	710	190	200	410
Away-from-home work rate										
2. Percentage of all ever-married women working away from home	30.4	46.4	26.6	17.6	10.3	33.8	6.7	9.2	26.2	25.0
Non-family employees										
3. Percentage of all ever-married women working for other employers	28.1	45.4	18.5	11.9	11.1	25.4	6.0	7.8	26.7	19.3

Source: For gross national product, World Bank, *World Bank Atlas: Population, Per Capita Product and Growth Rates*, 1978, 13th ed. (Washington, D.C., 1978).

[a] Standard age distribution was the sample distribution for Colombia.

[b] Women aged 20–49.

[c] Women aged 16–49.

[d] All rates based on type of work after marriage.

had ever worked divided by the number of women who worked since marriage. It is designed to show the degree of discontinuity in work created by the event of first marriage. The percentage of women in the sample who had ever worked is then given.

An examination of the data given in table 87 shows certain systematic differences between countries with a clear regional pattern for the three countries of Latin America. The relatively high instability ratios shown for Colombia, Panama and Peru mean that the women reported as working at any moment in time were not that different from many other women in terms of work experience, whereas in certain Asian countries, women working at the time of the survey have systematically different work patterns from other married women. In other words, in Latin America, there was much greater flexibility in the timing of work, whereas in most of the Asian countries described here, there was little flexibility either because most women were reported as working all of the time, as in Thailand, or because working women are a small and unusual group, as in Bangladesh and Pakistan.

A similar pattern appears in the discontinuity index. The three Latin American countries and Jordan all show a significant drop in work rates with marriage, whereas in most Asian countries, most women who worked before marriage also worked after marriage. However, in Bangladesh and Pakistan, the reason for this pattern is that few women work before marriage in part because of the low age of marriage and in part because of cultural and religious prescriptions against women's work. In the other countries of Asia, substantial percentages of women in the sample were recorded as having worked before marriage, with a range from 40.0 per cent in Sri Lanka to 91.3 per cent in Thailand.

Three patterns of women's work emerge from table 87. The first is displayed in the countries of Latin America, where a substantial percentage of women had worked at some time and the timing of work was flexible. The second is displayed by the Muslim countries—Bangladesh, Jordan and Pakistan—where relatively few women were recorded as working in any circumstances. However, in Jordan, there appears to be more flexibility in the timing of work for the relatively few women who did work, whereas in Bangladesh and Pakistan, the few working women appeared to work consistently and were therefore likely to be quite unusual in many respects, in relation to the average woman. In the other countries of Asia, the level of work experience was reasonably high and less flexibility was found, although the Republic of Korea and Sri Lanka appear to represent a somewhat intermediate group.

In the second part of table 87, three indicators of type of work are presented: (1) the percentage of all ever-married women who had been employed in non-agricultural occupations at some time after marriage; (2) the percentage of all ever-married women who had worked away from home at some time since first marriage; and (3) the percentage of all ever-married women who had been employees of a non-family enterprise since first marriage. These statistics are based on all women rather than only on working women because of the substantial variation in women's work rates across countries.

Although a significant range of values is displayed for each of these three indicators, the variation among countries is substantially less than that displayed by the over-all work rates. A major reason for this is that unpaid family labour, which is treated differently from one country to the next, has been largely eliminated from each of these indicators. The variation remaining should be a much better reflection of actual inter-country differences in work patterns.

The percentage of married women who were working in non-agriculture can be seen to have varied systematically with the level of development, as indicated by the gross national product per capita. In general, women's participation in non-agricultural occupations appears to be closely linked with the level of gross national product per capita: the two notable exceptions are Jordan, where participation was low despite a relatively high level of that measure; and Indonesia, where roughly one fourth of the married women had worked in non-agriculture despite a relatively low level.

The reasons for the variations in the other two indicators of type of work are less obvious. More than a quarter of all ever-married women had worked away from home in Colombia, Indonesia, Panama, Peru, Sri Lanka and Thailand. Among the other four countries, the Muslim countries of Bangladesh, Jordan and Pakistan show substantially smaller percentages, which can be at least partially explained by the traditional seclusion of women in the home. In only four countries (Colombia, Indonesia, Panama and Sri Lanka) did more than a quarter of ever-married women work as a non-family employee. The pattern of women's employment in Panama is strikingly different from the rest and is likely to be largely due to the industrial composition of production in that economy.

B. Work patterns by age, age of youngest child and marital status

Patterns of women's work according to age are often seen to reflect the impact of marriage and childbearing. The double-peaked age/labour force participation profile that is so typical of many developed countries is a reflection of the impact of childbearing on women's labour force participation within a relatively narrow interval and the high rates of participation of younger women. In general, age/participation profiles for the developing countries are much flatter than those for the developed countries in part because of the relatively long period over which childbearing takes place.[6] In addition, developing countries in which age at marriage is very early show a gently upward-sloping profile from age group 15–19, whereas countries with later mean marriage ages show a relative peak of participation in age group 20–24 years.[7]

Figure 22 shows the age/work profiles for the 10 countries included in this analysis. These work profiles are particularly startling because their continuously upward slopes appear to conflict with previous findings. However, it must be remembered that this sample consists exclusively of ever-married women and therefore provides quite different figures than the census data on participation of all women usually used to derive these profiles. One would expect that women aged 15–19 years who are already married would have relatively low work rates because, in developing countries, childbearing typically begins shortly after marriage. Fertility control is more typically used, if at all, to limit family size than to affect the timing of first birth and subsequent spacing. Therefore, the sharply sloped profile in the early years for most countries may reflect the easing of work/fertility conflicts with the aging of first-born children who can take on certain child-care responsibilities. The relative peaks of work participation displayed for many countries at ages 35–39 may reflect the completion of childbearing. It should be noted that the three Muslim countries (Bangladesh, Jordan and Pakistan) have low flat profiles, indicating that few women work regardless of age or childbearing patterns.[8]

However, one must be cautious in the interpretation of these profiles because little is known about trends in work rates in these countries. If trends have been relatively stable, it is a reasonable approximation to interpret these profiles in a life-cycle context, but it must be remembered that these profiles are constructed on the basis of age-specific work rates for different cohorts of women. In countries where fertility has been declining and/or economic development has been progressing, these profiles will not be representative of the experience of any individual cohort of women, if these changes have brought in their stead changes in the levels of work.

Table 88 shows the over-all changes in labour force participation rates between 1950 and 1975 for the countries discussed here, based on estimates and projections of the International Labour Organisation (ILO). Six of the 10 countries show relatively little change in labour force participation rates over time; and in these cases, figure 22

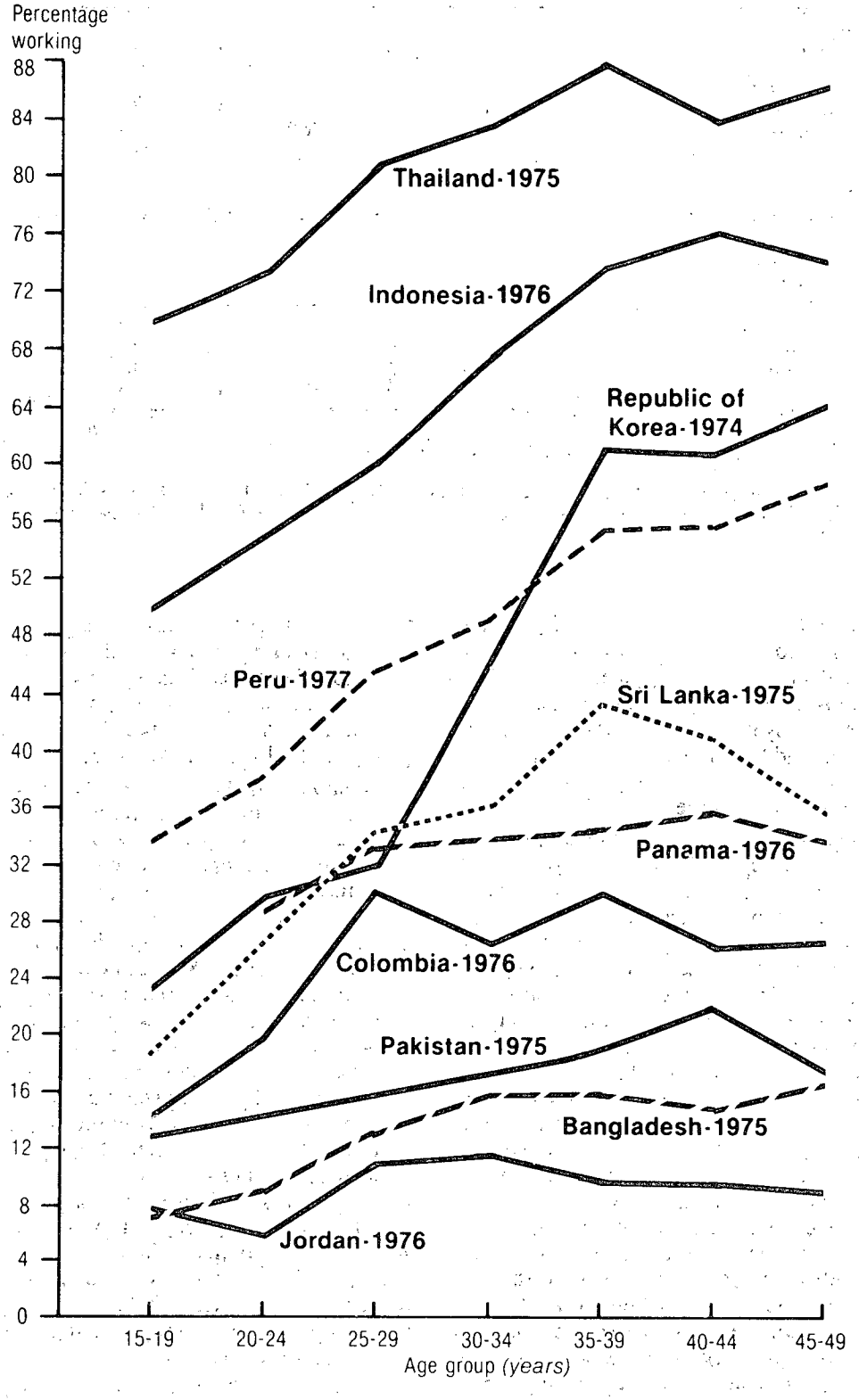
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[6] Guy Standing, *Labour Force Participation and Development* (Geneva, International Labour Office, 1978).

[7] This statement is based on an analysis of mid-1975 estimates of female labour force participation rates by age for these 10 countries, taken from International Labour Office, *Yearbook of Labour Statistics 1978* (Geneva, 1978), special table, pp. 15–47.

[8] These three profiles resemble the usual International Labour Organisation profiles more closely because in these countries the large majority of women aged 15–19 are in the ever-married category. The level of work in Bangladesh shown in table 87 is too low because of the exclusion of in-kind work. It should be noted that although Indonesia has a large Muslim population, adherence is less evident in Bali and Java, where the survey was conducted.

Figure 22. Current work rates for ever-married women aged 15–49 years, by age group, 10 countries participating in the World Fertility Survey



should provide a reasonably accurate approximation of the labour force participation of women over the life cycle. In Bangladesh, Jordan and Pakistan, work was found to be relatively uncommon at all ages and, therefore, the profiles are flat; whereas in Indonesia, Peru and Sri Lanka, participation rates clearly increase with age. In Colombia, Panama and the Republic of Korea, labour force participation rates have increased dramatically since 1960. In the case of the Republic of Korea, this increase suggests a profile even more steeply sloped than

TABLE 88. AGE-STANDARDIZED FEMALE LABOUR FORCE PARTICIPATION RATES, 10 WORLD FERTILITY SURVEY COUNTRIES[a]

Major area and country	*1950*	*1955*	*1960*	*1965*	*1970*	*1975*
LATIN AMERICA						
Colombia	20.9	21.1	21.3	24.6	27.9	27.7
Panama	24.8	25.8	26.9	30.6	34.3	33.7
Peru	23.3	23.3	23.3	22.6	21.9	23.3
EAST ASIA						
Republic of Korea	27.8	28.6	29.4	35.2	40.9	40.7
SOUTH ASIA						
Bangladesh	17.4	17.9	18.5	19.1	19.7	20.1
Indonesia	31.1	31.0	30.8	32.8	34.8	33.9
Jordan	4.5	4.6	4.8	5.1	5.4	5.8
Pakistan	9.2	9.3	9.5	9.6	9.7	10.3
Sri Lanka	28.2	28.9	29.5	30.2	30.8	30.4
Thailand	83.9	86.7	85.9	84.1	78.3	76.4

Source: International Labour Organisation, *Labour Force Estimates and Projections, 1950–2000*, vol. I, *Asia*; and vol. III, *Latin America* 2nd ed. (Geneva, 1977).

[a] The labour force participation rate is defined as the female labour force aged 15–54 divided by the female participation of the same age, standardized using the 1960 distribution of the female population in Colombia aged 15–54.

that depicted; and in the cases of Colombia and Panama, a profile with a more continuous upward slope. On the other hand, in Thailand, labour force participation rates had declined.[9] In this case, it is likely that the actual life-cycle profile was relatively flat because of the overwhelming importance of unpaid family labour. It is possible that if such work had been excluded, Thailand would have appeared more similar to the other countries.

It has been suggested that the upward-sloping work profile may be explained by the easing of work/fertility conflicts as children age. In particular, in countries where large families are the norm, a crucial aspect of fertility that determines work patterns may be the age of the youngest child, rather than the size of the family, because of the importance of older children in the rearing of younger children once they are no longer physically dependent on their mother. Table 89 shows differences in work rates between women according to the age of their youngest child, controlling for age.[10] In every country but Jordan, Pakistan and Thailand, the age of the youngest child was found to be a significant factor (based on an analysis of variance) explaining variations among women in work rates. It should be noted that women with no children were included as a separate category and were found to have the highest work rates in 6 out of 10 countries. In the other four countries, women with their youngest child over age 4 had the highest work rate, suggesting that, in certain cases, the presence of children may be an inducement to work. The lowest work rates were typically found for women who had a child under a year of age. In general, work rates can be seen to increase with the age of the youngest child, but only in Bangladesh, Colombia, Indonesia, Panama and Sri Lanka can notable differences in work rates be seen between women whose youngest child is less than 1 year and those whose youngest child is older than 4 years.

A comparison of figure 22 and table 89 suggests that the ages of the youngest children is at least a partial explanation for the age/work profiles, with patterns in some countries more strongly linked to this hypothesis than others.[11] Countries where the life-cycle work profiles are likely to slope up continuously until age 39 include Bangladesh, Colombia, Indonesia, Panama, Peru, the Republic of Korea and Sri Lanka. Of this group Bangladesh, Colombia, Indonesia, Panama, Peru and Sri Lanka appear to have work patterns consistent with this hypothesis. Except for Bangladesh, these are also countries where work/fertility conflicts should be particularly acute because of the relatively high percentages of women working away from home and for non-family employers (table 87). Work profiles in the Republic of Korea remain somewhat puzzling. There, the work rates of women whose youngest child was less than 3 years of age were found to be relatively high but were significantly less for women whose youngest child was over age 4. The small differences found among women of different ages in the work rates for Jordan and Pakistan are consistent with their flatter profiles and their relatively low participation in non-family work.

The relatively high work rates for women who had never borne a child might suggest that the age/work profiles should fall from the time of first marriage to the

[9] The decline is probably due to declines in the relative importance of unpaid family work as the economy develops.

[10] This aspect is important because the length of the open interval will be very dependent on the age of the women, and, therefore, the age distribution within each of these groups is expected to differ.

[11] A fuller test of this hypothesis would require looking at the age of the oldest child, the family size and the length of open interval simultaneously.

TABLE 89. WORK RATES FOR EVER-MARRIED WOMEN AGED 15–49 YEARS, BY AGE OF YOUNGEST LIVING CHILD, 10 WORLD FERTILITY SURVEY COUNTRIES[a]

Major area and country	Year	No child	Youngest child under one year	Youngest child aged 1–2 years	Youngest child aged 2–4 years	Youngest child aged 4 years or more
LATIN AMERICA						
Colombia	1976	0.30	0.18	0.25	0.25	0.32
Panama	1976	0.39	0.21	0.29	0.29	0.42
Peru	1977	0.59	0.46	0.51	0.51	0.52
EAST ASIA						
Republic of Korea	1974	0.53	0.50	0.53	0.53	0.44
SOUTH ASIA						
Bangladesh	1975	0.13	0.07	0.08	0.11	0.17
Indonesia	1976	0.77	0.54	0.57	0.61	0.71
Jordan	1977[b]	0.10	0.10	0.09	0.10	0.12
Pakistan	1975	0.20	0.15	0.15	0.19	0.17
Sri Lanka	1975	0.41	0.30	0.36	0.36	0.37
Thailand	1975[b]	0.86	0.79	0.83	0.81	0.83

[a] Work rates controlled for age using multiple-classification analysis.
[b] Differences between columns in work rates not statistically significant.

time of first pregnancy. The rising profiles shown in figure 22 strongly suggest that, for the large majority of women, childbearing must follow almost immediately upon marriage. Otherwise, these profiles would appear flatter or even downward-sloping at first.

Another possible explanation for the upward-sloping profile in some countries is the increasing probability of marital disruption (from death or separation) with age. Labour force participation is strongly affected by marital status because married women at most share financial responsibility for the household, whereas widowed, separated and divorced women often bear sole responsibility for supporting the family. Table 90 shows the differences in work rates by marital status, when the age distribution is controlled.[12] This is the women's marital status at the time of the survey. It is immediately apparent that married women (defined to include those united by common law in Colombia and Panama) have significantly lower recorded work rates than those who were widowed, separated or divorced at the time of the survey. There is no systematic pattern among these marital status groups in terms of the relative level of recorded work.[13] This aspect may depend very much upon differences among countries in family law and custom.

The importance of this phenomenon for the age/work profiles is very much dependent on the prevalence of marital disruption, the remarriage rate and the timing of these events. Figure 23 shows the percentage of ever-

[12] This factor is important because the probability of marital disruption increases with age and therefore the age distribution of widows, and of those separated and divorced, does not resemble the age distribution of currently married women.

[13] In another comparison not shown here, ever-married women were divided into three groups: currently married and married only once; currently married but married more than once; and not currently married. The work rates of currently married women who had been married once or more than once were not notably different, but the women not currently married had strikingly higher work rates. It appears that current status is more important in determining work rates than past marital disruption.

TABLE 90. WORK RATES FOR EVER-MARRIED WOMEN AGED 15–49 YEARS, BY MARITAL STATUS, 10 WORLD FERTILITY SURVEY COUNTRIES[a]

Major area and country	Year	Married	Common law	Widow	Separated	Divorced
LATIN AMERICA						
Colombia	1976	0.21	0.23	0.45	0.54	...
Panama	1976	0.36	0.22	0.49	0.77	0.53
Peru	1977	0.48	[b]	0.73	0.71	0.65
EAST ASIA						
Republic of Korea	1974	0.48	[b]	0.61	0.59	0.74
SOUTH ASIA						
Bangladesh	1975	0.10	[b]	0.37	0.42	0.28
Indonesia	1976	0.64	[b]	0.82	0.78	0.81
Jordan	1977	0.10	[b]	0.17	0.42	0.19
Pakistan	1975	0.16	[b]	0.32	0.24	0.28
Sri Lanka	1975	0.34	[b]	0.51	0.55	0.48
Thailand	1975	0.82	[b]	0.85	0.83	0.88

[a] Work rates controlled for age using multiple-classification analysis.
[b] Category not broken out separately.

married women who were not currently married, by age group, for each of the 10 countries. In most cases, the percentage of unmarried women did not rise steeply until after age 39 years; and until then, the unmarried group never exceeded 16 per cent of the total sample. Although obviously a factor affecting work patterns, marital status does not appear to be a primary explanation of the shape of the age/work profile, which shows its most dramatic increases between the ages of 25–29 and 35–39 for most of those countries with upward-sloping profiles. Thus, the explanation is more likely to be found in women's childbearing patterns and in the trends and structure of employment opportunities for women.

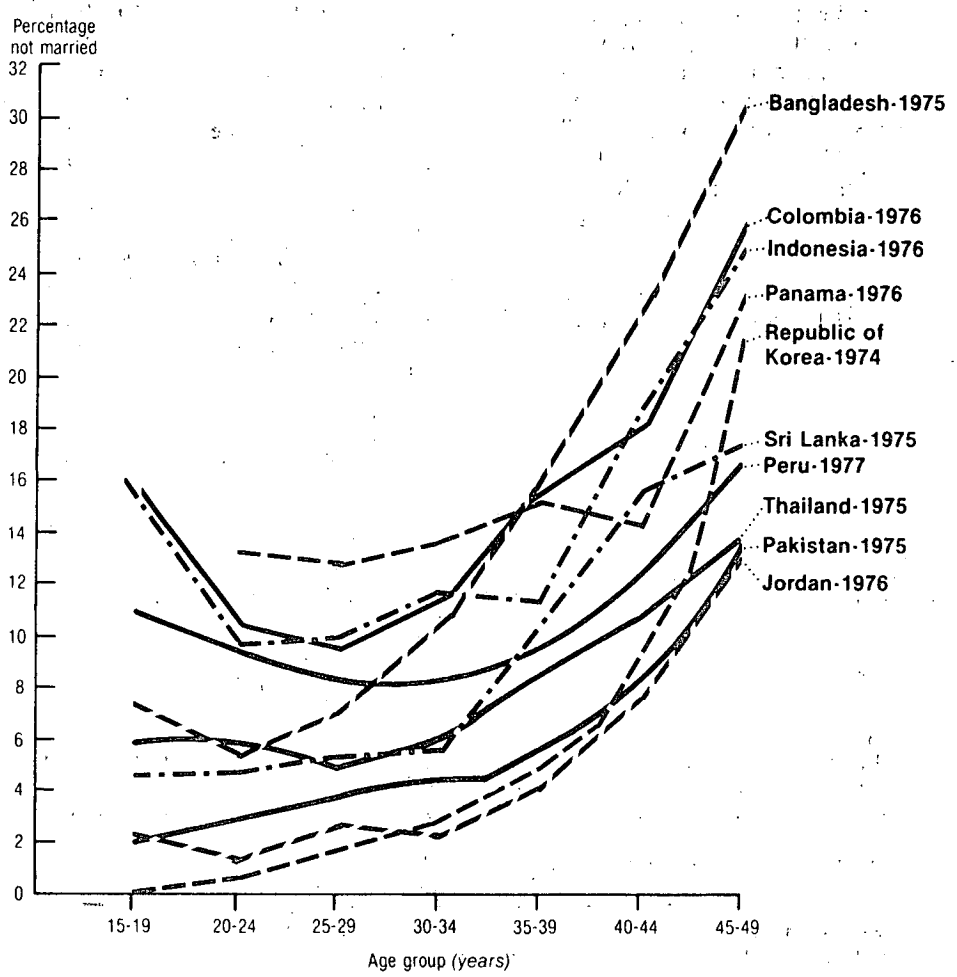
Although the foregoing discussion makes it clear that such factors as age, marital status and age of youngest child contribute to an explanation of women's work patterns, it is also apparent that other factors also are important. Because the relationship between work and fertility depends crucially upon the type of work women do, it is clear that inter-country differences in work patterns may have a lot to do with the structure of employment and the stage of development. In section C, this hypothesis is explored more closely by examining the relationship between different characteristics of women's work and average number of children ever born.

C. Mean number of children ever born according to type of work

The opportunity structure for women's work depends upon the level of economic development, the composition of production and various cultural factors affecting the level of discrimination against women in employment (or alternatively, the relative acceptance of women in different economic sectors). Such macro-level variables are not available in the World Fertility Survey data, but some hint as to the importance of these factors in explaining women's work patterns and rates can be seen by looking at the differentials in the mean number of children ever born, according to the nature of women's work. In these preliminary explorations, the sample was further restricted to continuously married women (i.e., currently married women who had married only once) so as to eliminate the compounding effect of marital status on the relationship between work rates and children ever born.[14] By looking only at continuously married women, there is

[14] Not only were the work rates found to be significantly higher than the average for non-married women but the mean number of children ever born was significantly lower than the average for this group. Therefore, in a sample of all ever-married women, fewer children ever born for women with high work rates could be purely a reflection of the fact that these women are less likely to be currently married.

Figure 23. Percentage of the ever-married sample who were not currently married, by age group, 10 countries participating in the World Fertility Survey



confidence that work and fertility experience have coexisted within the context of an unbroken marriage.

The three dimensions of work type available on the standard recode tapes of the World Fertility Survey are occupation, work status and place of work. Tables 91–93 present differences in the mean number of children ever born according to each of these work characteristics, with marital-duration controlled.[15] In each case, the comparison includes the "no work" category as a contrasting "type of work". Obviously, since nearly all women work throughout the world, it is important to regard the "no work" category as representative of another type of work—that confined to the household sector. This work is also economically productive but unmeasured and forms the residual in all calculated work rates.

It is hypothesized that work in the non-agricultural sector, work taking place away from home and work as a non-family employee would involve the most difficulty for women engaged in bearing and rearing children. Therefore, one would expect to find women with fewer

[15] Obviously, marital duration is the principal determinant of cumulative fertility; and, therefore, any difference between work groups in the distribution of years since marriage will strongly affect the averages being compared.

TABLE 91. MEAN NUMBER OF CHILDREN EVER BORN TO CONTINUOUSLY MARRIED WOMEN, BY OCCUPATION, 10 WORLD FERTILITY SURVEY COUNTRIES[a]

Major area and country	*Year*	*Type of Work*		
		Agriculture	*Non-agriculture*	*No work*[b]
LATIN AMERICA				
Colombia	1976	5.06	3.69	4.35
Panama	1976	4.71	3.34	4.11
Peru	1977	4.86	4.17	4.51
EAST ASIA				
Republic of Korea	1976	4.10	3.19	3.39
SOUTH ASIA				
Bangladesh	1975	3.49	3.80	4.01
Indonesia	1976	3.33	3.57	3.97
Jordan	1976	5.73	4.84	5.41
Pakistan	1975[c]	4.19	4.26	4.18
Sri Lanka	1975	4.00	3.68	3.95
Thailand	1975	4.08	3.44	3.72

[a] Controlled for marital duration using multiple-classification analysis.
[b] Considered to be a "type of work", confined to the household sector.
[c] The *F* ratio is not significant in a two-way analysis of variance with children ever born and place of work.

TABLE 92. MEAN NUMBER OF CHILDREN EVER BORN TO CONTINUOUSLY MARRIED WOMEN, BY PLACE OF WORK, 10 WORLD FERTILITY SURVEY COUNTRIES[a]

Major area and country	*Year*	*Work away from home*	*Work at home*	*No work*[b]
LATIN AMERICA				
Colombia	1976	3.72	4.12	4.35
Panama	1976	3.30	3.90	4.13
Peru	1977	4.17	4.62	4.52
EAST ASIA				
Republic of Korea	1974	3.23	3.86	3.40
SOUTH ASIA				
Bangladesh	1975	3.85	3.71	4.01
Indonesia	1976	3.58	3.28	3.97
Jordan	1976	4.92	5.44	5.41
Pakistan	1975[c]	4.24	4.23	4.18
Sri Lanka	1975	3.66	4.29	3.95
Thailand	1975	3.62	4.01	3.71

[a] Controlled for marital duration using multiple-classification analysis.
[b] In this context, "no work" is considered a "place of work" in that it is confined to the household sector.
[c] The *F* ratio is not significant in a two-way analysis of variance with children ever born and place of work.

TABLE 93. MEAN NUMBER OF CHILDREN EVER BORN TO CONTINUOUSLY MARRIED WOMEN, BY WORK STATUS, 10 WORLD FERTILITY SURVEY COUNTRIES[a]

Major area and country	*Year*	*Non-family employee*	*Self-employed*	*Family worker*	*No work*[b]
LATIN AMERICA					
Colombia	1976	3.69	3.90	4.31	4.35
Panama	1976	3.32	3.52	4.32	4.11
Peru	1977	3.95	4.48	4.77	4.51
EAST ASIA					
Republic of Korea	1974	3.22	3.31	3.97	3.40
SOUTH ASIA					
Bangladesh	1975	3.90	3.87	3.06	4.01
Indonesia	1976	3.62	3.49	3.23	3.97
Jordan	1976	4.83	[c]	5.42	5.41
Pakistan	1975[d]	4.15	4.26	[e]	4.17
Sri Lanka	1975	3.64	3.95	4.46	3.95
Thailand	1975	3.65	3.45	4.09	3.72

[a] Controlled for marital duration using multiple-classification analysis.
[b] Considered to be a "type of work", confined to the household sector.
[c] Category not separately broken out after marriage.
[d] The *F* ratio is not significant in a two-way analysis of variance with children ever born and work status.
[e] Category excluded in Pakistan; it is presumed that these women were included in the "no work" category.

children in these occupations. On the other hand, farm work, work taking place at home and family or self-employed work are much more flexible and do not involve to the same extent the physical separation of mothers and children. These types of work should be much better suited to mothers with many children. Household work ("no work"), although, the least incompatible with respect to childbearing and child-rearing, is also the least financially remunerative way for women to spend their time, in terms of their acquiring purchasing power over market goods and services. Therefore, it is unclear whether one should expect women's cumulative fertility to be highest in this group or in the more traditional work category of agricultural, home and family work. A large family may increase a woman's need to work for pay and be most likely to encourage work in a traditional context.

For all three types of work measures, variation in type of work is a significant factor explaining variations among women in mean children ever born (using an analysis of variance test) in every country investigated except Pakistan. This result is not surprising given that in Pakistan only agricultural workers defined as non-family employees were included in the work category. In the case of the non-agricultural/agricultural distinction given in table 91, 7 of the 10 countries are characterized by the expected pattern, with cumulative fertility highest for women in agricultural occupations, next highest for women in the "no work" category, and lowest in the non-agricultural occupations. This pattern is reversed in the case of Bangladesh and Indonesia, where agricultural occupations appear to have the lowest fertility. Obviously, further research must be conducted before these divergent patterns can be fully understood.[16]

In table 92, differences in cumulative fertility by place of work are presented. Again, Bangladesh and Indonesia were found to be exceptions to the typical pattern, which is that women working away from home have the lowest fertility. The relative ranking of work at home and "no work" show no systematic pattern but this is not surprising because in fact both groups work at home. In table 93, which shows cumulative fertility differentials by work status, Bangladesh and Indonesia again provided exceptions to the typical pattern, which is that fertility is lowest among non-family employees. Thailand were also an exception in this case, where the lowest fertility was found in the self-employed group. The relative rank among the rest of the work status groups does not show any consistent pattern.

Although certain patterns have emerged from this preliminary investigation, it is apparent that many inter-country differences remain to be explained. It can be said, however, in terms of regional patterns, that the Latin American countries appear more homogeneous among themselves with respect to women's work patterns. At this point, these findings are only suggestive of some of the important dimensions of the work/fertility relationship. The major conclusion that can be drawn thus far is that women's work patterns have something to do with childbearing patterns as well as the distribution of employment for women in terms of occupation, industry and location of work.

[16] In fact, Indonesia and Bangladesh are a puzzling contrast: whereas in Indonesia, a large part of the agricultural work force is unpaid, in Bangladesh, only cash work was counted and that group was relatively small.

Chapter XVII

POTENTIAL POPULATION-SUPPORTING CAPACITIES OF LANDS: AFRICA *

Demands for food for the world population, from the natural resources that sustain human existence, have increased enormously in recent years. Despite major advances in agricultural technology, hunger continues to spread and now affects at least 500 million people. Projections reveal that almost 50 per cent more food will have to be grown in the year 2000 to meet current inadequate nutritional levels; yet additional supplies will be needed to conquer famine and malnutrition.[1]

The ability of land to produce food is, however, limited. The limits of production are set by soil and climatic conditions and by the use and management applied. Any "mining" of land beyond these limits will, in the long term, only result in degradation and ever-decreasing productivity. Accordingly, there are critical levels of populations that can be provided with food in perpetuity, from any given land area. Once the upper level has been reached, any attempts to provide food for populations in excess of the restrictions set by the soil and climatic conditions will ultimately result in failure. The degradation of land and the eventual reduction of food production are the outcome of such practices.

Recognizing these facts within the context of a rapidly expanding world population, the Food and Agriculture Organization of the United Nations (FAO) and the United Nations Fund for Population Activities (UNFPA), in collaboration with the International Institute for Applied Systems Analysis, initiated a project to determine the limits of the food-producing capacities of lands. A further objective is to compare these estimates with data on current and projected populations and so to identify critical areas where land resources are insufficient to feed existing and/or future populations and where action is urgently required to rectify this situation. It is hoped that the results of the study will be used for planning future population activities and that the work will shed light on issues related to migration, international and inter-regional trade and land use.

This chapter describes the methodology used and presents illustrative results for Africa. These results are compared with current and projected population data, and critical areas where action is considered urgent are identified. The reported work has been guided by international expert consultations held under the auspices of FAO and UNFPA.[2]

The reader should keep in mind that the results and their analysis represent a first approximation and need to be interpreted with due caution. More detailed country studies are required and will be the object of a second phase of the project.

A. General methodology

The methodology developed to assess the potential population-supporting capacity of land uses six principles which are fundamental to any sound evaluation of the productive capacity of land:

(*a*) Land suitability is only meaningful in relation to a specific use, e.g., land suited for the cultivation of cassava is not necessarily suited for the cultivation of pearl millet;

(*b*) The evaluation of production potential is made in respect of specified input levels, e.g., whether fertilizers are applied, if pest control is effected, and whether machines or hand tools are being used;

(*c*) "Suitability" refers to use on a sustained basis; that is, the envisaged use of land must not result in its depletion, e.g., through wind erosion, water erosion, salinization or other degradation processes;

(*d*) The evaluation involves comparison of more than one alternative type of land use, e.g., suitability for millet or sorghum or maize, and not just for a single crop;

(*e*) Different kinds of land use are compared at least on a simple economic basis; i.e., suitability for each use is assessed by comparing the value of the produce to the cost of production;

(*f*) An interdisciplinary approach is adopted, the evaluation being based on inputs from crop ecologists, agronomists, climatologists and economists, in addition to those from pedologists.

These principles are described in an FAO report[3] and are as formulated over the past years through international co-operation.

Basic to the assessment is the soil and climatic inventory. The climatic inventory differentiates major climates (e.g., warm tropics, cool tropics) and length-of-growing-period zones at 30-day intervals (e.g., 120–150

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* Prepared by the Food and Agriculture Organization of the United Nations.

[1] Food and Agriculture Organization of the United Nations, "Agriculture: toward 2000", document C79/24 prepared for the twentieth session, Rome, 10–29 November 1979.

[2] *Report on the First FAO/UNFPA Expert Consultation on Land Resources for Populations of the Future* (Rome, 1978); and *Report on the Second FAO/UNFPA Expert Consultation on Land Resources for Populations of the Future* (Rome, 1980).

[3] Food and Agriculture Organization of the United Nations, *A Framework for Land Evaluation*, Soils Bulletin No. 32 (Rome, 1976).

days). The soil map[4] prepared by FAO and the United Nations Educational, Scientific and Cultural Organization (UNESCO) records the composition, location and extent of some 5,000 mapping units, which are associations of soil units. The legend to the map is based on 26 major soil units and 12 phases important to management. Measurement of the unique agro-ecological zone resulting from this combination allows quantification of the land resources in all developing countries in terms of the soil and climatic requirements of crops.

The inventory quantifies, by country, the extent of each individual soil unit (broken down by phase, slope and texture class) as it occurs in each major climate and in each length-of-growing-period zone.

The assessment is made by country, because in such a global evaluation it is not possible to take into account the existing or projected trade of food-supplies between countries.

Prior to the analysis of the inventory to ascertain maximum potential calorie production, deductions are made for land required for non-agricultural use, for irrigation and for rest period requirements. The result of these deductions are country inventories of the land annually available for rain-fed cultivation. Each data cell (agro-ecological zone) of this inventory (more than 35,000 data cells for Africa) is then analysed separately for all 16 crops included in the study (and for livestock production) to ascertain which use is most productive in the unique circumstances of the soil and climatic conditions of the zones.

This analysis is achieved by first applying major climate/crop temperature requirement rules to ascertain which crops can be considered further. Individual crop productivity rules, as determined for each major climate and each length-of-growing-period zone, are then applied; and deductions for seed and waste (also crop-dependent) follow. Subsequently, appropriate degradation hazard rules (dependent on crop and on soil and climatic conditions) are introduced to arrive at estimates of agro-climatic productivity. Application of limitations imposed by soil, phase, slope and texture limitations then allows the computation of land productivity in the circumstance of cultivation of each of 16 crops assessed in the study, including grassland.

The next step in the methodology is to calculate the calorie and protein production from the different crops through application of crop/calorie and protein composition rules. Selection of the crop giving the highest calorie and protein production in each cell is then effected and the result from each cell in a length-of-growing-period zone is totalled to arrive at the maximum potential colorie and protein production from each zone in each country. A constraint of retaining the currently grown mixture of crops on all land is included in the assessment for low levels of input, in order to allow for continued dietary preference for crops currently grown and consumed. Data on the current mixture of crops in each length-of-growing-period zone are derived from current land-use inventories.

Once the maximum potential calorie and protein production (for each length-of-growing-period zone) is ascertained, application of country-specific data on calorie and protein requirements per capita allow the computation of the potential population-supporting capacity in each zone in each country. These data are computed as potential population densities (persons per hectare) and are compared with data on the current population density to identify critical zones where, according to the level of input envisaged, potential sustained production from land resources is insufficient to meet the food needs of the populations already living in those areas. Country population projections for the year 2000, United Nations medium-variant projections, are also compared with the potential population densities to identify critical countries, i.e., those countries which will be critical with regard to food production for their future populations.[5] The results for Africa are presented in this chapter.[6]

B. Analysis of potential population-supporting capacities

Quantification of the maximum production potential of agro-ecological zones for rain-fed crop production allows analysis of the potential population-supporting capacities of the zones with the various levels of input considered. However, simple conversion of potential rain-fed crop production data into energy production and supportable populations, although an essential part of the analysis, is not in itself sufficient to give a reliable figure on potential population-supporting capacities. Current dietary preferences, country calorie and protein requirements and production from irrigated areas must also be considered. These components and the reiterative nature of the analysis undertaken are described below.

Calorie and protein conversion factors

The first step in the analysis is to convert all potential crop production data from each cell (agro-ecological zone) of the land inventory into the corresponding calorie and protein production according to the calorie and protein composition of the crops. Table 94 shows the international nutritive values (calorie and protein) used for calculating the energy values of potential crop production.

The result of this analysis is quantification of the calorie and protein production resulting from each crop alternative as applicable to each agro-ecological zone.

[4] *Soil Map of the World*, 1:5,000,000, vols. I–X, published jointly by the Food and Agriculture Organization of the United Nations and the United Nations Educational, Scientific and Cultural Organization (Paris, 1971–1979).

[5] The analysis does not take into account existing or projected trade of food-supplies between countries.

[6] For full details of the methodology, see "Potential population supporting capacity of lands—Africa", the basic document available from the Food and Agriculture Organization of the United Nations.

TABLE 94. INTERNATIONAL NUTRITIVE VALUES PER 100 GRAMS OF FOOD PRODUCTS

Crop	Food product	Calorie (kilocalories)	Protein (grams)	Suggested factor for converting yield dry weight into food product
Wheat	Dry grain	262	7.8	1.00
Rice	Dry paddy	234	4.4	1.54[a]
Maize	Dry grain	327	7.6	1.00
Barley	Dry grain	277	7.2	1.00
Millet	Dry grain	306	8.7	1.00
Sorghum	Dry grain	309	9.1	1.00
Ground-nut	Dry unshelled nut	388	18.2	1.54[b]
Bean	Dry grain	341	22.1	1.00
Soybean	Dry grain	335	38.0	1.00
White potato	Fresh tuber	70	1.7	3.33[c]
Sweet potato	Fresh tuber	97	1.1	3.13[d]
Cassava	Fresh tuber	109	0.9	2.86[e]
Sugar-cane	Fresh cane	30	0.2	10.0[f]
Banana/plantain	Fresh fruit with skin	70	0.8	3.70[g]
Oil-palm	Oil	884	—	1.00

Source: For international nutritive values, used in food balance-sheets for converting production into food, Food and Agriculture Organization of the United Nations and United States of America, Department of Health, Education and Welfare, *Food Consumption Tables for Use in Africa* (Rome, 1968).

[a] Grain-to-paddy ratio: 0.65.
[b] Kernel-to-nut ratio: 0.65.
[c] Moisture content: 70 per cent.
[d] Moisture content: 68 per cent.
[e] Moisture content: 65 per cent.
[f] Sugar in fresh cane: 10 per cent.
[g] Skin: 10 per cent of total weight. Moisture content: 70 per cent..

Dietary preference

Traditional subsistence cultivation has, to a large extent, determined the food familiarity/dietary preference of populations. Therefore, an instant change in cultivation pattern (i.e., new crops instead of currently grown crops) to obtain the maximum calorie and protein production, cannot be considered a realistic short-term possibility. Years of extension work, seed-supply schemes and reliable marketing facilities are required before such changes can be envisaged, even to meet basic food needs. Accordingly, in the assessment of potential population-supporting capacities, account has been taken of the mixture of currently grown crops and the relative proportions of their areas of cultivation. Although such data are available on an administrative-area basis for most countries, they are not available for agro-ecological zones. Such an inventory is in progress for all developing countries as a prerequisite of the computation of potential population-supporting capacities; it is complete for Africa and Western South Asia.

Results for Africa, according to agro-ecological zones, show a picture of food-crop cultivation closely correlated with zones defined in terms of the length of the growing period (growing-period zones). Tropical and subtropical areas with summer rainfall have the food-crop cultivation patterns given in table 95.

TABLE 95. CURRENT LAND-USE PATTERNS, AFRICA

Length-of-growing-period zone (days)	General description	Main crops[a]
Warm tropics and subtropics with summer rainfall		
75–120	Arid/semi-arid	Millet-sorghum
120–150	Semi-arid	Sorghum-maize/millet-(Ground-nut/bean)
150–180	Semi-arid/subhumid	Sorghum/millet-maize-(Ground-nut/bean)
180–270	Subhumid	Maize/sorghum-cassava-(Rice)
270–330	Subhumid/humid	Cassava/maize-ground-nut/Rice-(Plantain/sugar-cane)
330–365	Humid	Cassava-maize-plantain-rice-(Oil-palm)
Moderately cool and cool subtropics with summer rainfall		
120–365	Semi-arid/humid	Maize-beans (Wheat/barley)
Cool subtropics with winter rainfall		
75–120	Arid/semi-arid	Barley-wheat
120–270	Semi-arid/Subhumid	Wheat-barley

[a] Crops given in parentheses occupy smaller areas than do the other crops.

The current land-use pattern, as determined, is introduced into the analysis of potential population-supporting capacities at the stage of optimizing the total calorie and protein production in each length-of-growing-period zone (by addition of the optimum production from each cell contained in each zone). It is applied as follows, according to the level of input being considered:

(*a*) For the low level of input analysis, the pattern of the currently grown mixture of crops is rigidly maintained as a constraint on all potentially cultivable land, even

though the crops currently grown may be inferior in terms of calorie and protein productivity;

(*b*) At the intermediate level of input, the current land-use pattern is applied only to currently cultivated areas: any balance of cultivable land is allocated to crops providing the highest calorie and protein production, immaterial of the currently grown mixture of crops;

(*c*) The analysis of potential population-supporting capacities at the high level of input assumes that all cultivable land is devoted to crops giving the highest calorie and protein production, immaterial of the currently grown mixture of crops. Thus, it includes the positive effect of an optimal cropping pattern, ignoring effective demands and therefore overstating the effects of technological change.

In all three analyses, production from irrigated land enters into the computation of optimum production from each zone. This input is both in terms of calorie and protein production and in terms of contribution to maintaining the current crop mix, as appropriate to the level of input being considered. Country-specific data on current and projected[7] extents of irrigated land, and current and projected irrigated crop production, broken down by major climates and by length-of-growing-period zones, have been used in the analysis.

Country calorie and protein requirements

The computation of potential population-supporting capacity was based on the calorie and protein requirements as governed by the composition of the country populations.

This minimum calorie and protein constraint according to country (to avoid excessive carbohydrate production) is incorporated into the analysis in the form of a linear programme. Optimization of calorie and protein production at the zone level is reiterative for each zone until both the calorie and protein constraint and the applicable current crop-mix constraint are met. Accordingly, the analysis does not assume transfer of produce from one zone to another.

C. Results

The computations simulate the long-term (in perpetuity) capacity of zones to meet the calorie and protein requirements of the population under three alternative consumptions:

(a) *High level of input*: the ultimate potential capacity if all rain-fed cultivable land were put to optimal use through application of high levels of inputs including complete mechanization, complete installation of all necessary soil conservation measures and cultivation of only the most calorie/protein-productive crops;

(b) *Intermediate level of input*: the potential capacity if all rain-fed cultivable land were utilized under an intermediate level of input, with crop optimization confined to currently unused (but potentially cultivable) areas and with application of simple conservation measures to lessen land degradation;

(c) *Low level of input*: the potential capacity, assuming only hand-labour input (no fertilizers, pesticides, insecticides) and extending the currently grown mixture of crops to all potentially cultivable lands but without conservation measures and hence with productivity losses due to land degradation.

These estimates are compared on a country basis, with data on current populations in growing-period zones to identify critical country areas where land resources are insufficient to meet current food needs.

Although there is no suitable methodology to undertake population projections on a zone basis, projections prepared by the United Nations are available on a country basis.[8] Therefore, the appropriate potential population-supporting capacities of zones are aggregated to arrive at the potential for each country as a whole; and these country potentials are compared with data on the medium-variant country population projections (year 2000) as well as with population data. This procedure allows identification of critical countries where land resources are (or will be) insufficient to supply the food needs of current and/or projected country populations.

The current population data employed in this comparison are based on the most recent census data for administrative areas, the zone totals being derived by map overlays and approximation according to the extent of zone areas occurring in the administrative areas. For these computations, the census data, which related to various dates, were brought forward to 1975; and the country totals were adjusted to correspond to the current United Nations estimates.

The results of these comparisons are given below.

Summarized zone results

Results of the assessment for each zone in Africa, combined for all countries, are presented in Table 96 by major climate. The zones occurring in each major climate are listed in column 1. Column 2 gives the total area of the zone, column 3 the current population in the zone and column 4 the current population density, expressed as persons per hectare. The remaining six columns (5–10) show the results of the assessments of potential population-supporting capacities of the zones with the three levels of input envisaged. Columns 5, 7 and 9 show the potential density; and columns 6, 8 and 10 give the ratio of the potential to current populations as of 1975. A ratio under 1.0 indicates that the potential population-supporting capacity of a zone is less than the current population in that zone. Such figures are italicized, to indicate zones where the envisaged use of the land resources cannot meet the food needs of the existing population. In considering the results, it must be re-emphasized that the assessment represents a "first approximation" of the situation and that the results need to

[7] Food and Agriculture Organization of the United Nations, "Agriculture: toward 2000".

[8] *World Population Trends and Prospects by Country, 1950–2000: Summary Report of the 1978 Assessment* (ST/ESA/SER.R/33).

TABLE 96. POTENTIAL POPULATION-SUPPORTING CAPACITIES, BY LENGTH-OF-GROWING-PERIOD ZONE, AFRICA

Length-of-growing-period zones (days) (1)	Total land (thousands of hectares) (2)	Current population (thousands) (3)	Current density (person(s) per hectare) (4)	Low input: Potential density (person(s) per hectare) (5)	Low input: Ratio[a] (6)	Intermediate input: Potential density (person(s) per hectare) (7)	Intermediate input: Ratio[a] (8)	High input: Potential density (person(s) per hectare) (9)	High input: Ratio[a] (10)
Warm tropics									
365+ N	19 791	1 367	0.07	1.43	20.8	6.33	91.8	8.99	130.2
365- N	127 585	40 636	0.32	1.61	5.1	4.69	15.4	12.55	39.4
330-364 N	75 016	16 189	0.22	1.37	6.4	5.33	24.7	11.17	51.7
300-329 N	73 264	16 555	0.23	1.44	6.4	6.07	26.9	13.43	59.4
270-299 N	127 820	29 556	0.23	0.87	3.8	4.70	20.3	10.21	44.2
240-269 N	133 423	25 157	0.19	0.92	4.9	4.43	23.5	11.58	61.4
210-239 N	129 920	20 416	0.16	0.66	4.2	2.89	18.4	10.54	67.0
180-209 N	225 745	36 794	0.16	0.49	3.0	2.15	13.2	8.37	51.3
150-179 N	175 044	29 814	0.17	0.50	3.0	2.33	13.7	9.03	53.0
120-149 N	114 190	24 917	0.22	0.14	*0.6*	0.76	3.5	5.21	23.9
90-119 N	72 051	12 661	0.18	0.08	*0.4*	0.25	1.4	3.18	18.1
75-89 N	58 436	7 661	0.13	0.06	*0.5*	0.14	1.1	1.56	11.9
1-74 N	370 809	23 825	0.06	0.03	*0.5*	0.04	*0.7*	0.06	*0.9*
0 (dry)	180 563	4 620	0.03	0.00	*0.0*	0.00	*0.0*	0.00	*0.0*
1-74 I	64 808	1 299	0.02	0.01	*0.3*	0.02	*0.7*	0.03	1.3
75-89 I	22 707	1 134	0.05	0.03	*0.7*	0.11	2.1	0.92	18.4
90-119 I	49 590	3 229	0.07	0.03	*0.5*	0.15	2.3	2.01	30.9
120-149 I	43	11	0.25	0.11	*0.4*	0.51	2.0	2.36	9.4
SUBTOTAL	2 020 797	295 841	0.15	0.50	3.4	2.08	14.2	6.11	41.8
Moderately cool tropics									
365- N	1 446	398	0.28	0.01	*0.0*	0.06	*0.2*	0.87	3.2
330-364 N	1 568	693	0.44	0.05	*0.1*	0.27	*0.6*	2.27	5.1
300-329 N	2 138	1 022	0.48	0.17	*0.3*	0.65	1.4	3.27	6.8
270-299 N	7 293	3 223	0.44	0.25	*0.6*	0.85	1.9	4.77	10.8
240-269 N	10 570	4 754	0.45	0.33	*0.7*	1.05	2.3	5.34	11.9
210-239 N	9 586	2 855	0.30	0.36	1.2	1.39	4.7	5.74	19.3
180-209 N	8 775	2 400	0.27	0.32	1.2	1.26	4.6	5.07	18.6
150-179 N	4 225	1 657	0.39	0.25	*0.6*	0.85	2.2	3.70	9.4
120-149 N	3 887	1 158	0.30	0.14	*0.5*	0.50	1.7	2.20	7.4
90-119 N	4 709	1 029	0.22	0.03	*0.1*	0.06	*0.3*	0.12	*0.6*
75-89 N	2 551	702	0.28	0.02	*0.1*	0.05	*0.2*	0.12	*0.4*
1-74 N	1 466	246	0.17	0.05	*0.3*	0.06	*0.4*	0.08	*0.5*
0 (dry)	2 750	0	0.00	0.04	-	0.04	-	0.04	-
1-74 I	2 453	20	0.01	0.01	*1.0*	0.02	1.9	0.02	2.8
75-89 I	131	0	0.01	0.00	*0.5*	0.01	1.5	0.03	3.5
90-119 I	64	0	0.00	0.00	-	0.01	-	0.03	-
SUBTOTAL	63 612	20 157	0.32	0.22	*0.7*	0.78	2.5	3.58	11.3
Cool tropics									
365- N	697	193	0.28	0.01	*0.0*	0.04	*0.2*	0.28	1.0
330-364 N	749	317	0.42	0.03	*0.1*	0.18	*0.4*	0.61	1.4
300-329 N	1 010	470	0.47	0.04	*0.1*	0.18	*0.4*	0.64	1.4
270-299 N	3 534	1 420	0.40	0.08	*0.2*	0.31	*0.8*	0.91	2.3
240-269 N	5 084	2 276	0.45	0.17	*0.4*	0.68	1.5	3.53	7.9
210-239 N	4 607	1 357	0.30	0.28	*1.0*	1.00	3.4	3.53	12.0
180-209 N	4 226	1 143	0.27	0.38	1.4	1.40	5.2	4.88	18.0
150-179 N	1 985	749	0.38	0.24	*0.6*	0.83	2.2	3.52	9.3
120-149 N	1 807	539	0.30	0.14	*0.5*	0.51	1.7	2.10	7.0
90-119 N	2 044	431	0.21	0.03	*0.1*	0.07	*0.3*	0.12	*0.6*
75-89 N	1 185	335	0.28	0.02	*0.1*	0.05	*0.2*	0.12	*0.4*
1-74 N	678	109	0.16	0.01	*0.1*	0.02	*0.2*	0.04	*0.3*
0 (dry)	1 359	0	0.00	0.00	-	0.00	-	0.00	-
1-74 I	1 223	9	0.01	0.01	1.1	0.02	2.3	0.02	3.3
75-89 I	64	0	0.00	0.01	-	0.01	-	0.03	-
90-119 I	31	0	0.00	0.00	-	0.01	-	0.02	-
SUBTOTAL	30 283	9 348	0.31	0.16	*0.5*	0.60	2.0	2.33	7.5
Cold tropics									
0 (cold)	2 905	1 070	0.37	0.0	*0.0*	0.00	*0.0*	0.00	*0.0*
SUBTOTAL	2 905	1 070	0.37	0.0	*0.0*	0.00	*0.0*	0.00	*0.0*

TABLE 96 (*continued*)

Length-of-growing-period zones (days) (1)	*Total land (thousands of hectares)* (2)	*Current population (thousands)* (3)	*Current density (person(s) per hectare)* (4)	*Low input*		*Intermediate input*		*High input*	
				Potential density (person(s) per hectare) (5)	*Ratio*[a] (6)	*Potential density (person(s) per hectare)* (7)	*Ratio*[a] (8)	*Potential density (person(s) per hectare)* (9)	*Ratio*[a] (10)
Warm subtropics with summer rainfall									
270–299 N	48	17	0.36	0.05	*0.2*	3.68	10.3	4.27	12.0
240–269 N	28	9	0.33	0.07	*0.2*	1.56	4.7	4.06	12.2
210–239 N	30	10	0.33	0.08	*0.2*	0.65	1.9	3.99	12.0
180–209 N	593	192	0.32	1.14	3.5	3.80	11.7	6.12	18.9
0 (dry)	227 611	1 509	0.01	0.00	*0.0*	0.00	*0.0*	0.00	*0.0*
1–74 I	8 849	108	0.01	0.01	*0.5*	0.01	1.1	0.02	1.6
75–89 I	684	23	0.03	0.05	1.4	0.21	6.1	1.21	35.4
90–119 I	1 456	110	0.08	0.14	1.9	0.46	6.0	2.05	27.2
120–149 I	260	66	0.25	0.65	2.6	2.18	8.6	4.75	18.7
150–179 I	282	86	0.31	0.71	2.3	2.19	7.1	3.95	12.9
SUBTOTAL	239 840	2 130	0.01	0.01	*0.6*	0.02	2.2	0.04	4.9
Moderately cool subtropics with summer rainfall									
240–269 N	25	4	0.15	0.34	2.2	0.79	5.2	2.04	13.3
210–239 N	25	4	0.15	0.37	2.4	0.99	6.4	2.14	13.9
180–209 N	371	104	0.28	0.30	1.1	1.07	3.8	2.65	9.4
0 (dry)	3 992	11	0.00	0.00	*0.0*	0.00	*0.0*	0.00	*0.0*
1–74 I	730	172	0.24	0.01	*0.0*	0.02	*0.1*	0.02	0.1
75–89 I	80	37	0.46	0.01	*0.0*	0.01	*0.0*	0.02	*0.0*
90–119 I	194	90	0.46	0.14	*0.3*	0.01	*0.0*	0.23	*0.5*
120–149 I	261	130	0.50	0.17	*0.3*	0.29	*0.6*	0.59	1.2
150–179 I	654	297	0.46	0.29	*0.6*	0.56	1.2	1.27	2.8
SUBTOTAL	6 332	849	0.13	0.06	*0.5*	0.14	1.1	0.34	2.5
Cool subtropics with summer rainfall									
240–269 N	10	3	0.31	0.01	*0.0*	0.03	*0.1*	0.15	*0.5*
210–239 N	10	1	0.15	0.02	*0.1*	0.03	*0.2*	0.14	*0.9*
180–209 N	185	50	0.27	0.36	1.3	0.96	3.5	2.66	9.8
0 (dry)	1 984	5	0.00	0.00	*0.0*	0.00	*0.0*	0.00	*0.0*
1–74 I	292	51	0.18	0.01	*0.0*	0.02	*0.1*	0.02	*0.1*
75–89 I	34	16	0.46	0.01	*0.0*	0.01	*0.0*	0.02	*0.0*
90–119 I	91	42	0.46	0.01	*0.0*	0.01	*0.0*	0.22	*0.5*
120–149 I	126	63	0.50	0.08	*0.2*	0.21	*0.4*	0.52	1.0
150–179 I	324	147	0.46	0.19	*0.4*	0.48	1.1	1.24	2.7
SUBTOTAL	3 506	378	0.12	0.05	*0.4*	0.12	*1.0*	0.32	2.6
Cold subtropics with summer rainfall									
0 (cold)	185	37	0.20	0.00	*0.0*	0.00	*0.0*	0.00	*0.0*
SUBTOTAL	185	37	0.20	0.00	*0.0*	0.00	*0.0*	0.00	*0.0*
Cool subtropics with winter rainfall									
240–269 N	84	31	0.37	0.20	*0.6*	0.77	2.1	2.84	7.7
210–239 N	7 589	7 735	1.02	0.26	*0.3*	1.21	1.2	2.78	2.7
180–209 N	7 167	7 469	1.04	0.42	*0.4*	1.96	1.9	4.02	3.9
150–179 N	5 635	3 297	0.59	0.65	1.1	1.92	3.3	3.45	5.9
120–149 N	5 819	2 829	0.49	0.41	*0.8*	1.32	2.7	2.52	5.2
90–119 N	7 751	2 644	0.34	0.41	1.2	0.81	2.4	1.34	3.9
0 (dry)	431 366	42 619	0.10	0.14	1.4	0.14	1.4	0.14	1.4
1–74 I	38 515	5 215	0.14	0.14	1.0	0.16	1.2	0.19	1.4
75–89 I	7 491	1 508	0.20	0.51	2.6	0.54	2.7	0.57	2.8
90–119 I	1 538	1 136	0.74	0.58	*0.8*	0.73	*1.0*	0.95	1.3
SUBTOTAL	512 955	74 483	0.15	0.17	1.1	0.23	1.6	0.33	2.3
Cold subtropics with winter rainfall									
0 (cold)	5 967	2 636	0.44	0.00	*0.0*	0.00	*0.0*	0.00	*0.0*
SUBTOTAL	5 967	2 636	0.44	0.00	*0.0*	0.00	*0.0*	0.00	*0.0*
TOTAL[b]	2 885 911	406 929	0.14	0.39	2.7	1.51	10.8	4.46	31.7

NOTES: The term "365+" indicates humid year-round; "N" indicates normal lengths of growing period; "I" indicates intermediate lengths of growing period.

Italics indicate that potential population-supporting capacity is less than current population.

[a] Ratio of the potential to current population.

[b] Excluding South Africa.

be interpreted with due caution, particularly as no account is taken of trade between surplus and deficient zones.

Over the vast area of the tropics, the highest population densities are generally found in the moderately cool and cool (highland) areas. Maximum densities of more than 0.4 person per hectare occur in most of the wetter parts of these climates, decreasing to 0.3 and 0.2 person per hectare as the length of growing period shortens and conditions become less suited for crop growth. Only in the extremely arid areas do current population densities decrease below 0.2 person per hectare.

The current situation is not in accord with the potential population-supporting capacities of zones in these major climatic areas, which contain a considerable number of large cities. Under low-input conditions, the majority of the zones in the cool tropics contain more people than the land can support (11 critical zones), and the situation is no better in the moderately cool tropics (12 critical zones). Even with intermediate and high levels of input, some zones still remain critical.

The situation in the vast areas of the warm tropics (lowlands) in Africa is not, in general, critical. This climatic area could support more than three times the current population even with a low level of input. Current population densities range from 0.32 person per hectare in the wetter areas to 0.03 person per hectare in the driest areas.

However, within this over-all picture of the warm tropics, critical areas do occur. With a low level of input, the entire area of the Sahelian zone is critical. On the average, all length-of-growing-period zones of less than 150 days already carry twice the number of people that can be supported with a low input level. Even with intermediate input conditions, all zones of less than a 75-day growing period are critical and cannot meet the food needs of the existing populations.

The same results generally hold true for the relatively small areas with subtropical summer rainfall climates, as is shown by the number of critical areas in these climates of Africa:

Major climatic area	*Total number of zones*	*Number of critical zones with:* Low input	Intermediate input	High input
Warm tropical lowlands	18	9	3	2
Moderately cool tropical highlands	16	12	5	3
Cool tropical highlands	16	11	7	3
Cold tropical mountains	1	1	1	1
Warm subtropics, summer rainfall	10	5	1	1
Moderately cool subtropics, summer rainfall	9	6	5	4
Cool subtropics, summer rainfall	9	8	7	6
Cold subtropics, summer rainfall	1	1	1	1
TOTAL	80	53	30	21

In contrast with these results for the developing countries in Africa south of the Sahara, areas with subtropical winter rainfall climates are not so critical with application of an intermediate level of input.

In the subtropical areas with winter rainfall in Northern Africa, population densities range from more than 1.0 person per hectare in the wetter areas to less than 0.1 person per hectare in the driest areas. Given a low level of input, such populations cannot rely on the food produced from the available land resources in 5 of the 10 zones occurring in Northern Africa. The worst situation would occur in the highly populated coastal zone with a growing period of 210–240 days, where the ratio of the potential to current population is 0.256.

Given an intermediate level of input, only one zone (99–120 days) is critical; and even in this case, the ratio of the potential to current population is very close to 1.0. With a high level of input, all growing-period zones in the subtropics with winter rainfall, except for the cold mountain areas, could produce sufficient food for their constituent populations. The situation in these climatic areas of Africa is summarized below:

Major climatic area	*Total number of zones*	*Number of critical zones with:* Low input	Intermdiate input	High input
Cool subtropics, winter rainfall	10	5	1	0
Cold subtropics, winter rainfall	1	1	1	1
TOTAL	11	6	2	1

Country zone results

Similar computations have been made for each zone of each developing country of Africa. These computations serve to pin-point critical zones, for although the over-all results for a particular zone may be "safe", the zone may be "critical" in specific countries. However, these results—which cover 14 major climates and 21 length-of-growing-period zones for 51 countries—are too voluminous to record in tablular form and will accordingly be presented in map form in future reports.

Warm tropical and subtropical lowlands

In the warm tropical and subtropical (summer rainfall) lowlands, with a low level of input, the previously described situation for Africa as a whole remains valid for most countries; that is, all growing-period zones of more than 150 days duration have the potential population-supporting capacities that are higher than the current population. Exceptions, however, do occur. As shown by the ratios of the potential to current population, they include: the northern and southern areas of Ghana (0.75) and Togo (0.55); large parts of Nigeria (0.003–0.81); the northern, eastern and southern areas of Ethiopia (0.17–0.77); some eastern areas of Uganda and Kenya (0.33–0.69) ; small proportions of Rwanda and Burundi (0.08–0.88); and western Malawi (0.43).

Growing-period zones with less than 150 days duration are critical in most countries in low-input circumstances, except in Angola, Chad, Madagascar, Namibia, the Sudan, Zambia and Zimbabwe, where the critical limit usually commences at 120 days.

With an intermediate level of input, the number and extent of critical zones are markedly reduced, both in the general country situations and in the above-mentioned exceptions. With such a level of input, only the zones with

less than 75 days of growing period remain critical in most countries; notable exceptions are in the northern areas of Senegal (0.35), the Niger (0.37), the Upper Volta (0.39), Nigeria (0.8–0.68) and southern Kenya (0.81).

With a high level of input, few zones (outside of desert areas) remain critical in the warm tropics. These critical zones comprise lands with steeply sloping terrain which precludes cultivation under the mechanized conditions envisaged with a high level of input. Such terrain is at least partially cultivable with animal power, as envisaged with an intermediate level of input.

Moderately cool, cool and cold tropics and subtropics

The position in the moderately cool, cool and cold tropical and subtropical (summer rainfall) climates also generally follows the above-mentioned situation for Africa as a whole. Reference is made to the ratios of the potential to current population for individual country zones in the description of these areas; and, in view of the critical situation, an expanded description is presented and data are given in table 97.

Six countries—Burundi, Ethiopia , Kenya, Lesotho, Rwanda and the United Republic of Tanzania—have considerable areas of land in such climates; and in each, there is a serious situation in most of the highland areas.

With a low level of input, the majority of all growing-period zones are critical. In both Burundi and Rwanda, all zones are critical, with ratios of the potential to current population ranging from 0.02 to 0.54. In Kenya, Lesotho and the United Republic of Tanzania, only isolated zones are not critical. Even in these countries, the ratios of the potential to current population are close to the danger point of 1.0: in Kenya, 1.22; in Lesotho, 1.07–2.41; and in the United Republic of Tanzania, 1.16–1.71. In each country the situation is worse in the cool climatic areas. The situation is indeed critical for the populations living in these climates, a point that has perhaps not received as much publicity and recognition as the situation in the Sahel. However, the important cash revenue from tree crops in these areas is a mitigating circumstance in comparison with the Sahelian situation.

Only at an intermediate level of input does the position appear to improve. However, even with such application, all zones in Burundi remain critical, with ratios from 0.13 to 0.74. In Kenya, two zones become safe, but one has a near critical ratio of 1.09. In Rwanda, two zones are removed from the critical list, but again with low ratios (from 1.30 to 1.62). Only in Ethiopia and Lesotho does the situation materially improve, with six and three zones, respectively, having the resources to meet the needs of the current populations; the drier zones in these two countries, however, remain critical.

Application of a high level of input has the most beneficial influence in Burundi, Kenya and Lesotho, markedly reducing the number of critical zones. The growing-period zones in Kenya and Lesotho that remain critical are confined to areas with growing periods of less than 120 days; the same situation is true in Ethiopia and the United Republic of Tanzania.

Subtropical winter rainfall areas

The critical situation facing short growing-period zones is also reflected in the results for subtropical winter rainfall areas. The growing-period zone of 1–74 days in the majority of the countries of Northern Africa remains critical at all input levels. The exceptions are such countries as Egypt and the Libyan Arab Jamahiriya, with large areas of irrigation located in this zone. Irrigation complicates and indeed dominates the country zone situation in this major climate and the unique situation of Egypt points to the importance of taking into account country-specific forms of production when computing potential population-supporting capacities.

It appears that, with one exception (Tunisia), all zones with more than a 75-day growing period have sufficient land resources to meet the food needs of current populations with an intermediate level of input. In Tunisia, a high level of input is needed before this situation is attained; and even in this situation, the 75–90 day zone still remains critical because of the slightly lower rainfall in comparison with adjacent areas (the ratio of the potential to current population is 0.16). In Egypt also, one zone remains critical even under a high level of input: the 75–90 day zone at the mouth of the Nile, which contains the vast urban populations of Alexandria. The food needs of such locations can only be met from surrounding areas.

Current and projected populations by country

Table 98 presents a comparison of the capacity of a country to feed a population of a given size, with current and projected country population data for Africa.

The over-all (average) results show that, even with a low-input situation, the continent as a whole has sufficient land resources to feed both its current (1975) and projected (year 2000) populations. Under conditions of low input, the ratio of the potential to current population is 2.73. With an intermediate input level, the ratio is 10.8; and with a high input level, it is 31.7. Even with the increased populations envisaged by the year 2000, the potential to projected population ratios, although markedly reduced, still remain above 1.0 for all three sets of circumstances, being, respectively, 1.49, 5.42 and 15.5. Increases in the potential population-supporting capacities between 1975 and the year 2000 are due to additional production from planned expansions of irrigated land.

Although this situation for the continent as a whole appears satisfactory, variations in land resources result in wide differences between countries. At the country level, the results of the potential population-supporting capacity assessment vary from extremes of 0.0 person per hectare (Western Sahara) to 12.20 persons per hectare (Zaire). Although country areas extend over wide extremes of climatic and soil conditions, the previously described relationship between climatic conditions and potential population-supporting capacities is still evident. Countries mainly located in zones with long growing periods have the highest production potentials, while those in the drier areas have the lowest and reflect the restrictive nature of the climate to rain-fed production.

TABLE 97. RATIOS OF POTENTIAL TO CURRENT POPULATION IN MODERATELY COOL AND COOL TROPICS, BY LENGTH-OF-GROWING-PERIOD ZONE, SELECTED COUNTRIES OF AFRICA

Country and level of input	Length-of-growing-period zones (days)																					
	330–364		300–329		270–299		240–269		210–239		180–209		150–179		120–149		90–119		75–89		1–74	
	MC	C	MC	C	MC	C	MC	C	MC	C	MC	C	MC	C	MC	C	MC	C	MC	C	MC	C
Burundi																						
Low	-	-	-	-	*0.08*	*0.07*	*0.13*	*0.06*	*0.25*	*0.21*	-	-	-	-	-	-	-	-	-	-		
Intermediate	-	-	-	-	*0.22*	*0.13*	*0.51*	*0.37*	*0.74*	*0.61*	-	-	-	-	-	-	-	-	-	-	-	-
High	-	-	-	-	*13.9*	0.37	*1.83*	*14.3*	*2.07*	*1.50*	-	-	-	-	-	-	-	-	-	-	-	-
Ethiopia																						
Low	0.20	*0.05*	*0.99*	*0.21*	1.96	*0.53*	1.09	*0.52*	1.20	1.02	1.38	1.50	*0.92*	*0.88*	*0.43*	*0.51*	*0.08*	*0.10*	*0.07*	*0.07*	*0.03*	*0.03*
Intermediate	1.17	0.82	3.09	0.83	6.04	2.07	4.50	2.85	5.08	3.88	5.38	6.16	3.48	3.40	1.80	2.12	*0.23*	*0.26*	*0.16*	*0.17*	*0.62*	*0.58*
High	10.8	2.59	16.9	2.70	33.6	5.75	18.6	10.7	19.4	11.1	20.0	18.9	13.6	13.0	8.54	7.77	*0.46*	*0.49*	*0.37*	*0.37*	*0.01*	*0.01*
Kenya																						
Low	*0.02*	*0.03*	*0.06*	*0.03*	*0.16*	*0.08*	*0.16*	*0.14*	*0.34*	*0.32*	*0.97*	1.22	*0.30*	*0.26*	*0.30*	*0.30*	*0.05*	*0.05*	*0.12*	*0.18*	*0.43*	*0.07*
Intermediate	*0.04*	*0.06*	*0.31*	*0.13*	*0.86*	*0.24*	*0.54*	*0.34*	*1.09*	*0.61*	4.10	3.96	*0.81*	*0.86*	*0.74*	*0.72*	*0.11*	*0.18*	*0.29*	*0.27*	*0.53*	*0.16*
High	1.60	*0.97*	3.64	*0.75*	5.59	1.03	4.78	3.32	8.09	4.77	14.2	13.7	3.38	3.28	2.54	2.52	*0.39*	*0.44*	*0.66*	*0.63*	*0.67*	*0.31*
Lesotho																						
Low	-	-	-	-	-	-	2.33	*0.02*	2.41	*0.12*	1.07	1.33	*0.64*	*0.41*	*0.33*	*0.16*	*0.29*	*0.01*	*0.01*	*0.01*	*0.01*	*0.07*
Intermediate	-	-	-	-	-	-	5.16	*0.09*	6.44	*0.21*	3.80	3.53	1.23	1.06	*0.58*	*0.42*	*0.30*	*0.03*	*0.02*	*0.26*	*0.03*	*0.34*
High	-	-	-	-	-	-	13.2	*0.49*	13.9	*0.87*	9.40	9.81	2.78	2.73	1.18	1.04	*0.50*	*0.48*	*0.04*	*0.04*	*0.05*	*0.04*
Rwanda																						
Low	*0.21*	*0.02*	*0.39*	*0.01*	*0.03*	*0.03*	*0.47*	*0.34*	*0.54*	*0.50*	-	-	-	-	-	-	-	-	-	-	-	-
Intermediate	*0.05*	*0.05*	*0.11*	*0.05*	*0.13*	*0.07*	1.61	1.30	1.62	1.33	-	-	-	-	-	-	-	-	-	-	-	-
High	*0.63*	*0.21*	*0.76*	*0.19*	*0.83*	*0.23*	5.06	4.12	4.85	3.52	-	-	-	-	-	-	-	-	-	-	-	-
United Republic of Tanzania																						
Low	-	-	-	-	*0.02*	*0.06*	*0.30*	*0.34*	*0.51*	*0.54*	*0.84*	*0.93*	1.71	1.67	1.16	*0.86*	*0.27*	*0.28*	*0.13*	*0.11*	*0.07*	*0.09*
Intermediate	-	-	-	-	*0.01*	*0.04*	1.04	*0.81*	1.79	1.06	4.18	4.48	5.04	4.82	4.16	3.56	*0.50*	*0.55*	*0.35*	*0.30*	*0.16*	*0.22*
High	-	-	-	-	1.89	*0.41*	6.08	5.13	8.93	5.52	19.4	19.1	25.9	25.2	18.2	18.1	*1.01*	*1.01*	*0.74*	*0.60*	*0.34*	*0.43*

NOTE: MC = moderately cool tropics; C = cool tropics.

TABLE 98. POTENTIAL POPULATION-SUPPORTING CAPACITIES, PERSONS PER HECTARE AND RATIOS OF THE POTENTIAL TO CURRENT AND FUTURE POPULATIONS, AFRICA

	1975						2000					
	Low input		Intermediate input		High input		Low input		Intermediate input		High input	
Country	Person(s) per hectare	Ratio[a]	Person(s) per hectare	Ratio[a]	Person(s) per hectare	Ratio[a]	Persons per hectare	Ratio[b]	Persons per Hectare	Ratio[b]	Persons per hectare	Ratio[b]
Algeria	0.03	*0.48*	0.10	1.69	0.19	3.24	0.05	*0.40*	0.12	*0.90*	0.21	1.50
Angola	0.47	8.51	2.15	38.5	7.78	139	0.47	4.47	2.15	20.3	7.77	73.4
Benin	0.56	2.05	2.66	9.77	9.42	34.6	0.55	*0.90*	2.61	4.50	9.42	34.6
Botswana	0.01	*0.85*	0.07	4.21	0.73	43.8	0.01	*0.40*	0.07	2.10	0.73	21.8
Burundi	0.31	*0.20*	1.51	*0.95*	4.05	2.55	0.29	*0.10*	1.40	*0.40*	3.72	1.20
Cape Verde	0.01	*0.01*	0.01	*0.01*	0.02	*0.02*	0.01	*0.01*	0.01	*0.01*	0.02	*0.01*
Central African Republic	0.73	22.6	3.64	113	9.49	296	0.72	12.5	3.63	62.5	9.47	163
Chad	0.11	3.50	0.54	17.3	2.33	74.9	0.11	1.98	0.54	9.40	2.32	40.5
Comoros	0.46	*0.33*	2.55	1.84	5.57	4.03	0.44	*0.20*	2.45	1.20	5.37	2.60
Congo	1.08	27.3	4.53	114	11.5	291	1.09	15.0	4.53	62.5	11.5	158
Egypt	0.60	1.51	0.61	1.51	0.61	1.51	1.10	1.60	1.10	1.60	1.10	1.60
Equatorial Guinea	1.37	11.9	3.99	34.6	11.3	97.8	1.37	6.80	3.97	19.9	11.2	56.0
Ethiopia	0.17	*0.76*	0.63	2.77	2.67	11.7	0.20	*0.50*	0.65	1.50	2.67	6.10
Gabon	1.73	98.1	5.38	305	10.3	585	1.73	67.9	5.37	211	10.3	405
Gambia	0.78	1.73	3.56	7.88	9.45	20.9	1.13	1.32	3.68	4.30	9.21	10.8
Ghana	0.91	1.87	3.82	7.88	10.8	22.4	0.97	*0.94*	3.81	3.70	10.6	10.3
Guinea	0.61	3.33	2.16	11.8	7.15	39.1	0.61	1.80	2.15	6.30	7.13	20.9
Guinea-Bissau	0.64	4.37	2.75	18.8	8.64	59.2	0.64	2.70	2.74	11.6	8.61	36.6
Ivory Coast	1.43	6.90	5.38	26.0	11.6	56.3	1.42	3.30	5.30	12.3	11.5	26.7
Kenya	0.07	*0.30*	0.21	*0.94*	0.98	4.38	0.10	*0.20*	0.24	*0.43*	0.96	1.70
Lesotho	0.18	*0.43*	0.42	1.01	1.02	2.50	0.17	*0.24*	0.41	*0.57*	1.01	1.40
Liberia	0.85	5.26	4.31	26.6	11.0	68.0	0.86	2.41	4.23	11.9	10.8	30.5
Libyan Arab Jamahiriya	0.01	1.17	0.02	2.21	0.03	3.95	0.04	1.90	0.05	2.40	0.06	3.10
Madagascar	0.81	5.54	3.32	22.6	9.80	66.9	0.93	3.20	3.38	11.8	9.73	33.9
Malawi	0.64	*0.83*	2.44	3.16	6.58	8.51	0.71	*0.40*	2.37	1.40	6.21	3.60
Mali	0.06	1.27	0.29	5.87	1.41	28.5	0.08	*0.90*	0.31	3.10	1.40	14.2
Mauritania	0.01	*0.50*	0.02	1.15	0.08	5.44	0.02	*0.50*	0.02	*0.80*	0.08	2.40
Mauritius	2.79	*0.62*	5.64	1.26	4.63	1.03	5.01	*0.71*	9.03	1.28	8.84	1.25
Morocco	0.27	*0.78*	0.58	1.65	1.00	2.88	0.62	*0.80*	0.90	1.20	1.29	1.80
Mozambique	0.48	4.44	2.01	18.4	6.80	62.4	0.50	2.30	2.01	9.40	6.76	31.5
Namibia	0.01	*0.80*	0.02	2.23	0.40	37.9	0.01	*0.40*	0.02	1.10	0.40	19.5
Niger	0.01	*0.15*	0.02	*0.44*	0.34	8.89	0.01	*0.10*	0.02	*0.30*	0.34	4.20
Nigeria	0.55	*0.77*	2.37	3.27	8.14	11.3	0.56	*0.30*	2.24	1.40	7.68	4.70
Réunion	0.55	*0.28*	1.84	*0.96*	6.54	3.41	0.52	*0.20*	1.76	*0.60*	6.25	2.30
Rwanda	0.25	*0.17*	1.36	*0.90*	3.21	2.13	0.25	*0.07*	1.28	*0.40*	2.96	*0.90*
Sao Tome and Principe	1.61	1.93	5.83	6.70	9.12	10.9	1.60	1.70	5.81	6.30	9.08	9.90
Senegal	0.23	*0.89*	1.12	4.34	5.34	20.8	0.39	*0.80*	1.26	2.50	5.32	10.8
Sierra Leone	0.79	1.92	3.87	9.40	6.53	15.9	0.82	1.00	3.79	4.70	6.38	7.80
Somalia	0.02	*0.39*	0.04	*0.76*	0.10	2.09	0.03	*0.30*	0.05	*0.50*	0.12	1.20
Sudan	0.27	4.19	0.96	15.1	4.18	65.4	0.35	2.80	1.04	8.40	4.24	34.1
Swaziland	0.64	2.29	2.27	8.12	4.29	15.4	0.63	1.20	2.23	4.10	4.23	7.80
Togo	0.69	1.61	3.38	7.95	9.66	22.7	0.72	*0.78*	3.34	3.70	9.35	10.2
Tunisia	0.13	*0.36*	0.28	*0.81*	0.53	1.51	0.38	*0.60*	0.53	*0.90*	0.76	1.30
Uganda	0.54	*0.97*	2.08	3.71	7.63	13.6	0.54	*0.48*	2.02	1.70	7.38	6.10
United Republic of Cameroon	0.60	9.64	4.35	26.2	12.1	73.2	1.59	5.50	4.32	5.0	12.1	41.9
United Republic of Tanzania	0.39	2.28	1.64	9.60	5.72	33.4	0.42	1.10	1.66	4.40	5.68	15.1
Upper Volta	0.25	1.12	0.98	4.40	5.43	24.4	0.27	*0.60*	0.99	2.30	5.37	12.4
Western Sahara	0.00	*0.00*	0.00	*0.00*	0.00	*0.00*	0.00	*0.00*	0.00	*0.00*	0.00	*0.00*
Zaire	1.17	5.44	5.28	24.46	12.33	56.9	1.16	2.86	5.23	12.82	12.20	29.82
Zambia	0.62	14.2	2.99	68.7	10.4	238	0.62	6.50	2.97	31.6	10.3	110
Zimbabwe	0.28	1.75	1.54	9.60	5.62	35.0	0.36	*0.99*	1.59	4.40	5.54	15.5
AVERAGE	0.39	2.73	1.51	10.8	4.46	31.7	0.44	1.49	1.54	5.42	4.46	15.5

NOTES: Italics indicate that the potential population-supporting capacity is less than the 1975 and/or 2000 population.
[a] Ratio of potential to current (1975) population.
[b] Ratio of potential to projected (2000) population.

Comparisons of the country potentials with data on existing and projected country populations identify countries where the land resources are insufficient to meet the food needs of the people living on them. The number of "critical" countries in Africa, where the potential population-supporting capacity is less than the populations in 1975 and 2000, is shown below according to level of input:

Level of input	Number of "critical" countries based on: Population in 1975	Population in 2000
High	2	4
Intermediate	9	13
Low	22	28

Summary and conclusions

The ability of land to produce food is limited and the limits of production are set by soil and climatic conditions and by the crop and technology employed. Any "mining" of land beyond these limits leads to land degradation and reduced productivity. Accordingly, there are critical levels of populations that can be fed from any specific land area. Once the upper level of technology has been reached, any attempts to increase food production in excess of these critical levels can only result in failure. Degradation of land and hunger are the outcome of such practices.

Estimates of the potential population-supporting capacities of lands, at the global level, are being made to identify areas where land resources are insufficient to meet the food needs of the people living in them. Results for Africa show that the continent as a whole has sufficient rain-fed cultivable land for food self-sufficiency. Given only a low level of input, the combined potential productivity from all 51 countries could feed 50 per cent more people than the projected population for the year 2000. At an intermediate input level of technology, the land resources could adequately provide for more than five times the estimated future population. However, this would require a massive movement of food between and within countries or a major movement of people, and the creation of all necessary infrastructure facilities.

At the individual zone and country level, the situation markedly changes, due to the very large differences in land resources. At the country level, it is estimated that the land resources of 12 countries are insufficient to provide for the food needs of their populations in 2000, even if intermediate input levels were obtained by that date. It is further estimated that three countries have insufficient land resources to meet the food needs of their future populations, with high input levels.

Although it is not yet possible to make satisfactory population projections at the zone level, a comparison of the potential population-supporting capacities of zones with their current populations indicates the current situation. In large areas of the warm tropical lowlands, current population densities are generally less than the potential population-supporting capacities of the land.

However, one major exception is apparent, namely, the drier lands comprising growing-period zones of less than 150 days, which, on the average, are already carrying twice the number of people who can be supported without land degradation under a low level of input. The current density is 0.08 person per hectare; the potential population-supporting capacity is 0.04 person per hectare. Even with intermediate input conditions some of these zones in specific countries remain critical, as do all zones with less than a 75-day growing period. The current density of such zones is 0.04 person per hectare; the potential is 0.02 person per hectare.

Another, but less well-recognized, major critical area occurs in the highland areas with benign moderately cool and cool climates. Six countries are principally involved; and, in those countries, the majority of all growing-period zones are already carrying more people than the land resources can support with a low input level. The current density is 0.31 person per hectare. The potential population-supporting capacity of these zones is 0.20 person per hectare with a low input level. Even with the attainment of an intermediate input level, many zones in these climates will remain critical; and, in specific countries, some zones will remain critical even at the high input level.

Three solutions are possible in the latter circumstance (critical at a high level of input) and four in the former circumstance (critical at an intermediate level of input). For those areas already carrying more people than the land resources can support at the high input level, solutions involving population planning, food importation or major land improvements are among the long-term remedies. Continuation of the current situation can only lead to accelerated worsening condition through land degradation, declining productivity and malnutrition.

In areas where the situation is critical at the intermediate input level, a further possibility is apparent: raising the input level to attain additional production. The economics of this measure and of major land improvements, however, require careful investigation.

The recognition of critical areas has identified locations where more detailed work, incorporating aspects outside the scope of this first general study, is required to ensure the well-being of current and future populations.

Chapter XVIII

ECONOMIC DISPARITIES ASSOCIATED WITH SOCIO-DEMOGRAPHIC DEVELOPMENT*

An underlying theme of the 1970s was a recognition that development is a complex, multidimensional process in which population factors play a major and sometimes decisive role. This recognition implies a need for co-ordinated economic and social action if the world population is to fulfil its promise as an inexhaustible source of creativity. This view was formalized in various resolutions of the World Population Conference at Bucharest in 1974, when emphasis was placed on the need for a better understanding of population/development interrelationships in order to facilitate policy formation and development planning.[1]

This study seeks to illuminate the linkages between population and development in two ways. One is to provide a broad assessment of global trends in selected economic and socio-demographic development indicators, with an emphasis on the disparties between countries. The other is to review the interrelationships between economic progress and socio-demographic development. However, it is beyond the scope of this study to establish causal links between population and development variables. The findings drawn from this study should shed some light on socio-demographic aspects of current United Nations tasks in the context of the New International Development Strategy, a strategy dedicated to achieving a New International Economic Order.[2]

International cross-sectional data for the years 1960 and 1975 are used in this study.[3] Projected development indicators for the year 2000 also are selectively highlighted. The choice of countries to be included in the study was based primarily on data availability; 116 countries were selected.[4] In mid-1975, these countries had a total population of 3,910 million, or about 97 per cent of the world population.

The study includes 27 developed market economies, 6 centrally planned economies in Eastern Europe and the

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* Prepared by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat.

[1] *Report of the United Nations World Population Conference, 1974, Bucharest, 19-30 August 1974* (United Nations publication, Sales No. E.75.XIII.3), chaps. I and II.

[2] "Goals and objectives of the New International Development Strategy, preliminary consideration of policy measures in all fields arrangements for review and appraisal" (A/AC.196/10).

[3] For data on gross domestic product, excluding China, the centrally planned economies of Eastern Europe and the Union of Soviet Socialist Republics, all figures were taken from *Yearbook of National Accounts Statistics, 1978* (United Nations publication, Sales No. E.79.XVII.8). Some data not reported in the *Yearbook* were made available by the United Nations Statistical Office. Data for China are based on the estimates given in Lawrence J. Lau and others, "An econometric model of China", a working paper of the Department of Economics of Stanford University, Stanford, California, January 1978; the data are adjusted at 1970 prices. For the centrally planned economies of Eastern Europe and for the USSR, it is well known that the concept of net material product is not directly comparable with the concept of gross domestic product, thus requiring adjustments for the purpose of international comparison. To arrive at the present estimates of 1960 and 1975 gross domestic product at 1970 prices for these countries, the data used are estimates by the Economic Commission for Europe (ECE), in which all allowances for depreciation and non-materials services were added to the reported data for net material product. See *Economic Survey of Europe in 1969. Part I. Structural Trends and Prospects in the European Economy* (United Nations publication, Sales No. E.70.II.E.1). The data on gross domestic product for Eastern Europe and the USSR and for the market economies have recently been revised by ECE. However, as the revised data for market economies have not been adopted in the *Yearbook*, it was not considered appropriate to use the revised data of ECE for Eastern Europe and the USSR in the present study. Data on gross domestic product for the year 2000 are from projections by the Projections and Perspective Studies Branch of the Department of International Economic and Social Affairs of the United Nations Secretariat. Four scenarios were projected; that used in this study was based on the first scenario of trend assumption, which did not assume any marked departure from past policies and performance of the developing countries.

All figures on demographic indicators are taken from *World Population Trends and Prospects by Country, 1950-2000: Summary Report of the 1978 Assessment* (ST/ESA/SER.R/33). All other socio-economic indicators are from the following sources: *World Energy Supplies, 1950–1974* (United Nations publication, Sales No. E.76.XVII.5); Population Division, computer print-out for "Urban/rural projections from 1950 to 2000", revised 1 July 1977; United Nations Educational, Scientific and Cultural Organization, *Statistical Yearbook, 1978* (Paris, 1979); World Health Organization, *World Health Statistics Annual, 1960, 1965, 1970* and *1975* (Geneva); World Bank, *World Table 1976* (Baltimore, Maryland, Johns Hopkins University Press for the World Bank, 1976); *World Statistics in Brief*, Statistical Papers, Series V, No. 2 (United Nations publication, Sales No. E.78.XVII.9); and International Labour Office, *Labour Force Estimates and Projections, 1950-2000*, vol. V. *World Summary* (Geneva, 1977).

[4] The countries selected are as follows:

(a) *Developed market economies (27)*: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Federal Republic of Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Luxembourg, Malta, Netherlands, New Zealand, Norway, Portugal, South Africa, Spain, Sweden, Switzerland, United Kingdom of Great Britain and Northern Ireland, United States of America and Yugoslavia;

(b) *Centrally planned economies of Eastern Europe and USSR (7)*: Bulgaria, Czechoslovakia, German Democratic Republic, Hungary, Poland, Romania and Union of Soviet Socialist Republics;

(c) *Developing countries (82)*:

(i) *Africa (31)*: Algeria, Botswana, Comoros, Congo, Egypt, Ethiopia, Gabon, Ghana, Ivory Coast, Kenya, Liberia, Libyan Arab Jamahiriya, Madagascar, Malawi, Mauritania, Mauritius, Morocco, Nigeria, Rwanda, Senegal, Sierra Leone, Sudan, Togo, Tunisia, Uganda, United Republic of Cameroon, United Republic of Tanzania, Upper Volta, Zaire, Zambia and Zimbabwe;

(ii) *Latin America (24)*: Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, Suriname, Trinidad and Tobago, Uruguay and Venezuela;

[*footnotes continued on following page*]

Union of Soviet Socialist Republics, and 82 developing countries. The first two groups constitute the economically more developed countries and the third group the economically less developed countries. This classification was adopted for statistical purposes and does not necessarily reflect the stage that each country has reached in the development process.

The developing countries were classified in two ways. They were divided geographically into five major areas and into countries that do or do not export petroleum. Excluding China and Viet Nam, which have centrally planned economies, the countries included are market economies.[5]

This chapter is divided into three major sections. First, development levels are presented, highlighting inter-country disparities in gross domestic product per capita, energy consumption and socio-demographic indicators. In the second section, interperiod changes in these disparities are examined. A comment on the results of the study is presented in the final section.

A. Levels of economic and socio-demographic disparities, 1975

The focus of this section is on the economic gaps between countries in terms of gross domestic product, commercial energy consumption, social indicators and associated population characteristics.

Population and gross domestic product

Table 99 indicates that in 1975, the developing countries as a group, comprising 72 per cent of the world population, produced 20 per cent of the world gross domestic product. In contrast, the developed market economies, comprising 19 per cent of the world population, produced 65 per cent; and the centrally planned economies of Eastern Europe and the USSR, comprising

[*footnotes continued from preceding page*]

(iii) *East Asia* (*3*): China, Hong Kong and Republic of Korea;

(iv) *South Asia* (*22*): Bangladesh, Burma, Cyprus, India, Indonesia, Iran, Iraq, Jordan, Kuwait, Lebanon, Malaysia, Nepal, Pakistan, Philippines, Saudi Arabia, Singapore, Sri Lanka, Syrian Arab Republic, Thailand, Turkey, Viet Nam and Yemen;

(v) *Oceania* (*2*): Fiji and Papua New Guinea.

[5] Other centrally planned economies, such as Cuba and the Democratic People's Republic of Korea, were not included in the study because comparable data on gross domestic product for 1960 and 1975 were not available.

Table 99. Distribution of population and gross domestic product, by major country group, developed and developing countries, 1975

Country group	Number of countries	Population: Number (millions)	Population: Distribution (percentage)	Gross domestic product: Total (billions of dollars)[a]	Gross domestic product: Distribution (percentage)	Gross domestic product: Weighted average gross domestic product per capita (dollars)[a]
All countries	116	3910	100	3760	100	962
Developed market economies[b]	27	758	19	2434	65	3208
Developing economies[c]	82	2791	72	753	20	270
Centrally planned economies of Eastern Europe and USSR[d]	7	361	9	573	15	1590

Sources: For data on demographic indicators, *World Population Trends and Prospects by Country, 1950–2000: Summary Report of the 1978 Assessment* (ST/ESA/SER.R/33). For gross domestic product, excluding China, the centrally planned economies of Eastern Europe and the Union of Soviet Socialist Republics, *Yearbook of National Accounts Statistics, 1978* (United Nations publication, Sales No. E.79.XVII.8); and United Nations Statistical Office. Data for China are based on the estimates given in Lawrence J. Lau and others, "An econometric model of China", working paper of the Department of Economics of Stanford University, Stanford, California, January 1978; the data are adjusted at 1970 prices. For the centrally planned economies of Eastern Europe and the USSR, estimates of the Economic Commission for Europe; see *Economic Survey of Europe in 1969. Part I. Structural Trends and Prospects in the European Economy* (United Nations publication, Sales No. E.70.II.E.1). For further details concerning the data on gross domestic product, see footnote *3* in the text

[a] Expressed in 1970 prices.

[b] Australia, Austria, Belgium, Canada, Denmark, Finland, France, Federal Republic of Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Luxembourg, Malta, Netherlands, New Zealand, Norway, Portugal, South Africa, Spain, Sweden, Switzerland, United Kingdom of Great Britain and Northern Ireland, United States of America and Yugoslavia;

[c] Including, by major area:

Africa (*31*): Algeria, Botswana, Comoros, Congo, Egypt, Ethiopia, Gabon, Ghana, Ivory Coast, Kenya, Liberia, Libyan Arab Jamahiriya, Madagascar, Malawi, Mauritania, Mauritius, Morocco, Nigeria, Rwanda, Senegal, Sierra Leone, Sudan, Togo, Tunisia, Uganda, United Republic of Cameroon, United Republic of Tanzania, Upper Volta, Zaire, Zambia and Zimbabwe;

Latin America (*24*): Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, Suriname, Trinidad and Tobago, Uruguay and Venezuela;

East Asia (*3*): China, Hong Kong and Republic of Korea;

South Asia (*22*): Bangladesh, Burma, Cyprus, India, Indonesia, Iran, Iraq, Jordan, Kuwait, Lebanon, Malaysia, Nepal, Pakistan, Philippines, Saudi Arabia, Singapore, Sri Lanka, Syrian Arab Republic, Thailand, Turkey, Viet Nam and Yemen;

Oceania (*2*): Fiji and Papua New Guinea;

[d] Bulgaria, Czechoslovakia, German Democratic Republic, Hungary, Poland, Romania and Union of Soviet Socialist Republics.

TABLE 100. DISTRIBUTION OF POPULATION AND GROSS DOMESTIC PRODUCT, BY GEOGRAPHICAL AREA AND TYPE OF ECONOMY, DEVELOPING COUNTRIES, 1975

Country group	Number of countries	Population		Gross domestic product		
		Number (millions)	Distribution (percentage)	Total (billions of dollars)[a]	Distribution (percentage)	Weighted average of gross domestic product per capita (dollars)[a]
Developing economies	82	2 791	100	753	100	270
Geographical area						
Africa	31	328	12	66	9	200
Latin America	24	311	11	217	29	699
East Asia	3	934	33	237	31	254
South Asia	22	1 215	44	232	31	191
Oceania	2	3	1	1	[b]	286
Type of economy						
Petroleum-exporting countries[c]	12	292	10	130	17	445
Non-petroleum-exporting countries[d]	70	2 499	90	623	83	249

Sources: See table 99.

NOTE: For list of countries, see footnotes *b-d* to table 99.

[a] Expressed in 1970 prices.

[b] Less than 1 per cent.

[c] The 12 petroleum-exporting countries included are Algeria, Ecuador, Gabon, Indonesia, Iran, Iraq, Kuwait, Libyan Arab Jamahiriya, Nigeria, Saudi Arabia, Trinidad and Tobago, and Venezuela.

[d] The 70 non-petroleum-exporting countries include all other developing countries not listed in footnote c.

9 per cent of the world population, produced 15 per cent. In 1975, the gross domestic product per capita of the developing countries was equal to $270, measured in 1970 prices.[6] This figure amounted to about one twelfth that of the developed market economies and about one sixth that of the centrally planned economies of Eastern Europe and the USSR. In absolute terms, the gap in gross domestic product per capita between the developing and the developed market economies was $2,938. The gap between the developing countries and the centrally planned economies of Eastern Europe and the USSR was $1,320. This measure also differs markedly among developing countries. It appears from table 100 that in 1975 the average gross domestic product per capita was only $249 for the developing economies that are not petroleum exporters, which was $196 less than the figure for the petroleum-exporting countries.

In some countries, such as Bangladesh, Ethiopia, Rwanda and the Upper Volta, the gross domestic product per capita in 1975 was as low as $100. In contrast, some petroleum-exporting countries, such as Kuwait, the Libyan Arab Jamahiriya and Saudi Arabia, had reached the level of the developed countries: in 1975, gross domestic product per capita in those countries ranged from $2,500 to $11,000.

Disparities in gross domestic product per capita are also reflected in the regional averages, which ranged from a high of $699 in Latin America to a low of $191 in South Asia. The latter figure, however, is more representative of the less developed regions as a whole. Oceania, the area with the second highest level, had a gross domestic product per capita of $286, less than half that of Latin America.

The economic gap between the developed and developing countries is but a partial measure of world-wide disparities in levels of living. In table 101, the 116 countries are ranked in ascending order according to gross domestic product per capita and grouped into quintiles of total world population. In 1975, the 48 countries with the lowest gross domestic product per capita had 60 per cent of the world population; yet, they produced only 11 per cent of the world gross domestic product. The average per capita level of these countries was $175. In contrast, the remaining 68 countries, with 40 per cent of the world population, produced 89 per cent of the total gross domestic product. The average gross domestic product per capita of these countries was $2,138. This inequality can also be depicted another way: the countries in the highest decile produced a share of world gross domestic product that was 52 times that of the countries in the lowest decile. China and India, which account for almost half of the world population (23 and 16 per cent, respectively), also constituted the largest part of the two lowest quintiles. The United States of America, which had only about 5.5 per cent of the world population, accounted for a larger share of the world gross domestic product than any other country: 29 per cent.

The conventional Gini coefficient is a summary measure of the degree of concentration of gross domestic product with respect to all groups of the population. It has a value of zero if income is equally distributed and of 1.0 if all income is concentrated in one population group. A value greater than 0.3 is commonly regarded as an indicator of a high degree of concentration. The Gini coefficients for 1975 are as follows:

[6] All data on gross domestic product for 1960 and 1975 are expressed in dollars at 1970 prices.

Country group	Estimated Gini coefficient
All countries	0.662
Developed market economies	0.259
Developing economies	0.441
Centrally planned economies of Eastern Europe and USSR	0.053

Applied to all countries included in the study, the Gini coefficient in 1975 was 0.662, indicating a high degree of concentration of the world gross domestic product.[7] Inequality also existed in the distribution of gross domestic product per capita within each of the country groups. Within the developing countries, the developed market economies and the centrally planned economies of Eastern Europe and the USSR, the respective Gini coefficients in 1975 were 0.441, 0.259 and 0.053. These figures indicate that within the group of developing countries, the distribution of gross domestic product per capita was most skewed and that the corresponding distribution among the centrally planned economies of Eastern Europe and the USSR was least skewed. In the latter case, the low Gini coefficient is due in part to the fact that the Soviet Union accounts for 70 per cent of the aggregate gross domestic product of the group and for 71 per cent of its population. Nevertheless, the disparities in gross domestic product per capita between countries in this group are substantially smaller than between countries in the groups of developed market economies and developing economies.

Energy consumption

Levels of energy consumption provide another indicator of the economic gap between developed and developing countries. Past studies have shown that energy consumption is closely related to national production, both in agriculture and in industry.[8] Table 102 indicates that the weighted (unweighted) average[9] of world commercial energy consumption amounted to 2,038 (1,945) kilograms of coal equivalent per capita in 1975.

In 1975, commercial energy consumption in the developing countries was only 470 kilograms of coal equivalent per capita, which amounted to about one thirteenth of the corresponding figure for the developed market economies and about one twelfth of the figure for the centrally planned economies of Eastern Europe and the USSR. Within the developing economies, the levels of energy consumption varied by geographical area and by petroleum-exporting status. It appears from table 102 that in 1975, Latin America and Africa had the highest and lowest levels of per capita commercial energy consumption, respectively.

Differentials in gross domestic product per capita and commercial energy consumption are crude measures of the economic gaps between developed and developing countries. Welfare implications drawn from these data must be qualified at least by three considerations. First, the use of market prices and official exchange rates for conversion into a common currency (usually dollars) leads to major distortions in the evaluation of relative levels of living. Alternative methods of comparing levels of gross domestic product across countries, based on the relative purchasing power of currencies, would suggest that actual differences are probably much smaller.[10] Nevertheless, even if the relative purchasing power of

[7] In this study, Gini coefficients were computed from data on national gross domestic product per capita. They do not measure the disparities within countries and thus underestimate the degree of inequality for all groups of the world population.

[8] "Changing patterns in the world energy situation: note by the Secretary-General" (E/C.7/2/Add.1).

[9] The weighted averages are weighted by the size of the population. The unweighted averages treat each country as one unit.

[10] Irving B. Kravis, Alan W. Heston and Robert Summers, "Real GDP per capita for more than one hundred countries", *The Economic Journal*, vol. 88, No. 350 (June 1978), pp. 215-242.

TABLE 101. QUINTILE DISTRIBUTION, AND HIGHEST AND LOWEST DECILES, BY MAJOR COUNTRY GROUP, DEVELOPED AND DEVELOPING COUNTRIES, 1975

Category	Number of countries[b]	Share of gross domestic product (percentage)			
		All countries	Developed market economies	Developing economies	Centrally planned economies of Eastern Europe and USSR
		Population quintile (percentage)			
I. 0–20	11	2	8	7	17
II. 20–40	22	4	14	8	19
III. 40–60	15	5	19	17	20
IV. 60–80	42	20	27	19	21
V. 80–100	26	69	32	49	23
TOTAL	100	100	100	100	100
		Decile (percentage)			
I. 0–10	10	1	3	3	9
X. 90–100	13	47	16	36	13

Sources: See table 99.

NOTE: For list of countries, see footnotes *b-d* to table 99.

[a] Quintile distribution computed on the basis of an estimated Lorenz curve.

[b] When a country fell between two quintiles, it was assigned to the quintile that corresponded to the higher share of its population.

TABLE 102. CONSUMPTION OF COMMERCIAL ENERGY PER CAPITA, BY MAJOR COUNTRY GROUP, GEOGRAPHICAL AREA AND TYPE OF ECONOMY, 116 DEVELOPED AND DEVELOPING COUNTRIES, 1975

Country group	Consumption of commercial energy per capita	
	Weighted average (equivalent to kilograms of coal)	Unweighted average
All countries	2 038	1 945
Developed market economies	6 207	4 818
Developing economies	470	708
Centrally planned economies of Eastern Europe and USSR	5 444	5 250
Developing economies		
Geographical area		
Africa	214	277
Latin America	934	1 004
East Asia	654	931
South Asia	270	992
Oceania	335	434
Type of economy		
Petroleum-exporting countries	541	1 830
Non-petroleum-exporting countries	462	507

Source: *World Energy Supplies, 1950–1974* (United Nations publication, Sales No. E.76.XVII.5).

NOTE: For list of countries, see footnotes *b-d* to table 99.

currencies were taken into account, significant disparities would remain. Many other difficulties arise with gross domestic product per capita—for example, non-market transactions, employment costs, pollution, resource depletion, military expenses and index number problems. However, the fact remains that many people living in the developing countries lack adequate nutrition, housing, health services and education.[11]

Secondly, differences in income per capita between the developing and developed countries exaggerate disparities in welfare due to such demographic factors as differences in the age structure and size of the consumption unit. Because the needs of persons of different sex and age and of households of different sizes are not the same, the differentials in levels of living may be less than those implied by the differentials in gross domestic product per capita. Based on a limited number of inter-country comparisons, the income per equivalent adult consumer would be 10 or 20 per cent higher than the income per capita in developing countries.[12]

Thirdly, gross domestic product per capita and commercial energy consumption are but two measures of economic gaps. Alternative methods of measuring world-wide disparities have focused on the concept of poverty (a multidimensional phenomenon relating to societal norms) and the quality of life. Its components include life expectancy, nutrition, housing, other forms of consumption, education and skill formation. Although not all of these components can be summarized in a scalar measure, each can be regarded as a different aspect of poverty. Disparities in terms of selected socio-demographic indicators are examined in the next section. Nevertheless, Hauser states that a high correlation has been shown by studies, with regard to the developing countries meeting basic needs, or making progress towards those objectives, and increases in gross domestic product per capita.[13]

Socio-demographic disparities

Inter-country differences in gross domestic product per capita having been reviewed, this section explores their relation to gaps in levels of selected socio-demographic indicators for 1975. Findings based on country groups for each of the selected socio-demographic factors are presented, followed by findings concerning disparities among the developing economies.

Disparities between developed and developing countries

It has been generally recognized that a dichotomy between the developing and developed countries has existed with regard to fertility and mortality. But the degree of association between these demographic rates and levels of gross domestic product per capita is much weaker than it once was. Other variables, such as disease control and advanced medical techniques, have become important factors contributing to mortality declines.

It appears from table 103 that in 1975 the average total fertility rate in the developing economies was 4.932 per woman, which was 2.4 times that of the developed market economies and 2.1 times that of the centrally planned economies of Eastern Europe and the USSR. The weighted average of life expectancy at birth was 56 years for the developing countries, which was 22 and 20 per cent less than those of the developed market economies and the centrally planned economies of Eastern Europe and the USSR, respectively. Given these differentials in levels of fertility and life expectancy between the developing and developed countries, one would expect that rates of natural increase in the former group would be substantially higher than those in the latter. The weighted (unweighted) average rate of natural population increase in the developing countries was 3.3 and 2.5 (3.6 and 4) times as large as the corresponding rates in the developed market economies and the centrally planned economies of Eastern Europe and the USSR, respectively.

The over-all association of economic disparities with disparities in fertility and life expectancy levels is also found in country configurations. In this study, levels of gross domestic product per capita were related to total fertility rates and to life expectancy at birth, respectively. The results are given in tables 104 and 105, in which each

[11] Over 460 million people, or about 12 per cent of the world population in 1974, were undernourished; of these, at least 40 per cent were children. A recent study by the Food and Agriculture Organization of the United Nations, based on a normative scenario, also reveals that the number of people below the critical level of food intake would not fall below 240 million over the next two decades. See "The world food problem" (E/CONF.65/4), prepared for the United Nations World Food Conference, Rome, 5-16 November 1974; and Food and Agriculture Organization of the United Nations, "Agriculture: toward 2000", C 79/24, document prepared for the twentieth session, Rome, 10-29 November 1979.

[12] E. Kleiman, "Age composition, size of households, and the interpretation of per capita income", *Economic Development and Cultural Change*, vol. 15, No. 1 (October 1966), pp. 37-58.

[13] Philip M. Hauser, ed., *World Population and Development*, (Syracuse, New York, Syracuse University Press, 1979), pp. 35-36.

TABLE 103. AVERAGE GROSS DOMESTIC PRODUCT PER CAPITA AND DEMOGRAPHIC INDICATORS, BY MAJOR COUNTRY GROUP, 116 DEVELOPED AND DEVELOPING COUNTRIES, 1975

Country group	*Gross domestic product per capita (dollars)*[a]		*Rate of natural population increase (per 1,000)*		*Total fertility rate (per woman)*		*Life expectancy at birth (years)*	
	Weighted[b]	*Unweighted*	*Weighted*[b]	*Unweighted*	*Weighted*[b]	*Unweighted*	*Weighted*[b]	*Unweighted*
All countries	962	1 150	18.1	20.7	4.086	4.662	61	60
Developed market economies	3 208	2 612	6.8	7.3	2.018	2.217	72	72
Developing economies	270	627	22.3	26.4	4.932	5.671	56	55
Centrally planned economies of Eastern Europe and USSR	1 590	1 636	8.8	6.6	2.362	2.265	70	70

Sources: See table 99.

NOTE: For list of countries, see footnotes *b-d* to table 99.
[a] Expressed in 1970 prices.
[b] Average weighted by population size.

variable is classified into seven strata, creating a total of 49 cells in each comparison. These tables reveal two rather systematic, although not uniform, patterns. A movement from lower to higher income strata is negatively associated with changes in total fertility rates and positively associated with changes in life expectancy at birth.

Two observations can be made concerning these country configurations. First, although most countries conform to the patterns described above, a number of countries deviate from them, showing levels of fertility and life expectancy that are different from those which would have been expected on the basis of their gross domestic product per capita. This finding confirms that levels of that measure alone cannot explain all inter-country differences in demographic behaviour. In terms of population size, the most important example is China, which has low levels of fertility and a high life expectancy, compared with other countries in the $200–$349 income bracket. The total fertility rate in China (3.502) and the life expectancy at birth (63 years) are very close to the levels of countries that are in the $750–$1,399 stratum per capita. (Cyprus, Fiji, Mauritius and Sri Lanka also have lower fertility rates than other countries in their respective strata of gross domestic product per capita.) In contrast, the petroleum-exporting countries, such as Iran, Kuwait, the Libyan Arab Jamahiriya, Saudi Arabia and Venezuela, as well as Israel and Suriname, had comparatively high fertility rates in relation to other countries in their per capita groups. That the petroleum-exporting countries do not follow the general pattern may be due to the fact that gross domestic product is a measure of production rather than consumption and that in the case of oil, it measures the sale of an asset.

Similarly, when compared with other countries in their own income strata, a substantial number of countries characterized by a low gross domestic product per capita had a higher life expectancy. These countries include China, Costa Rica, Cyprus, El Salvador, Fiji, Jamaica, Mauritius, Paraguay and Sri Lanka, with life expectancy at birth over 60 years in 1975, although their levels of gross domestic product per capita were less than $750. One explanation of the lower mortality in these countries is that they have been more successful than others in developing means and facilities for improving health, including improved social and economic conditions (other than income levels). In contrast, other countries had a lower life expectancy than was usual for countries in their strata of gross domestic product per capita. These countries include the Congo, Gabon, the Ivory Coast, the Libyan Arab Jamahiriya, Saudi Arabia, South Africa and Zambia, where socio-demographic development in general may not have kept pace with rapid economic growth.[14]

Secondly, it appears from tables 104 and 105 that two clusters of countries can be distinguished. At one end of the spectrum are the countries with a gross domestic product per capita of $350 or less that have total a fertility rate of five or more children per woman of childbearing ages and a life expectancy at birth of less than 55 years. At the other end of the spectrum are countries with a per capita level of $750 and more that have a total fertility rate of three children or fewer per woman and a life expectancy at birth of at least 65 years. This group includes all the developed countries and a few developing countries. Between the income strata of $349 and $750, the distributions involve a very wide range of fertility and mortality levels.

The income stratum of $350–$749 deserves further attention. In this stratum, there is a wide range of total fertility rates and levels of life expectancy at birth. Total fertility rates in this group range from less than 2.5 in Cyprus to 6.5 and more for such countries as in Iran and Iraq. Similarly, the levels of life expectancy at birth range from less than 50 years in Zambia to more than 70 years in Cyprus and Fiji. Nevertheless, the majority of countries in this income stratum are at a transition stage approaching low fertility rates coupled with a high life expectancy at birth.

The existence of the two clusters observed in this study is consistent with the threshold hypothesis, according to which fertility is little affected by the process of social and economic development until a certain level of develop-

[14] Most of these countries are petroleum exporters. Two other countries, the Congo and South Africa, are major mineral exporters. Thus, the gross domestic product of these countries may be inflated by the sale of resources.

TABLE 104 CONFIGURATION OF COUNTRIES ACCORDING TO TOTAL FERTILITY RATE AND GROSS DOMESTIC PRODUCT PER CAPITA, 116 DEVELOPED AND DEVELOPING COUNTRIES, 1975

Total fertility rate	*Countries in each total fertility rate group in which 1975 gross domestic product per capita was: (dollars)*[a]						
	Under 100	*100–199*	*200–349*	*350–749*	*749–1,399*	*1,400–2,599*	*2,600 and over*
Under 2.5	—	—	—	Cyprus	Malta Yugoslavia	Austria Bulgaria Czechslovakia German Democratic Republic Greece Hungary Italy Japan New Zealand Poland United Kingdom USSR	Australia Belgium Canada Denmark Finland France Germany, Federal Republic of Iceland Luxembourg Netherlands Norway Sweden Switzerland United States of America
2.5–2.9	—	—	—	—	Argentina Hong Kong Portugal Romania Singapore Spain Trinidad and Tobaco Uruguay	Puerto Rico	—
3.0–3.9	—	Sri Lanka	China Mauritius	Chile Costa Rica Fiji Republic of Korea	—	Ireland Israel	—
4.0–4.9	—	—	—	Colombia Guyana Jamaica	Gabon Panama	—	—
5.0–5.9	Burma Haiti India Indonesia	Comoros United Republic of Cameroon Viet Nam	Congo Egypt Paraguay Philippines Thailand	Brazil Dominican Republic Guatemala Lebanon Malaysia Peru Turkey	South Africa Venezuela	—	—
6.0–6.4	Nepal Upper Volta Zaire	Madagascar Senegal Sierra Leone Uganda United Republic of Tanzania	Botswana El Salvador Papua New Guinea	Ecuador Mexico Tunisia	Suriname	—	Kuwait
6.5 and over	Bangladesh Ethiopia Malawi Rwanda	Kenya Mauritania Nigeria Pakistan Sudan Togo Yeman	Bolivia Ghana Honduras Ivory Coast Jordan Liberia Morocco	Algeria Iran Iraq Nicaragua Syrian Arab Republic Zambia Zimbabwe[b]	—	Libyan Arab Jamahiriya	Saudi Arabia

Sources: See table 99.

[a] Measured in 1970 prices.
[b] Formerly called Southern Rhodesia.

TABLE 105. CONFIGURATION OF COUNTRIES ACCORDING TO LIFE EXPECTANCY AT BIRTH AND GROSS DOMESTIC PRODUCT PER CAPITA, 116 DEVELOPED AND DEVELOPING COUNTRIES, 1975

Life expectancy at birth (years)	*Countries in each life expectancy group in which 1975 gross domestic product per capita was: (dollars)*[a]						
	Under 100	*100–199*	*200–349*	*350–749*	*749–1,399*	*1,400–2,599*	*2,600 and over*
Under 45	Ethiopia Malawi Nepal Rwanda Upper Volta Zaire	Comoros Madagascar Mauritania Senegal Sierra Leone Togo United Republic of Cameroon Yemen	Congo Ivory Coast	—	Gabon	—	—
45–49.9	Bangladesh Haiti Indonesia	Nigeria Sudan United Republic of Tanzania Viet Nam	Bolivia Botswana Ghana Liberia Papua New Guinea	Zambia	—	—	Saudi Arabia
50–54.9	Burma India	Kenya Pakistan Uganda	Egypt Jordan Morocco	Iran Iraq Nicaragua Zimbabwe[b]	—	Libyan Arab Jamahiriya	—
55–59.9	—	—	Honduras Philippines Thailand	Algeria Dominican Republic Ecuador Guatemala Peru Syrian Arab Republic Tunisia Turkey	South Africa	—	—
60–64.9	—	—	China El Salvador Paraguay	Brazil Colombia Lebanon Malaysia Mexico Republic of Korea	—	—	—
65–69.9	—	Sri Lanka	Mauritius	Chile Costa Rica Guyana Jamaica	Argentina Panama Portugal Romania Singapore Suriname Trinidad and Tobago Uruguay Venezuela Yugoslavia	Hungary USSR	Kuwait
70 and over	—	—	—	Cyprus Fiji	Hong Kong Malta Spain	Austria Bulgaria Czechoslovakia German Democratic Republic Greece Ireland Israel Italy Japan New Zealand Puerto Rico Poland United Kingdom	Australia Belgium Canada Denmark Finland France Germany, Federal Republic of Iceland Luxembourg Netherlands Norway Sweden Switzerland United States of America

Sources: See table 99.

[a] Measured in 1970 prices.

[b] Formerly called Southern Rhodesia.

ment has been reached. At that time, the factors resistant to fertility decline have disappeared and a significant reduction in fertility ensues.

Given the a priori classification of countries into seven strata of gross domestic product per capita and total fertility rates, the data suggest that a gross domestic product per capita of $750 at 1970 prices would be the threshold level for significant fertility reduction. Based on an a priori classification of income strata and the country configuration, a per capita level of $350 seems to be the dividing line between the pre-transition and the intermediate stage of demographic transition. The current country configuration with polar groups having low and high fertility rates and with many countries in an intermediate position could be interpreted as indicating that one group of countries had completed the transition to low fertility, another group had not yet attained the threshold level of transition, and a few countries are currently in the process of transition from high to low fertility levels.

Although these findings are consistent with the threshold hypothesis, they must be qualified at least by two factors. First, gross domestic product per capita is not a sufficient measure of socio-economic development; others are examined below.[15] Secondly, the threshold hypothesis is open to a priori objections on the ground that it is preoccupied with the effects of socio-economic development on fertility and neglects the possible feedback effects. In actuality, the transition to low fertility and the improvement of socio-economic conditions interact with each other. Moreover, efforts to identify thresholds for the initiation of fertility reduction are still at a preliminary stage and it should not be used for predictive purposes.[16]

Age structure and urbanization are among those demographic variables which are most closely related to economic development. They also reveal a contrasting pattern between the developing and developed countries. Changes in the age composition of the population will affect economic development because the productive performance of a country depends largely upon its working-age population. Furthermore, the age structure of a population will have an impact on consumption levels and patterns, because people at different ages have different needs.

The adult working-age population ratio, defined as the number of persons aged 15–64 as a percentage of total population, is lower in the developing countries than in the developed countries. In the developing countries, the adult working-age population accounted for only 56 per cent of total population in 1975. This figure is 8 and 9 percentage points lower than those of the developed market economies and the centrally planned economies of Eastern Europe and the USSR, respectively:

	Adult working-age ratio		*Proportion of the population urban*	
Country group	*Weighted*[a]	*Unweighted*	*Weighted*[a]	*Unweighted*
	(percentage)		*(percentage)*	
All countries	58	57	39	46
Developed market economies	64	63	72	69
Developing economies	56	54	28	37
Centrally planned economies of Eastern Europe and USSR	65	65	60	58

[a] Country averages weighted by population size.

In 1975, persons under 15 years of age made up about two fifths of the total population in the developing countries, compared with only about one fourth of total population in the developed countries. Persons above age 65 made up only 4 per cent of the total population in the developing countries, compared with about 11 per cent in the developed countries.

The difference in age structure can be a significant factor in explaining differentials in gross domestic product per capita. Because the young and persons of retirement age are consumers but may not be producers, the greater their proportion in the population, the less is its capacity to produce and save likely to be, thus resulting in slower economic growth.

The difference between the age structures of the developing and developed countries is consistent with the differences in their fertility and mortality levels. The comparatively low proportion of the population of working age is attributed to the high fertility and mortality levels in the developing countries (see table 103). Within the developing countries, there is a difference in the age structures of countries in the pre-transition and the intermediate transition stages of fertility change. For countries in the pre-transition stage with high fertility and mortality levels, such as Ethiopia and the Upper Volta, the proportion of the population under age 15 is comparatively low, resulting in an adult working-age ratio of more than 52 per cent. In contrast, such countries as Suriname, where the ratio is 50 per cent, are at the intermediate stage of demographic transition, where the rate of mortality decline exceeds the rate of fertility decline. This configuration results in the high proportion of persons under age 15 and consequently in the comparatively low proportion of the population of adult working age.

Economic development, industrialization and urbanization are linked in a number of ways, but the scope of this study is confined to relationships between the proportion of the population that is urban and the levels of gross domestic product per capita. The findings based on broad country groups support the hypothesis that there is a positive association between these two measures.

It appears from the foregoing text table that 39 per cent of the world population were classified as urban dwellers

[15] See. W. Parker Mauldin and Bernard Berelson, "Conditions of fertility decline in developing countries, 1965–75", *Studies in Family Planning*, vol. 9, No. 5 (May 1978), p. 92; *Population Bulletin of the United Nations, No. 7–1963, With Special Reference to Conditions and Trends of Fertility in the World* (United Nations publication, Sales No. 64.XIII.2); Dudley Kirk, "A new demographic transition?", *Rapid Population Growth: Consequences and Policy Implications* (Baltimore, Maryland, Johns Hopkins University Press for National Academy of Sciences 1977), pp. 138-145; K. S. Srikantan, *The Family Planning Program in the Socioeconomic Context* (New York, The Population Council, 1977).

[16] D. Kirk, *op. cit.*, pp. 145-146.

in 1975.[17] A majority of the population in the developing countries reside in areas classified as rural, while a majority of the population in the developed countries reside in areas defined as urban. In 1975, the proportion of the population classified as urban was only 28 per cent in the developing countries, which was lower than the proportion pertaining in the developed market economies and the centrally planned economies of Eastern Europe and the USSR, by 44 and 32 percentage points, respectively.

Urbanization is associated with a shift in employment from agricultural to non-agricultural economic activities. In such highly urbanized countries as the United Kingdom of Great Britain and Northern Ireland and the United States of America, with urban population ratios of 90 and 71 per cent, the proportions of the economically active population engaged in agriculture in 1975 were only 2.4 and 2.8, respectively.[18] In contrast, such countries as Nepal and Rwanda, which had urban population ratios of about 4 per cent in 1975, had approximately 93 per cent of their economically active populations engaged in agriculture.

Differentials exist not only in levels of gross domestic product per capita and demographic variables but in other indicators of the quality of life. Striving for a better quality of life has been considered as important to development as is the pursuit of rapid economic growth, although the two are closely related. Although the definition and statistical indicators of the quality of life are diverse, the indicators presented here are limited to combined primary-school and secondary-school enrolment ratios, population per physician, population per nurse and radio receivers per 1,000 persons.

[17] The urban population estimates, in terms of agglomerations of population, were compiled by the Population Division of the United Nations Secretariat from national sources, using the official definition of "urban" populations in each country. Urban definitions may vary greatly from one country to another and even vary from time to time within the same country, thus creating problems of international comparability. Such differences of definition are often believed to reflect differences in the characteristics features of urban and rural settlement considered most relevant in individual countries.

[18] Food and Agriculture Organization of the United Nations, *FAO Production Yearbook, 1978*, FAO Statistics Series No. 22, vol. 31 (Rome, 1979), pp. 65-70.

The data on these indicators, as presented in table 106, reveal a sharp division between the educational, health and public communication facilities available in the developing countries and those available in the developed countries. There are 7,061 persons per physician, for instance, in the developing economies, about 11 times the number in the developed market economies and 17 times that in the centrally planned economies of Eastern Europe and the USSR.

The disparities among individual countries are, of course, greater than those indicated by group averages. In 1975, there were more than 36,000 persons per physician in such countries as Nepal and Rwanda, while there were less than 500 persons per physician in such countries as Austria and Greece. Similarly, disparities are reflected in school enrolment, population per nurse and radio receivers per 1,000 population.

Disparities among developing countries

Great disparities in terms of socio-demographic indicators exist not only between the developing and developed countries but within the group of developing countries. However, the association between the levels of gross domestic product per capita and the levels of socio-demographic development is not as strong when the developing countries are examined separately by country groupings. That is, some developing countries have become more like developed countries in terms of their socio-demographic characteristics although their levels of gross domestic product per capita remain quite low.

There are great disparities between the socio-demographic characteristics of the petroleum-exporting countries and other developing economies. As shown in table 107, the average gross domestic product per capita in the petroleum-exporting countries was 78 per cent higher than that of the other developing countries; yet, total fertility rates in the former group were 23 per cent higher and life expectancy at birth was 12 per cent lower. Natural rates of population increase were about 28 per cent higher in the petroleum-exporting countries than in the other developing countries. Table 108 shows that in 1975, the levels of social indicators, in terms of primary-

TABLE 106. AVERAGE LEVELS OF SOCIAL INDICATORS, BY MAJOR COUNTRY GROUP, 116 DEVELOPED AND DEVELOPING COUNTRIES, 1975

Country group	*Primary-school and secondary-school enrolment (percentage)*		*Persons per physician*		*Persons per nurse*		*Radio receivers per 1,000 persons*	
	Weighted[a]	*Unweighted*	*Weighted*[a]	*Unweighted*	*Weighted*[a]	*Unweighted*	*Weighted*[a]	*Unweighted*
All countries	70	71	4 615	5 481	7 904	3 127	322	228
Developed market economies	89	89	663	661	257	255	814	432
Developing economies	57	61	7 061	7 767	9 878	4 646	86	149
Centrally planned economies of Eastern Europe and USSR	90	88	415	522	324	308	412	288

Sources: For school enrolment, United Nations Educational, Scientific and Cultural Organization, *Statistical Yearbook, 1978* (Paris, 1979); for persons per physician and per nurse, World Health Organization, *World Health Statistics Annual, 1975* (Geneva, 1975) and *World Statistics in Brief*, Statistical Papers, Series V, No. 2 (United Nations publication, Sales No. E.78.XVII.9); for radio receivers, World Bank, *World Table 1976* (Baltimore, Maryland, and London, Johns Hopkins University Press, 1976).

NOTE: For list of countries, see footnotes *b–d* to table 99.

[a] Country averages weighted by population size.

TABLE 107. AVERAGE LEVELS OF GROSS DOMESTIC PRODUCT PER CAPITA AND DEMOGRAPHIC INDICATORS,[a] BY GEOGRAPHICAL AREA AND TYPE OF ECONOMY, 82 DEVELOPING COUNTRIES, 1975

Country group	Average gross domestic product per capita, 1975 (dollars)[b]	Rate of natural population increase (per 1,000)	Total fertility rate (per woman)	Life expectancy at birth (years)	Adult working-age ratio (percentage)	Proportion of population that is urban (percentage)
Developing economies	270	22.3	4.932	56	56	28
Geographical area						
Africa	200	28.7	6.493	48	52	25
Latin America	699	27.5	5.117	63	54	61
East Asia	254	15.1	3.512	63	60	25
South Asia	191	24.8	5.623	51	54	23
Oceania	286	24.7	5.567	52	55	21
Type of economy						
Petroleum-exporting countries	444	27.8	5.932	50	52	30
Non-petroleum-exporting countries	249	21.7	4.815	57	56	28

Sources: For gross domestic product and demographic indicators, excluding proportion urban, data taken from sources cited for table 99. For proportion urban, Population Division, computer print-out for "Urban/rural projections from 1950 to 2000", revised 1 July 1977.

NOTE: For list of developing countries, see footnote *c* to table 99.
[a] Country averages weighted by population size.
[b] Measured in 1970 prices.

school and secondary-school enrolment ratios, persons per physician and radio receivers per 1,000 persons were less favourable in petroleum-exporting countries than in the other developing economies. This finding may explain in part why these countries have higher fertility and lower life expectancy than is usual for countries with similar levels of gross domestic product per capita.

The diversity in levels of living is also reflected in the regional averages. Of the five geographical areas, the developing countries of Africa and South Asia have the lowest levels of gross domestic product and social indicators. The weighted averages of gross domestic product per capita were $200 and $191 in Africa and South Asia, respectively. These low income levels were accompanied by high rates of natural population growth, low levels of life expectancy at birth and inadequate school and health facilities. On the other hand, Latin America, with a per capita level of $699 in 1975, in relation to other less developed regions, had a high life expectancy at birth (63 years), high primary-school and secondary-school enrolment ratios and low population per physician. In terms of social indicators, the population of Latin America is better served than those of Africa, South Asia and Oceania. It is closer to that of East Asia. Although these regional averages conceal inter-country differences, they do highlight the sharp contrast in levels of living in various less developed regions of the world.

The data on East Asia are dominated by the statistics for China, because its share of regional population is 96 per cent. Although the gross domestic product per capita in China remains quite low, their continuing improvement of health and sanitation measures has increased their life expectancy at birth to 63 years and their continuing efforts to limit population growth have reduced the total fertility rate to 3.502 children per woman. China is now approaching the fertility levels achieved by such developed countries as Portugal and Yugoslavia.

TABLE 108. AVERAGE LEVELS OF SOCIAL INDICATORS, BY GEOGRAPHICAL AREA AND TYPE OF ECONOMY, 82 DEVELOPING COUNTRIES, 1975

Country group	Primary-school and secondary-school enrolment ratio (percentage)	Persons per physician	Persons per nurse	Radio receivers per 1,000 persons
Developing economies	57	7 061	9 878	86
Geographical area				
Africa	49	14 517	3 250	74
Latin America	78	1 897	2 828	249
East Asia	80	2 000	1 506	192
South Asia	55	7 012	12 402	39
Oceania	45	9 721	—[b]	524
Type of economy				
Petroleum-exporting countries	58	13 377	6 402	79
Non-petroleum-exporting countries	56	5 921	10 556	87

Sources: See sources for table 106.

NOTE: For list of developing countries, see footnote *c* to table 99.
[a] All computations based on averages weighted by the population share.

Moreover, the statistics on school enrolment ratios, population per physician and per nurse suggest that the developing economies of East Asia have markedly improved their social conditions and in that respect are currently at a more advanced stage than Latin America and far ahead of other less developed regions.

B. GROWTH OF DISPARITIES BETWEEN 1960 AND 1975

Differentials in gross domestic product per capita

The present study indicates that population growth has not prevented economic advance and modernization in developing countries but it has constrained the growth of gross domestic product per capita (see table 109).

Although total gross domestic product grew more rapidly in the developing countries than in the developed market economies, growth per capita in the developing countries lagged behind. Both the total and the per capita levels grew more rapidly in the centrally planned economies than in the developing economies. During the period 1960–1975, the growth rate of the gross domestic product of the developing economies as a whole was 5.6 per cent per annum, which was 1.4 percentage points higher than that of the developed market economies but 1.0 percentage point lower than that of the centrally planned economies of Eastern Europe and the USSR. At the same time, the population in the developing economies grew at 2.3 per cent per annum, which was more than double the rates of the developed market economies and the centrally planned economies of Eastern Europe and the USSR. Consequently, the rate of growth of gross domestic product per capita in the developing countries was 3.2 per cent, which was slightly lower than the corresponding rate for the developed market economies and much lower than the rate for the centrally planned economies of Eastern Europe and the USSR.

TABLE 109. AVERAGE ANNUAL RATE OF INCREASE IN POPULATION, AGGREGATE GROSS DOMESTIC PRODUCT AND GROSS DOMESTIC PRODUCT PER CAPITA, AND AVERAGE ANNUAL INCREMENT OF GROSS DOMESTIC PRODUCT PER CAPITA, BY MAJOR COUNTRY GROUP, 116 DEVELOPED AND DEVELOPING COUNTRIES, 1960–1975

	Average annual compound growth rate (percentage)			*Average annual increment of gross domestic product per capita (dollars)*[a]
Country group	*Population*	*Aggregate gross domestic product*	*Gross domestic product per capita*	
All countries	1.9	4.8	2.8	22
Developed market economies	1.0	4.2	3.3	80
Developing economies	2.3	5.6	3.2	7
Centrally planned economies	1.0	6.6	5.5	59

Sources: See sources for gross domestic product cited for table 99.

NOTE: For list of countries, see footnotes *b-d* to table 99.
[a] Measured in terms of 1970 prices.

Corresponding to the differential in rates of growth of gross domestic product per capita, there also exists a differential in the absolute annual increments of that measure between 1960 and 1975. The annual average increment was $7 for developing countries, which was about one eleventh of the annual increment in the developed market economies and one eighth that of the centrally planned economies.

The absolute gap between the gross domestic product per capita of the developing countries and that of the developed countries has been widening substantially. For instance, the gap between that measure in the developing countries and the developed market economies was $2,938 in 1975, compared with $1,846 in 1960. This gap will widen to $9,000 in the year 2000 should the current trend of economic performance continue.[19] Unless the rates of growth of the developing countries become much larger than those of the developed countries,[20] it is virtually inevitable that the absolute difference in income will increase, given the initial disparities. If the developing and developed countries were to grow at the same rate, the annual increment in the gross domestic product per capita of the latter group would greatly exceed that of the former because of the higher base to which the growth rate of the latter group applies. Unfortunately, during the period 1960–1975, gross domestic product per capita in the developing countries was growing, on the average, at a slightly slower rate than that in the developed countries.

On the whole, the lower growth rates and smaller absolute increments of gross domestic product per capita in the developing countries, and the consequent widening economic gap between the developing and developed countries during the period 1960–1975, have been linked to the more rapid expansion of population in the developing countries. However, a number of studies dealing with the relationship between the growth of population and the growth of gross domestic product per capita, using the data of individual countries, have failed to reveal a similar association.[21] Furthermore, the broad association found in this study does not prove that a reduction of population growth in developing countries will necessarily raise output per capita.

Past investigations of whether substantial population growth facilitated or constrained the growth of output were inconclusive. On the one hand, the supply of labour in developing countries may be abundant as a result of rapid population growth. Thus, the size of the labour force is not a constraint on economic growth, as may be the case in the economically more developed economies. On the other hand, productive capacity, particularly capital equipment, may be limited, giving rise to a labour surplus. Moreover, potentials for capital formation may have been constrained by the pressure of total consumption requirements (although per capita consumption still remains very low), as a result of rapid population growth.

World-wide disparities in gross domestic product per capita are determined not only by economic gaps between the developed and developing countries but by inequalities within each group of countries. Table 110 indicates that the annual population growth rate for the non-petroleum-exporting countries was 2.3 per cent during the period 1960–1975, as compared with 2.8 per cent in the case of the 12 petroleum-exporting countries. The average annual rate of growth of gross domestic product per capita for the former group was 2.7 per cent,

[19] The projected gross domestic product for the year 2000 was not available for the centrally planned economies of Eastern Europe and for the Union of Soviet Socialist Republics, as well as for some developing countries and developed market economies. The reported average is based on those countries for which data were available.

[20] The contrasts between trends and objectives, and some of the reasons for the gap between them, are contained in "Long-term development objectives" (A/AC.196/11).

[21] Richard A. Easterlin, "Effect of population growth on the economic development of developing countries, *Annals of the American Academy of Political and Social Sciences*, vol. 369 (Janaury 1967), pp. 98-106; J. C. Chesnais and A. Sauvy, "Progrès économique et accroissement de la population, une expérience commentée", *Population*, vol. 28 (July–October 1976), pp. 843-857; Simon Kuznets, "Population and economic growth", *Proceedings of the American Philosophical Society*, vol. 111, No. 3 (June 1967), pp. 170-192.

which was 3.9 percentage points below that of the latter during the same period. The sluggish growth of many non-petroleum-exporting developing countries, such as Bangladesh, India and some countries in Africa, was due in part to set-backs in the agricultural sector and to international oil price increases. Conversely, those price increases were a major factor in the rapid growth in the gross domestic product of the petroleum-exporting countries.

TABLE 110. AVERAGE ANNUAL RATE OF INCREASE IN POPULATION, GROSS DOMESTIC PRODUCT AND GROSS DOMESTIC PRODUCT PER CAPITA, AND AVERAGE ANNUAL INCREMENTS OF GROSS DOMESTIC PRODUCT PER CAPITA, BY GEOGRAPHICAL AREA AND TYPE OF ECONOMY, 82 DEVELOPING COUNTRIES, 1960–1975

	Average annual growth rate (percentage)			
Country group	*Population*	*Aggregate gross domestic product*	*Gross domestic product per capita*	*Average annual increment of gross domestic product per capita (dollars)*[a]
Developing economies	2.3	5.6	3.2	6.8
Geographical area				
Africa	2.7	4.9	2.2	3.7
Latin America	2.8	6.0	3.1	17.3
East Asia	1.8	4.6	2.7	5.6
South Asia	2.5	6.5	3.9	5.6
Oceania	2.7	3.5	1.0	2.1
Type of economy				
Petroleum-exporting countries	2.8	9.6	6.6	18.3
Non-petroleum-exporting countries	2.3	5.0	2.7	5.4

Sources: Data taken from sources for gross domestic product cited for table 99.

NOTE: For list of developing countries, see footnote *c* to table 99.
[a] Measured at 1970 prices.

The pattern of disparities is also reflected in the regional averages. East Asia, with the most populous less developed regions, contains about one third of the people of all developing countries. The annual rate of increase of population between 1960 and 1975 was 1.8 per cent in East Asia, a rate substantially lower than that of other less developed regions. But the growth rates of gross domestic product, total and per capita, in East Asia were slightly below the over-all average for developing countries. In the other four geographical areas, the average annual rates of population growth during the period 1960–1975 were in the range from 2.5 to 2.8 per cent. Although population growth rates were similar, the growth rates of gross domestic product, total and per capita, varied significantly between major areas, from 1.0 per cent in Oceania to 3.9 per cent in South Asia. The relatively high rate of growth of the gross domestic product in South Asia is due in part to the presence of many petroleum-exporting countries.

The disparity has been increasing slightly in that the Gini coefficient increased by 0.07 during the period from 1960 to 1975. Moreover, the relative position of the poorest countries worsened slightly; the share of gross domestic product of the countries with the lowest gross domestic product per capita, which have 60 per cent of the world population, decreased from 13 per cent in 1960 to 11 per cent in 1975.

Within the developing countries, the Gini coefficient increased from 0.349 in 1960 to 0.441 in 1975, as shown below:

Country group	*1960*	*1975*	*Increment, 1975 minus 1960*
All countries	0.655	0.662	0.007
Developed market economies	0.337	0.259	−0.078
Developing economies	0.349	0.441	0.092
Centrally planned economies of Eastern Europe and USSR	0.106	0.053	−0.053

In 1975, the countries with the lowest gross domestic product per capita and with 20 per cent of the population accounted for only 7 per cent of the gross domestic product of the developing economies, which was a decrease of 4 percentage points from 1960. It must be mentioned, however, that in reviewing these interperiod changes, individual countries may have shifted from a lower to a higher income group, or vice versa.

Analysis of variance can be used to assess quantitatively the proportion of the disparity accounted for by the factors given above, which may be referred to as the "between-group" effect and the "within-group" effect, respectively. Because the total measure of disparities used in the analysis of variance is not comparable with the Gini coefficient, the statistics presented below are confined to the relative proportion of the variance accounted for by the between-group and within-group effects.

National rates of economic growth have varied substantially within each country grouping used in this study. As shown below, this variation is the major factor in the trend towards increasing disparities in gross domestic product per capita. In 1975, 30 per cent of the total variation in the inter-country gross domestic product per capita was due to the between-group effect, that is, the variation between the developed market economies, the developing economies and the centrally planned economies of the Eastern Europe and the USSR. The remaining 70 per cent of the variance was accounted for by the within-group effect, that is, the disparities among countries within each of the groups:

Year	*Proportion of total variance accounted for by the between-group effect*	*Proportion of total variance accounted for by the within-group effect*
	(percentage)	
1960	39	61
1975	30	70

The foregoing figures indicate that the between-group effect decreased by 9 percentage points during the period 1960–1975. Consequently, the relative importance of the within-group effect in explaining the world-wide disparities increased by 9 percentage points. This decline in the relative importance of the between-group effect during the period 1960–1975 is consistent with the observation that the gross domestic product per capita in the developing countries, as a ratio of that of the developed countries, has decreased slightly.

Disparities in energy consumption

Given growing population, the growth in output per capita is largely dependent on increases in energy consumption. The increasing use of energy is also associated with increasing urbanization and industrialization.

Table 111 indicates that per capita world commercial energy consumption per capita underwent an increase of 2.2 per cent per annum between 1960 and 1975. In the developing countries, the rate of growth of such consumption was 1.6 per cent, was lower than the corresponding rate for developed market economies by 1.3 percentage points and of centrally planned economies by 2.7 percentage points.[22] The low growth rate of energy consumption per capita in the developing countries was due in part to the very low growth rate in China during the period under study.[23] When the data for China are excluded from the computation, the growth rate of commercial energy consumption per capita in the developing countries was 3.4 per cent, a figure that exceeds the corresponding rate for the developed market economies.

Within the developing economies, rates of growth of energy consumption also varied by geographical areas and by petroleum-exporting status. It appears from table 111 that the average annual growth rate of commercial energy consumption per capita between 1960 and 1975 was as high as 5.9 per cent in petroleum-exporting countries, which exceeded the corresponding figure in non-petroleum-exporting countries by about a factor of five.

TABLE 111. RATES OF GROWTH OF CONSUMPTION OF COMMERCIAL ENERGY PER CAPITA, BY MAJOR COUNTRY GROUP, GEOGRAPHICAL AREA AND TYPE OF ECONOMY, 116 DEVELOPED AND DEVELOPING COUNTRIES, 1960–1975

Country group	*Average annual growth rate, 1960–1975, based on weighted average*[a] *(percentage)*
All countries	2.2
Developed market economies	2.9
Developing economies	1.6
Centrally planned economies of Eastern Europe and USSR	4.3
Developing countries	
Geographical area	
Africa	4.1
Latin America	2.8
East Asia	.3
South Asia	4.1
Oceania	2.1
Type of economy	
Petroleum-exporting countries	5.9
Non-petroleum-exporting countries	1.2

Source: World Energy Supplies, 1950–1974 (United Nations publication, Sales No. E.76.XVII.5).

NOTE: For list of countries, see footnotes *b-d* to table 99.
[a] Group averages formed by weighting country growth rates by country population.

[22] Data on non-commercial energy were excluded because they were not available. This omission creates a bias in comparison between developing and developed countries because non-commercial forms of energy account for a much larger proportion of energy supply in the former group than in the latter. This omission also creates a problem in measuring rates of growth of energy consumption over time within the developing countries because of the shift from non-commercial to commercial energy consumption.

[23] The statistics for energy consumption in China reported in *World Energy Supplies, 1950-1974* (United Nations publication, Sales No. E.76.XVII.5), are a preliminary estimate and are not based on official statistics from China.

Disparities in socio-demographic indicators

The following discussion concerns the relationship between changes in gross domestic product per capita and selected socio-demographic indicators during the period 1960–1975.

To some extent the widening gap in gross domestic product per capita between developed and developing countries is associated with changes in demographic patterns. The rate of population growth for the world as a whole did not change significantly between 1960 and 1975, which was due to the very slow decline in the rate of population growth in the developing countries. Table 112 shows that though the rate of natural increase in the developing countries, on average, decreased by −0.06 percentage point per annum during the period 1960–1975, the size of the decrease was about 0.22 percentage point less than that of the developed market economies and 0.31 percentage point less than that of the centrally planned economies of Eastern Europe and the USSR. It is worth while to mention that although the rate of natural increase is decreasing, it is still positive and therefore population will continue to increase but at a slower rate.

TABLE 112. AVERAGE ANNUAL INCREMENTS IN DEMOGRAPHIC INDICATORS, BY MAJOR COUNTRY GROUP, 116 DEVELOPED AND DEVELOPING COUNTRIES, 1960–1975

Country group	*Average annual increment*[a]			
	Rate of natural population increase (per 1,000)	*Life expectancy at birth (years)*	*Adult working-age ratio (percentage points)*	*Average proportion of population that is urban (percentage points)*
All countries	−0.09	0.40	0.00	0.33
Developed market economies	−0.28	0.20	0.07	0.49
Developing economies	−0.06	0.53	0.00	0.41
Centrally planned economies of Eastern Europe and USSR	−0.37	0.13	0.13	0.77

Sources: For sources of data on gross domestic product, see table 99; for proportion urban, Population Division, computer print-out for "Urban/rural projections from 1950 to 2000", revised 1 July 1977; for other demographic indicators, *World Population Trends and Prospects by Country, 1950–2000: Summary Report of the 1978 Assessment* (ST/ESA/SER.R/33).

NOTE: For list of countries, see footnotes *b-d* to table 99.
[a] Country averages weighted by population size.

Comparison of data for 1960 with those for 1975 shows that all but three of the countries (Fiji, Guyana and Sri Lanka) with a life expectancy at birth of 60 years in 1960 had a gross domestic product per capita above $400. In 1975, however, many countries with a level as low as $200

had achieved the same life expectancy at birth. A particular value for life expectancy, say, 60 years, was associated with a lower gross domestic product per capita in 1975 than was the case in 1960. This shift might be explained, as suggested earlier, by factors other than income, particularly programmes in public health and disease control.

A related finding is that in 1975 a lower level of gross domestic product per capita was associated with a lower level of the birth rate than was the case in 1960. This shift could also be explained by non-income factors, such as the reduction in infant mortality, the increase in education levels, the improvement in the status of women and more effective fertility reduction programmes.

An additional factor determining profiles of change in demographic indicators during the period 1960–1975 is the asymptotic nature of demographic trends. Generally speaking, countries with high rates of fertility have a smaller potential for further increases. Similarly, countries with low fertility rates have limited possibilities for further declines. A similar asymptotic pattern may exist with respect to increases in life expectancy. It appears from Table 112 that between 1970 and 1975 the annual increase of the average life expectancy at birth in the developing countries (0.53 year) was 0.33 year greater than the annual increase in the developed market economies and 0.4 year greater than that of centrally planned economies of Eastern Europe and the USSR.

The ratio of the adult working-age population to total population in the developing countries remained more or less constant during the period 1960–1975, indicating that the population under age 15 had increased in the same proportion as the population aged 15–64. This was a result of fertility decrease which was matched by a proportionate decrease in mortality.

There were significant differences in the rates of change among developing countries. Table 113 shows that annual decrements in the rate of natural increase (−0.38) were greatest in East Asia, due largely to the trend in China. That major area also achieved the largest gains in life expectancy at birth, with an average annual increase of 0.67 year between 1960 and 1975. The largest annual increments to the rate of natural increase occurred in the case of Africa (0.25). The smallest annual increment in life expectancy (0.40 year) was recorded in the case of Latin America.

A sharp contrast also exists between developing countries which export petroleum and those that do not. Increments in gross domestic product per capita were more than three times higher in the former group of countries. Rates of natural increase were rising in the former group while falling in the latter in spite of the fact that the annual increments to life expectancy were greater in the non-petroleum-exporting developing countries.

The proportion of the population that is urban increased between 1960 and 1975 in all major country groups. The average increments in that proportion was 0.41 percentage point in the developing countries and 0.49 percentage point in the developed market economies. The largest annual increment (0.77 percentage point) occurred in the case of the centrally planned countries of Eastern Europe and the USSR. These data indicate that the differentials in the proportion of the population that is urban between the developing and developed market economies are not widening as in the case of other demographic variables. And there appears to be no clear relationship between increments in gross domestic product per capita and increments in the proportion of the population that is urban.

TABLE 113. AVERAGE ANNUAL INCREMENTS OF GROSS DOMESTIC PRODUCT PER CAPITA AND DEMOGRAPHIC INDICATORS, BY GEOGRAPHICAL AREA AND TYPE OF ECONOMY, 82 DEVELOPING COUNTRIES, 1960–1975

	Average annual increment[a]				
Country group	*Gross domestic product per capita (dollars)*[b]	*Rate of natural population increase (per 1,000)*	*Life expectancy at birth (years)*	*Adult working-age ratio (percentage points)*	*Average proportion of population that is urban (percentage points)*
Developing economies	6.8	−0.06	0.53	0.00	0.41
Geographical area					
Africa	3.7	0.25	0.47	−0.13	0.51
Latin America	17.3	−0.06	0.40	0.00	0.79
East Asia	5.6	−0.38	0.67	0.12	0.35
South Asia	5.6	0.09	0.47	−0.07	0.29
Oceania	2.1	0.13	0.51	0.00	0.94
Type of economy					
Petroleum-exporting countries	18.3	0.13	0.47	−0.13	0.56
Non-petroleum-exporting countries	5.4	−0.08	0.53	0.00	0.39

Sources: For sources of data on gross domestic product, see table 99; for sources of data on demographic indicators and proportion urban, see table 112.

NOTE: For list of developing countries, see footnote *c* to table 99.
[a] Computation based on weighted average by the population share.
[b] Measured in 1970 prices.

Health facilities have been continuously improved both in the developing countries and in the developed countries but table 114 shows that the numbers of physicians and nurses have been increasing at a faster rate than the population as a whole in developing countries. As a result, the ratio of population to physicians and to nurses has been falling in the developing countries. The annual decrease during the period 1960–1975 was 322 persons per physician and 57 persons per nurse. Those decreases were substantially larger in absolute terms than the corresponding decreases in the developed countries. This result is to be expected because the developed countries, with a low number of persons per physician and per nurse, have limited room for further improvement. Despite such differentials in rates of improvement, the gaps between the developing and developed countries will continue to be large for some time if current trends continue.

TABLE 114. AVERAGE ANNUAL INCREMENTS IN SOCIAL INDICATORS, BY MAJOR COUNTRY GROUP, 116 DEVELOPED AND DEVELOPING COUNTRIES, 1960–1975

	Average annual increment[a]			
Country group	*Primary-school and secondary-school enrolment ratios (percentage points)*	*Persons per physician*	*Persons per nurse*	*Radio receivers per 1 000 persons*
All countries	0.67	−217	85	15
Developed market economies	0.40	−9	−9	39
Developing economies	1.13	−322	−57	4
Centrally planned economies of Eastern Europe and USSR	−0.07	...	...	...

Sources: For school enrolment, United Nations Educational, Scientific and Cultural Organization, *Statistical Yearbook, 1978* (Paris, 1979); for persons per physician and per nurse, World Health Organization, *World Health Statistics Annual, 1975* (Geneva, 1975); and *World Statistics in Brief*, Statistical Papers, Series V, No. 2 (United Nations publication, Sales No. E.78.XVII.9); for radio receivers, *World Bank, World Table 1976* (Baltimore, Maryland, Johns Hopkins University Press, 1976).

NOTE: For list of countries, see footnotes *b-d* to table 99.
[a] Country averages weighted by population size.

Progress has also been made with respect to education. The developing countries have adopted a variety of measures to expand and strengthen their systems of education. During the period 1960–1975, the annual percentage increase in the combined primary-school and secondary-school enrolment ratios in the developing countries was larger than those in the developed market economies and the centrally planned economies of Eastern Europe and the USSR.

Within the group of developing countries, the changes in gross domestic product per capita between 1960 and 1975 were not associated in a uniform way with changes in socio-demographic indicators (see table 115). During that period, the increments of gross domestic product per capita were greater in the petroleum-exporting countries than in the non-petroleum-exporting countries; and the petroleum-exporting countries made the greatest progress in terms of the annual change in numbers of persons per physician and per nurse. However, they made less progress than the other developing countries in terms of their annual change in the natural population growth rate and life expectancy at birth.

TABLE 115. AVERAGE ANNUAL INCREMENTS IN SOCIO-DEMOGRAPHIC INDICATORS, BY GEOGRAPHICAL AREA AND TYPE OF ECONOMY, 82 DEVELOPING COUNTRIES, 1960–1975

	Average annual increment[a]			
Country group	*Primary-school and secondary-school enrolment ratios (percentage points)*	*Persons per physician*	*Persons per nurse*	*Radio receivers per 1,000 persons*
Developing economies	1.1	−322	−57	4
Geographical area				
Africa	1.6	−974	−84	4
Latin America	1.7	−19	−14	10
East Asia	1.1	−67	−114	11
South Asia	1.0	−288	−95	2
Oceania	1.3	−172	...	31
Type of economy				
Petroleum-exporting countries	1.6	−1 370	−104	4
Non-petroleum-exporting countries	1.0	−119	−51	4

Sources: See table 114.

NOTE: For list of developing countries, see footnote *c* to table 99.
[a] Computation based on weighted average by the population share.

Improvements in the quality of life, in terms of changes in school enrolment and population per physician and per nurse varied by geographical area as well as by petroleum-exporting status. This situation may be due in part to development strategies and country programmes. The average annual increments of school enrolment ratios were higher in Africa and Latin America than in other areas. As concerns the changes in numbers of persons per physician and per nurse, the data appear to conform to an asymtotic pattern. For example, Latin America, with the lowest ratio of population per physician, had an average annual decrease of 19 persons per physician during the period 1960–1975, which was far less than the decreases of 974 persons and 288 persons, respectively, in Africa and South Asia.

On the average, improvements in health facilities, in terms of changes in population per physician and per nurse and the combined ratio of primary-school and secondary-school enrolment, were greater in petroleum-exporting countries than in non-petroleum-exporting countries.

C. COMMENT ON RESULTS OF STUDY

The cross-sectional analysis based on 1975 data and the interperiod comparisons on the basis of data for 1960 and 1975 generally confirm the findings of earlier studies. Wide disparities in the gross domestic product per capita and commercial energy consumption continued to exist in 1975; and those disparities, instead of being reduced, increased slightly between 1960 and 1975, implying a widening of the gap in gross domestic product per capita between the developed and the developing countries. Inter-country disparities also existed between developing

countries grouped according to geographical areas and according to petroleum-exporting status. In general, the countries with the lowest gross domestic product per capita experienced the most rapid growth of population.

Inter-country differences existed not only with respect to levels of income, energy consumption and demographic indicators, but in other indicators of the quality of life. Although great and continuing efforts have been made in the developing countries, directed towards the improvement of educational and health facilities, their levels of social services lagged far behind those of the developed countries. The disparities among countries were greater than those indicated by group averages.

Although there is a clear dichotomy between the levels of socio-demographic variables in the developing and developed countries, a substantial number of countries deviate from the general patterns. These departures from the averages of the respective country or income groups indicate that institutional, cultural and socio-economic factors, as well as public programmes and policies in such fields as health and family planning, have exerted an impact on demographic behaviour. In particular, the socio-demographic indicators of the petroleum-exporting countries tended to be lower than the average for countries with similar levels of gross domestic product per capita.

Although the levels of gross domestic product per capita based on broad country groupings are generally, but not uniformly, associated with levels of socio-demographic indicators, these population and development interrelationships are not always apparent when changes for the period 1960–1975 are examined. This analysis also indicates that given levels of fertility and mortality are associated with a lower level of gross domestic product per capita in 1975 than in 1960, which suggests a possible shift in the relationship between income and demographic factors due to changes in variables other than income. Although the role of income and economic growth in demographic change cannot be ignored, this finding and others lend support to the view that income levels and changes are not sufficient fully to explain differences in demographic behaviour among countries. Income may be only a proxy variable reflecting a variety of aspects of average levels of living which exert an influence on demographic trends.

The interperiod changes of socio-demographic indicators by country groupings may also reflect the asymptotic nature of socio-demographic trends. Countries with high rates of fertility and mortality, and low levels of education and health facilities, have a greater potential for further improvements than countries at a high level of development.

If the demographic trends experienced by the developing countries in recent years persist, their populations will continue to increase at a high rate. Such rapid population growth would have far-reaching implications for food requirements, for material production, for services that would improve the quality of life, and for mobilization and allocation of resources to meet increasing socio-economic requirements. Declines in birth rates are likely to cause changes in age structure which would also have significant socio-economic implications, because age structure has a considerable bearing on the proportion of the population that is economically active and determines requirements for education facilities, housing and health services.

In the developing countries, the proportion of the population that is urban, though currently lower than that of the developed countries, has increased rapidly. Such rapid urbanization has created a variety of strains and social costs, including the growth of slums, the shortage of schools and hospitals, and the overloading of transportation facilities.

Although the developing countries have made significant progress in respect of their education systems and health facilities, those improvements have not yet met the rapidly increasing requirements. Were current trends to continue, shortages of these facilities would remain pressing and social services in the developing countries would continue to lag behind those in the developed countries and inter-country differences within the developing countries would remain large. These facts suggest that a slackened pace of population growth could be a significant component of a strategy to accelerate the pace of social and economic growth in the developing countries and that this will be true for many years to come.

Chapter XIX

INDUSTRIAL CARRYING CAPACITY*

According to a recent study,[1] the maximum carrying capacity of the earth will be reached by the year 2030, when the world population is projected to be 10 billion. The report states that the populations in Africa south of the Sahara and in the Himalayan hills of Asia have already exceeded the carrying capacities of those immediate areas, bringing about the erosion of the capacity of the land to support life. The consequent poverty and ill health have further complicated efforts to reduce fertility. Unless this circle of interlinked problems is soon broken, population growth in such areas will, unfortunately, slow for reasons other than a decline in birth rates.[2]

Problems related to the decline of the carrying capacity of the earth are most immediate, severe and tragic in those regions containing the poorest developing countries. In such regions, social and economic conditions must improve before the fertility rates can be expected to drop, so as to relieve the population pressure on the carrying capacity of the land. The report, therefore, rightly perceives the immediate global challenge to be the prevention of international tension and conflicts resulting from the persistent problems of worsening poverty.

This chapter attempts to contribute to such analyses of the world's resources by studying the industrial carrying capacity. This capacity may be defined as the capacity of those resources to sustain industrialization, which is an essential component of over-all development for enlarging the carrying capacity of the earth.

To carry out the analysis, it is necessary to develop an economic scenario which provides a picture of the world economy over the period in question.

Such a picture not only includes expectations about the behaviour of significant economic variables but incorporates those goals which have been espoused by the international community. Accordingly, this chapter contains a scenario that gives the expected values of important economic variables for five regions[3] over the years in question. This scenario, prepared with the use of an economic model, incorporates the achievement of the Lima target in the year 2000 and further develops the picture of industrialization in developing countries for the year 2025. It is therefore a scenario of industrialization in which the goal, that of 25 per cent of the world manufacturing arising from developing countries in the year 2000, is achieved; and thus it incorporates, in its analysis of the long-term future, the attainment of a target in a crucial instrument of development.

This study also contains an analysis of employment. By taking the economic scenario and analysing its implications for employment, in the regions considered, it is possible to assess the relative position of demand and supply, given the population estimates available for the years in question.

With regard to the ability of industrialization to contribute to over-all development, the economic scenario provides an illustration of the role of manufacturing in the over-all process. In particular, it deals with the impact of the achievement of the Lima target and an extension of the process to the year 2025. Accordingly, it illustrates, in terms of the structure of final demand and of gross domestic product per capita, the way in which such an industrialization pattern in the developing regions would affect their over-all economic structure and development, and consequently the earth's carrying capacity.

A. AN ECONOMIC SCENARIO

The LIDO model

The scenario for the years up to the year 2025, which is the basis for the analyses in this study, was prepared using the Lima Industrial Development Objective (LIDO) model. In its present form, it gives details on five regions: Africa, Latin America, Asia and the Middle East, which constitute the developing countries; and the developed countries.[4] It uses an input/output accounting basis, dealing with four sectors: agriculture; mining; manufacturing; and other. (The last-named sector includes construction and services.) The base year is 1975. The model has been altered to run beyond the original target year (2000) in order to give a picture of the world

* Prepared by the United Nations Industrial Development Organization.

[1] *The Global 2000 Report to the President: Entering the Twenty-First Century*, Report by the Council on Environmental Quality and the United States Department of State (Washington, D.C., Government Printing Office, 1980).

[2] *Ibid.*

[3] The term "region" as used in this chapter does not refer to the 24 geographical regions established by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat.

[4] The countries included in these five regions do not in all cases conform to those included in the major geographical areas or other regions established by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat. The countries included here in the Middle East are Algeria and the Libyan Arab Jamahiriya in Northern Africa; Iran in Middle South Asia; and Bahrain, Democratic Yemen, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, the Syrian Arab Republic, the United Arab Emirates and Yemen in Western South Asia. In this chapter, Cyprus, Israel, South Africa and Turkey, which the Population Division groups with the developing countries, are included in the developed countries.

economy in 2025 and figures for the intervening years (1980 and 1990) also are given. The model is a method of generating consistent scenarios rather than a forecasting or policy-making device. It is designed to take assumptions about certain economic variables and to trace their effects on other variables of interest, taking the achievement of the Lima target and the economic technology of the world economy as given.

For each of the regions, the model produces a brief quantitative sketch of the economy in the solution year. This sketch comprises an estimate of gross domestic product and a four-sector decomposition of value added, consumption, investment, foreign trade and the input/output structure. All variables are measured in constant 1975 prices. To generate these outputs, the model requires three groups of inputs: (*a*) the "economic technology" comprising base-year information and various economic relationships (many of which change with gross domestic product per capita); (*b*) exogenous targets—usually a regional distribution of the Lima targets; and (*c*) exogenous assumptions about the population and trade balance of each region and about the growth of gross domestic product in the developed countries over the projected period. The trade balances reflect the net transfer of resources to each area in the solution year, but it is the assumption about gross domestic product that provides the main driving force of the model. The gross domestic product of one region, up to now the developed countries, determines (through the "economic technology") their manufacturing value added. This value added, through the Lima targets, implies the manufacturing value added of the other (developing) regions, which, again through the "economic technology", gives the over-all economic growth rates of the developing countries.

Scenario assumptions

The principal assumptions for the new LIDO scenario adopted here can be summarized as follows:

(*a*) The Lima target will be achieved in the year 2000, with the following distribution of industrial production: Africa, 2 per cent; Latin America, 13 per cent; Asia, 7 per cent; Middle East, 3 per cent;

(*b*) Annual average growth rates of gross domestic product are as follows:

1975–1980: developed countries, 3.5 per cent; developing countries, 5.4 per cent (based on observed trends over the period 1972–1977);

1980–1990: developed countries, 3.7 per cent; developing countries, 7.4 per cent. (This is the assumption made by the Department of International Economic and Social Affairs[5] of the United Nations Secretariat and by the Food and Agriculture Organization of the United Nations[6] (FAO) for the developing countries for this period. It is expected to be incorporated into the New International Development Strategy for the Third Development Decade.);

1990–2000: developed countries, 3.9 per cent. The growth rate for the developing countries for this period is part of the model solution and is determined by the Lima targets;

2000–2025: developed countries, 4.0 per cent; developing countries, 6.0 per cent;

(*c*) The over-all trade surplus of the developed countries, with respect to the developing countries (excluding those in the Middle East) in the year 1990 will be 0.8 per cent of their gross domestic product; and in the years 2000 and 2025, it will be 1 per cent. The trade surplus of the Middle East will be halved by 1990 and will be zero by the year 2000;

(*d*) Agriculture in the developing countries, in terms of value added in that sector, will grow at no more than 3.6 per cent per annum.[7]

Gross domestic product and population

From the assumptions made, it can be seen that the exogenously given growth rates for gross domestic product will heavily influence the values of the generated scenario. Table 116 gives the annual average percentage figures for the regions and the time periods of the scenario.

[5] "Effect of growth in agriculture on other sectors", prepared for the Administrative Committee on Co-ordination Task Force on Long-term Development Objectives, April 1979.

[6] "Agriculture: towards 2000" (A/AC/196/I/XRP.2), prepared for the Preparatory Committee for the New International Development Strategy.

[7] This constraint follows the recommendation of the Preparatory Committee of the New International Development Strategy at its first session.

TABLE 116. GROWTH RATES OF GROSS DOMESTIC PRODUCT, DEVELOPING COUNTRIES, BY REGION, AND DEVELOPED COUNTRIES, 1975–2025
(*Percentage per annum*)

Period	*Africa*	*Latin America*	*Asia*	*Middle East*[a]	*Developing countries*	*Developed countries*[b]
1975–1980	5.7[c]	4.6[c]	5.2[c]	6.8[c]	5.4	3.5[c]
1980–1990	7.6	6.9	7.3	8.3	7.4[c]	3.7[c]
1990–2000	5.2	10.9	8.9	4.8	8.4	3.9[c]
1976–2000	6.3	8.0	7.5	6.6	7.4	3.7[c]
2000–2025	6.2	5.7	6.0	6.8	6.0[c]	4.0[c]

[a] Including Algeria and the Libyan Arab Jamahiriya in Northern Africa; Iran in Middle South Asia; and Bahrain, Democratic Yemen, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, the Syrian Arab Republic, the United Arab Emirates and Yemen in Western South Asia.

[b] Including Cyprus, Israel, South Africa and Turkey, which the Population Division groups with the developing countries.

[c] Exogenous figure.

It can be seen that the over-all growth rate of 7.4 per cent for the developing countries, in the period 1980–1990, represents for them a fairly substantial increase over what is believed to have been their historical performance in the period 1975–1980. However, the pattern of growth for the individual less developed regions changes again in the period 1990–2000, because the growth rates are those necessary to achieve the regional distribution of the Lima target mentioned above. In the case of Africa and the Middle East, their growth rates in this decade will be lower than in the period 1980–2000, because their shares of the Lima target (2 and 3 per cent, respectively) are relatively low.

On the other hand, Latin America and Asia will have to show a further increase in growth rates of the gross domestic product for this period, in order to attain their required shares (13 and 7 per cent, respectively). It can be seen that the growth rate in Latin America is extremely high, fully reflecting its high share of the target. The figures for the period 2000–2025 have been obtained by supplying exogenous growth rates for the developed and developing countries. The figure of 4 per cent per annum for the developed countries represents a slight improvement over the period up to 2000. The figure for the developing countries as a whole, on the other hand, represents a decrease and reflects an expectation that the high growth rates necessary to achieve the Lima target cannot be indefinitely sustained.

The exogenous assumptions as to population growth are important to the scenario in two ways. The first is that, as has been said, the structure of the LIDO model itself changes accordingly as the gross domestic product per capita of the region concerned increases. The second is that the per capita figures themselves give an indication of the extent to which such a scenario represents a step towards over-all economic development, in so far as gross domestic product per capita is an indicator of this process. The population growth rates assumed are given in table 117. Table 118, accordingly, shows the gross domestic product per capita attained by each region in each of the years of the analysis. Although the developing countries outperform the developed countries in terms of growth of gross domestic product, at every stage of the period (see table 116), they also do so in terms of population. The effect of this aspect is that the gap in gross domestic product per capita between the developed and developing countries will not close over the 50-year period of the scenario, even though it will go some way towards doing so. The second part of table 118 shows the gross domestic product per capita of the developing countries as a percentage of that of the developed countries. It can be seen that the developing countries as a whole, which in 1975 had a gross domestic product per capita of just over 10 per cent of that of the developed countries, will have, in the year 2025, a figure that is still only 17.8 per cent of that of the developed countries. Thus, the high growth rates of the gross domestic product given here barely compensate for population growth. Indeed, if the individual less developed regions are examined, it can be seen that the relative position of Africa hardly improves at all and the figure for Asia is even lower than that for Africa. Only Latin America and the Middle East make substantial progress, but even by 2025, the figures for their gross domestic product per capita are just under, and just over, respectively, one half that of the developed countries. The implications are, therefore, that neither the attainment of the Lima target, nor continued progress beyond it, in itself suffices to assist the developing countries towards a tolerable level of development, without further and special efforts. It can be seen from table 118, for instance, that even in 2025, neither Africa nor Asia can be expected to have a gross domestic product per capita anywhere near that of the industrialized countries in 1975.

Manufacturing and structural change

This study of industrial carrying capacity relies heavily upon the behaviour of the manufacturing sector given in this scenario. Table 119 gives the growth rates of manufacturing value added for the regions and periods concerned, as the Lima target used this definition of industrial production. The relationship between the growth rates of the developing regions in the two periods (1980–1990 and 1990–2000) can be seen to exhibit much the same behaviour as was seen with the gross domestic product growth rates themselves.

Given that the developing countries are expected to continue to outperform the developed countries for the period 2000–2025, their share of world manufacturing value added will therefore increase beyond the shares given as targets for them in the year 2000.

Since, as can be seen, manufacturing will grow at higher rates than the gross domestic product as a whole, it can

TABLE 117. POPULATION GROWTH RATES, DEVELOPING COUNTRIES, BY REGION, AND DEVELOPED COUNTRIES, 1975–2025

Period	*Africa*	*Latin America*	*Asia*	*Middle East*[a]	*Developed countries*[b]
1975–1980	2.91	2.66	2.47	2.82	0.67
1980–1990	2.95	2.61	2.35	2.74	0.64
1990–2000	2.73	2.4	1.98	2.4	0.54
2000–2025	2.07	1.54	1.43	1.68	0.26

Source: Medium-variant projections provided by the Population Division of the Department of International Economic and Social Affairs of the United Nations Secretariat, August 1980.

[a] For names of countries, see footnote *a* to table 116.

[b] See footnote *b* to table 116.

TABLE 118. GROSS DOMESTIC PRODUCT PER CAPITA, DEVELOPING COUNTRIES, BY REGION, AND DEVELOPED COUNTRIES, 1975–2025

Year	Africa	Latin America	Asia	Middle East[a]	Developing countries	Developed countries[b]
Gross domestic product per capita (dollars)						
1975	369.8	1 126.9	203.4	1 552.1	459.2	4 507.8
1980	422.8	1 240.0	231.7	1 873.9	524.4	5 178.0
1990	657.4	1 868.5	370.2	3 171.8	834.0	6 986.3
2000	832.6	4 159.1	710.5	3 982.7	1 498.4	9 705.5
2025	2 256.6	11 241.0	2 112.1	13 563.7	4 319.3	24 222.9
Gross domestic product per capita as percentage of gross domestic product per capita of developed countries						
1975	8.2	25.0	4.5	34.4	10.2	100.0
1980	8.2	23.9	4.5	36.2	10.1	100.0
1990	9.4	26.7	5.3	45.4	11.9	100.0
2000	8.6	42.9	7.3	41.0	15.4	100.0
2025	9.3	46.4	8.7	56.0	17.8	100.0

[a] For names of countries, see footnote *a* to table 116.
[b] See footnote *b* to table 116.

TABLE 119. MANUFACTURING VALUE ADDED GROWTH RATES, DEVELOPING COUNTRIES, BY REGION, AND DEVELOPED COUNTRIES, 1975–2025
(*Percentage per annum*)

Period	Africa	Latin America	Asia	Middle East[a]	Developing countries	Developed countries[b]
1975–1980	7.1	4.8	7.2	10.2	6.2	3.9
1980–1990	10.5	7.1	9.1	12.2	8.7	4.2
1990–2000	7.2	11.5	10.9	6.3	10.2	4.3
1975–2000	8.5	8.4	9.4	9.4	8.8	4.2
2000–2025	7.4	5.7	6.5	8.3	6.4	4.3

[a] For names of countries, see footnote *a* to table 116.
[b] See footnote *b* to table 116.

immediately be expected that such growth will be accompanied by changes in the structure of all the economies concerned, with the sectoral shares of value added undergoing considerable alterations. Because of the high performance of manufacture required to meet the Lima target, this result could be expected even if there were no links between the behaviour of the different sectors. In fact, however, the input/output approach, taken in the model from which this scenario derives, allows for the examination of such linkages and the taking of them into account in the whole scenario generation.

Table 120 shows the composition of value added in terms of the four sectors with which this scenario deals. For the aggregates of the developed countries and the developing countries, it can be seen that even in the developed countries a change takes place in this distribution over the time period, while for the developing countries the transformation is very marked indeed. In the developing countries, manufacturing in 1975 had a share of total gross domestic product of just over 18 per cent; but as a result of the high manufacturing growth rates, this share increases by the year 2000 to 25.2 per cent and then rises further to 27.9 per cent in 2025.

Table 121 gives the detailed figures of the sectoral distribution of value added for the four less developed regions, the aggregate figures having been presented in the previous table. It can be seen that the pattern of behaviour is broadly similar for all of them and thus the average behaviour shown in table 120 is representative.

TABLE 120. PERCENTAGE DISTRIBUTION OF GROSS DOMESTIC PRODUCT, BY SECTORAL VALUE ADDED, DEVELOPED AND DEVELOPING COUNTRIES, 1975–2025

	Agriculture	Mining	Manufacturing	Other
Developed countries[a]				
1975	6.4	4.7	29.7	59.2
1980	6.2	2.7	30.3	60.8
1990	5.5	2.2	31.7	60.6
2000	5.0	1.9	32.7	60.3
2025	3.5	1.0	35.8	59.7
Developing countries				
1975	19.8	15.5	18.2	46.5
1980	18.2	14.5	19.0	48.4
1990	12.7	12.4	21.4	53.5
2000	8.1	9.3	25.2	57.5
2025	4.6	7.3	27.9	60.3

[a] See footnote *b* to table 116.

Final demand

In addition to value added, the scenario contains details of the changes to be expected in final demand structures, i.e., the relative weights in the gross domestic product of consumption, investment, exports and imports. In fact, the LIDO model generates such figures, not

TABLE 121. PERCENTAGE DISTRIBUTION OF GROSS DOMESTIC PRODUCT, BY SECTORAL VALUE ADDED, DEVELOPING COUNTRIES BY REGION, 1975–2025

	Agriculture	*Mining*	*Manufacturing*	*Other*
Africa				
1975	26.9	19.0	10.2	43.9
1980	24.2	18.6	10.9	46.3
1990	16.2	17.9	14.3	51.6
2000	11.2	17.9	17.3	53.6
2025	6.4	12.3	22.7	58.6
Latin America				
1975	11.9	6.8	26.4	54.8
1980	11.3	6.6	26.6	55.5
1990	8.3	5.9	27.2	58.6
2000	5.2	4.8	28.6	61.4
2025	3.5	4.8	28.7	63.0
Asia				
1975	34.3	5.5	16.7	43.5
1980	31.7	5.6	18.4	44.4
1990	22.7	5.4	21.8	50.0
2000	14.1	5.4	26.2	54.3
2025	7.0	3.8	29.8	59.4
Middle East[a]				
1975	10.3	44.1	9.9	35.7
1980	9.3	37.2	11.6	42.0
1990	5.8	27.0	16.5	50.6
2000	3.8	22.6	19.0	54.5
2025	2.4	14.3	26.8	56.6

[a] For names of countries, see footnote *a* to table 116.

TABLE 123. GROSS DOMESTIC PRODUCT: PERCENTAGE DISTRIBUTION OF FINAL DEMAND COMPONENTS, DEVELOPING COUNTRIES BY REGION, 1975–2025

	Consumption	*Investment*	*Exports*	*Imports*
Africa				
1975	77.9	27.5	30.4	35.8
1980	76.8	27.5	32.0	36.4
1990	83.2	24.3	29.8	37.4
2000	90.0	16.6	30.8	37.4
2025	84.0	19.9	35.1	39.0
Latin America				
1975	76.4	26.5	14.2	17.1
1980	75.3	26.5	15.7	17.4
1990	78.4	24.9	15.4	18.6
2000	62.3	39.3	21.1	22.8
2025	80.8	20.4	18.4	19.6
Asia				
1975	80.7	22.5	20.9	24.1
1980	80.0	22.5	22.3	24.9
1990	81.4	23.2	23.5	28.1
2000	74.5	28.3	30.1	32.9
2025	82.8	19.0	30.2	32.0
Middle East[a]				
1975	56.1	23.2	49.9	29.2
1980	61.9	23.2	44.9	30.0
1990	66.8	29.8	38.1	34.7
2000	82.9	17.1	32.3	32.3
2025	75.6	24.4	38.3	38.3

[a] For names of countries, see footnote *a* to table 116.

only in the aggregate but for each sector of each region. However, only the aggregate proportions are given in Table 122 for the developed and developing countries, and in table 123 for the four less developed regions individually.

The behaviour of the investment share, i.e., the proportion that investment forms of total gross domestic product, closely follows the growth rate for the period in question, because the two are related by means of assumed incremental capital output ratios. The values used are: Africa and Asia, 3.2; and Latin America and the Middle East, 3.6. The assumption for the developed countries is of a ratio of 5.7. The consequences of the incremental capital output ratios can be seen from both tables 122 and 123.

As far as trade is concerned, the tables show the effect of the imposed trade surpluses for the developed countries in the years 1990, 2000 and 2025. By 2000, the Middle East is assumed to have a balance in trade (including service trade) and the surplus of the developed countries is shared out between the other less developed regions. The consequence of this is that for the developed countries, there is an expansion of both export and import shares in the total gross domestic product which is significantly larger than the expansion for the developing countries. The growth of exports over time is as follows. World exports expand uniformly over the whole period 1975–2025 at about 5.37 per cent per annum; but the expansion, as between developed and developing countries, is not uniform. The exports of developed countries grow at about 4.6 per cent from 1975–2000 and show only a slight increase to 4.7 per cent from 2000–2025. However, exports of developing countries increase at 7.6 per cent from 1975–2000 and 6.2 per cent from then onward. The extra growth for developing countries means that their share of world exports increases quite substantially. Thus, whereas in 1975 it was 22.3 per cent, it is postulated at 36.7 per cent in the year 2000; and it shows a further increase to 45.0 per cent in the year 2025.

TABLE 122. GROSS DOMESTIC PRODUCT: PERCENTAGE DISTRIBUTION OF FINAL DEMAND COMPONENTS, DEVELOPED AND DEVELOPING COUNTRIES, 1975–2025

	Consumption	*Investment*	*Exports*	*Imports*
Developed countries[a]				
1975	76.6	23.6	16.1	16.3
1980	76.6	23.6	16.5	16.7
1990	78.1	21.1	18.5	17.7
2000	76.8	22.2	19.8	18.8
2025	76.2	22.8	23.4	22.4
Developing countries				
1975	73.9	25.0	25.3	24.1
1980	74.0	24.9	25.9	24.9
1990	77.4	25.5	24.8	27.6
2000	72.1	30.2	26.4	28.7
2025	80.7	20.7	27.4	28.8

[a] See footnote *b* to table 116.

B. World employment potential[8]

Besides the important questions of resource availability, environmental stability, space to accommodate and feed growing populations etc., an assessment of carrying capacity must also take into account the question whether this rapidly rising number of human beings will be able to live productive lives, or whether, because of economic constraints, these people would at best have to remain idle, with all the ensuing economic, social and political consequences for the future evolution of humankind. In other words, the question is whether the absorptive capacity of the economic system is sufficient to accommodate the vastly increased labour forces of the future; or whether the carrying capacity of the earth is primarily limited not by nature but rather by economics, i.e., humanity itself.

Methodology

Considering the long-term nature of this question with the years 2000 and 2025 as the major bench-marks, and the drastic changes in social, economic and technological conditions that are almost certainly to be expected, no projection as such can be attempted. The only possibility is the development of scenarios of the future and the evaluation and discussion of their implications. By so doing, it is possible to gain additional insight into the possibilities and risks of the future and to find—without being able to give a final answer to the above-mentioned question—some indications as to the relevance and urgency of the problem that is posed. Given a time horizon of 50 years, the analysis proceeds in two stages: the first stage, with a higher degree of regional disaggregation, to the year 2000; and the second, in a more aggregated manner, to the year 2025.

The following discussion is based on the scenario (described in section A), which analyses the implications of the Lima target.

For the analysis of employment potential, additional modifications were required:

(*a*) Although the original scenario distinguished four economic sectors (agriculture, mining, manufacturing and other), the available labour force data permitted only a disaggregation into three sectors, namely, agriculture, industry and services. Accordingly, mining and manufacturing had to be collapsed into one sector. Furthermore, the construction sector had to be reallocated to the newly formed industry sector;[9]

(*b*) For the more detailed analysis up to the year 2000, it was felt that, in view of the significant structural differences, the developed countries should be split into market economies and centrally planned economies. It was assumed that the historical growth differential between these two subgroups of developed countries of approximately 2 percentage points will persist in the future. On the basis of this assumption, the growth rates of the gross domestic product and the sectoral values added could then be analytically determined for both subgroups of developed countries.[10]

Tables 124 and 125 give the annual growth rates, by economic sector, that were determined on the basis of these modifications. The most striking feature of the modifications is that, for the developing countries, the services sector will have the highest expansion rate. This rate is primarily due to the inclusion of mining in the industry sector, because the mining sector in the original scenario is expected to grow only slowly.

Table 124. Growth rates of gross domestic product and sectoral value added, developing countries by region and developed countries by type of economy, 1975–2025

(*Annual rates in percentage*)

	Agriculture	*Industry*	*Services*	*Total gross domestic product*
Africa	2.61	7.05	7.09	6.25
Latin America	4.50	8.01	8.62	8.03
Asia	3.72	8.74	8.54	7.47
Middle East[a]	2.38	5.58	8.66	6.56
Total developing countries	3.60	7.46	8.42	7.39
Developed market economies[b]	2.75	2.86	3.57	3.26
Developed centrally planned economies	2.39	5.71	5.30	5.26
Total developed countries	2.61	3.77	3.83	3.74

[a] For names of countries, see footnote *a* to table 116.
[b] See footnote *b* to table 116.

Table 125. Growth rates of gross domestic product and sectoral value added, developing and developed countries, 1975–2025

(*Annual rates in percentage*)

	Agriculture	*Industry*	*Services*	*Total Gross domestic product*
Developing countries				
1975–2000	3.60	7.46	8.42	7.39
2000–2025	3.60	6.07	6.40	6.00
1975–2025	3.60	6.80	7.30	6.70
Developed countries[a]				
1975–2000	2.61	3.77	3.83	3.74
2000–2025	2.45	4.21	3.95	4.00
1975–2025	2.53	4.00	3.88	3.87

[a] See footnote *b* to table 116.

Development of labour force supply and requirements

Productivity trends

The discussion of employment potential rests upon the labour force requirements accompanying economic de-

[8] The discussion in this section excludes the centrally planned economies of Asia.

[9] The reallocation was performed by applying the sectoral share of the construction sector in total gross domestic product in the base year of the scenario (1975), in each region, to the projections as well. This assumption of (limited) structural constancy appears to be justified, as an evaluation of cross-country and cross-regional data yielded no convincing evidence of a stable relationship between the share of the construction sector in total gross domestic product and the level of economic development.

[10] Although the growth rates of gross domestic product of the two subgroups can be determined straightforwardly on the basis of the assumption given above by a simple calculation involving logarithms, the sectoral growth rates were determined in a second step iteratively by an RAS procedure.

velopment. These labour force requirements are determined by the corresponding development of labour productivities (output per capita) in each sector and region. In order to be able to make appropriate assumptions with regard to the development of labour productivity over time and its relationship to economic growth, the evolution of labour productivities over the period from 1960 to 1977, and the subperiods thereof, was analysed. Tables 126–128 give the levels of labour productivity in 1975, and the growth and the relationship of productivities to economic growth for the period from 1960 to 1977.

The results of the foregoing analyses are applied in conjunction with the modified scenario to assess the development of labour force requirements by economic sector and region up to the year 2000. Table 129 gives the elasticity values that were used for the less developed regions.

For the material production sectors (agriculture and industry) in the developed countries, growth rates for the labour productivity, rather than elasticities, were specified. The major reason for this assumption was that technical progress can be expected to have an autonomous development in the developed countries in the future as well. In agriculture, it was assumed that labour productivity in all developed countries will increase at an annual rate of 4.5 per cent; and in industry, at 3.5 per cent in the developed market economies and 4.5 per cent in the

TABLE 126. LABOUR PRODUCTIVITIES IN VALUE ADDED PER CAPITA, BY ECONOMIC SECTOR, DEVELOPING COUNTRIES BY REGION AND DEVELOPED COUNTRIES BY TYPE OF ECONOMY, 1975
(Values in 1975 dollars)

	Agriculture	*Industry*	*Services*	*Total*	*Gross domestic product per capita*
Africa	375	2 967	2 076	983	370
Latin America	1 119	5 634	4 289	3 446	1 127
Asia	284	1 264	1 091	564	203
Middle East[a]	876	14 247	5 511	4 667	1 552
Total developing countries	403	3 551	2 335	1 287	459
Developed market economies[b]	5 729	13 905	13 086	12 610	5 496
Developed centrally planned economies	2 607	6 582	5 422	5 176	2 612
Total, developed countries	3 851	10 842	11 085	9 813	4 508

Sources: Historical gross domestic product and value-added figures taken from a communication of the United Nations Statistical Office, in which time series in constant 1975 dollars are provided for the period 1960–1977.

For labour force figures and their distribution by economic sector, International Labour Organisation, *Labour Force Estimates and Projections, 1950–2000* (Geneva, 1977). For 1960 and 1970, this source provides actual figures; for the period 1970–2000, projections of the totals are available in five-year intervals. For 1975 and 1977, these projections or interpolations thereof were taken as preliminary labour force totals, which were augmented according to the *Yearbook of International Labour Statistics*, wherever data availability permitted. For the distribution of labour force, according to economic sectors, use was made of extrapolations of labour force structure projections given in *World Development Report, 1979* (New York, Oxford University Press for World Bank, 1979); and country labour force totals. Again, this information was augmented in all cases (countries) where the *Yearbook* provided more recent data on the distribution of the labour force. The procedure used appears to give relatively good estimates of the labour forces.

[a] For names of countries, see footnote *a* to table 116.
[b] See footnote *b* to table 116.
[c] Figures were transformed from the net material product accounting scheme into the System of National Accounts scheme and are thus comparable to gross domestic product figures for the developed market economies and the developing economies. The changes apply primarily to the services sector.

TABLE 127. ANNUAL GROWTH RATES OF LABOUR PRODUCTIVITY, DEVELOPING COUNTRIES BY REGION AND DEVELOPED COUNTRIES BY TYPE OF ECONOMY, 1960–1977
(Rates in percentage)

	Agriculture	*Industry*	*Services*
Developing countries			
Africa	0.2	3.4	1.1
Latin America	2.5	2.4	1.6
Asia	1.1	4.0	2.4
Middle East[a]	2.7	4.1	4.3
Developed countries			
Market economies[b]	4.6	3.7	1.6
Centrally planned economies	3.7	4.3	4.2

[a] For names of countries, see footnote *a* to table 116.
[b] See footnote *b* to table 116.

TABLE 128. ELASTICITIES[a] OF LABOUR PRODUCTIVITY WITH RESPECT TO VALUE ADDED, DEVELOPING COUNTRIES BY REGION AND DEVELOPED COUNTRIES BY TYPE OF ECONOMY, 1960–1977

	Agriculture	*Industry*	*Services*
Developing countries			
Africa	0.15	0.40	0.23
Latin America	0.71	0.38	0.27
Asia	0.43	0.55	0.43
Middle East[b]	0.81	0.50	0.48
Developed countries			
Market economies[c]	2.98	0.83	0.37
Centrally planned economies	3.64	0.50	0.65

[a] Defined as the relative annual change (percentage) of the labour productivity divided by the relative annual change (percentage) of the value added of the same sector.
[b] For names of countries, see footnote *a* to table 116.
[c] See footnote *b* to table 116.

TABLE 129. ASSUMED ELASTICITIES OF PRODUCTIVITY GROWTH WITH RESPECT TO VALUE ADDED, DEVELOPING COUNTRIES BY REGION, 1975–2000

	Agriculture	*Industry*	*Services*
Africa	0.20	0.45	0.45
Latin America	0.70	0.50	0.50
Asia	0.50	0.55	0.60
Middle East[a]	0.80	0.45	0.50
Total developing countries[b]	0.53	0.49	0.57

[a] For names of countries, see footnote *a* to table 116.
[b] Implicit elasticities resulting as the weighted average of the four regions.

developed centrally planned economies. On the other hand, productivity growth in the services sector is considered to be primarily output-dependent, with elasticities of 0.55 and 0.75 for the developed market economies and the centrally planned economies, respectively[11]

In general, the specified growth rates or elasticities are quite close to the historical values. Since, in most cases, elasticities are used instead of growth rates, the adjustment to increased levels of growth in developing countries is taken into account, thus avoiding the errors that would arise from the use of inconsistently specified growth rates. The elasticities of the services sector were raised throughout in order to take account of the above-mentioned biases in that sector.[12]

Labour force requirements and supply until 2000

The economic growth implied by the achievement of the Lima target will therefore yield, by the year 2000, the labour force requirements shown in table 130. The changes in the sectoral distribution of the labour force according to this development pattern are given in table 131.

The major result is that, given the implied high economic growth rates, the available labour force will be absorbed by the economic system by the year 2000, i.e., the increase in employment opportunities will be sufficient to provide work for the rapidly growing labour forces, especially those of the developing countries.

The projected labour force supply for the year 2000 is 273.4 million in Africa, 207.3 in Latin America, 767.5 in Asia, 75.3 in the Middle East, 391.3 in the developed market economies and 217.0 in the developed centrally planned economies. It is 1,323.5 in the developing countries and 608.3 in the developed countries. When compared with the labour force requirements, the requirements match the available supply and even exceed it marginally (51.4 million or 3.8 per cent excess demand for the developing countries and 13.1 million or 2.2 per cent excess demand for the developed countries). Although for the aggregated regions these differences are, especially with a view to statistical significance, too small to warrant further discussion, on a regional level the discrepancies are more relevant. For the Middle East, supply exceeds demand (by 12.6 per cent); while for all other less developed regions, labour demand exceeds labour supply: for Africa by 1.3 per cent; for Asia by 3.5 per cent; for Latin America by 14.3 per cent. But these discrepancies may in part be due simply to the way the Lima target is subdivided and may represent only to a lesser extent the real incentives and forces for a reallocation of human resources. Again, the main conclusion is that applying historically plausible relationships concerning productivity development in this scenario of an admittedly accelerated economic growth leads to a surprisingly well-balanced picture for the year 2000.

TABLE 130. DEVELOPMENT OF LABOUR DEMAND, BY ECONOMIC SECTOR, DEVELOPING COUNTRIES BY REGION AND DEVELOPED COUNTRIES BY TYPE OF ECONOMY, 1960–2000
(*Millions*)

	Agriculture	*Industry*	*Services*	*Total*
Africa				
1960	83.1	8.0	14.2	105.4
1975	100.9	17.1	25.1	143.1
2000[a]	168.9	43.6	64.4	276.9
Latin America				
1960	33.5	14.0	22.2	70.0
1975	38.8	25.0	41.8	105.5
2000[a]	54.0	65.5	117.5	237.0
Asia				
1960	236.3	32.8	53.3	322.4
1975	294.1	53.0	85.4	432.4
2000[a]	464.3	136.0	193.8	794.1
Middle East[b]				
1960	19.1	4.1	5.0	28.2
1975	21.0	7.4	9.8	38.1
2000[a]	23.6	15.6	27.7	66.9
Total developing countries				
1960	372.0	58.9	94.9	526.0
1975	454.8	102.5	162.1	719.1
2000[a]	710.8	260.7	403.4	1 374.9
Developed market economies[c]				
1960	51.0	101.3	116.3	268.5
1975	33.6	113.4	174.6	321.5
2000[a]	21.5	109.0	258.6	389.1
Developed centrally planned economies				
1960	73.1	50.0	44.8	167.9
1975	50.7	81.5	61.9	194.0
2000[a]	29.7	106.5	85.5	221.7
Total developed countries				
1960	124.0	151.3	161.1	436.4
1975	84.2	194.9	236.4	515.5
2000[a]	51.2	215.5	344.1	610.8

Source: For projections to 2000, International Labour Organisation.

[a] Values are projections of labour force requirements.
[b] See footnote *a* to table 116.
[c] See footnote *b* to table 116.

Labour force requirements and supply until 2025

Because of the increased uncertainties involved, the analysis for development beyond the year 2000 up to 2025

[11] The assumptions on elasticities and growth rates are based on an evaluation of the historical values given above, the values of the intermediate periods between 1960 and 1977, and the results of the supplementary analyses.

[12] This increase is especially necessary as the methodology of the original scenario (an input/output approach) does not possess this implicit downward bias for the services sector, even when the projection is made in constant 1975 prices.

TABLE 131. DEVELOPMENT OF LABOUR DEMAND, PERCENTAGE DISTRIBUTION BY ECONOMIC SECTOR, DEVELOPING COUNTRIES BY REGION AND DEVELOPED COUNTRIES BY TYPE OF ECONOMY, 1960–2000

	Agriculture	*Industry*	*Services*
Developing countries			
Africa			
1960	78.8	7.6	13.5
1975	70.5	11.9	17.5
2000[a]	61.0	15.7	23.2
Latin America			
1960	47.9	20.0	32.1
1975	36.8	23.7	39.6
2000[a]	22.8	27.6	49.6
Asia			
1960	73.3	10.2	16.5
1975	68.0	12.3	19.8
2000[a]	58.5	17.1	24.4
Middle East[b]			
1960	67.7	14.5	17.7
1975	55.1	19.4	25.7
2000[a]	35.3	23.3	41.4
Developed countries			
Market economies[c]			
1960	19.0	37.7	43.3
1975	10.5	35.2	54.3
2000[a]	5.5	28.0	66.5
Centrally planned economies			
1960	43.5	29.8	26.7
1975	26.1	42.0	31.9
2000[a]	13.4	48.0	38.6

Source: For projections to 2000, International Labour Organisation.

[a] Values based on projections of labour force requirements.
[b] See footnote *a* to table 116.
[c] See footnote *b* to table 116.

was not carried out at the same level of regional disaggregation but rather by considering only the aggregated regions—the total developing and developed countries. For the developing countries, the elasticities for agriculture and services were further raised to 0.75 and 0.65, while the productivity growth in industry was assumed to be 3.5 per cent, corresponding to the 1975–2000 level. For the developed countries, the productivity growth rate in agriculture was lowered to 4.0 per cent, for industry it was increased to 4.5 per cent and the elasticity for the services sector was increased to 0.85. Thus, with the minor exception of agriculture in developed countries, where natural-resource constraints might have an effect, the factors positively inducing productivity growth were either consistently raised or at least kept at their previous levels. These assumptions should be considered quite strong; and the likelihood is that the advancement of labour productivities will be slower, rather than more rapid. As it turns out, even this comparatively strict set of assumptions leads to a remarkable growth of labour force requirements by the year 2025, which nearly match the available labour force supply.

The potential labour force supply was not available from the above-mentioned labour force supply projections; therefore, an extrapolation of its development until 2025 had to be made. Given a population projection for the year 2025 and extrapolating the participation rate (rising in developing countries and falling in developed countries), the available labour force for the year 2025 was estimated and is shown in table 132.

Tables 133 and 134 give the long-term evolution of the labour force requirements and the distribution by economic sector. When the labour force required by the year 2025 (2,086.4 million for developing countries and 627.9 million for developed countries, yielding a total of 2,714.3 million in comparison with 1,234.6 million in 1975) is compared with the available labour force supply, an excess demand of 93 million or 4.5 per cent for the developing countries and an oversupply of 9.2 million or 1.4 per cent for the developed countries is to be expected. Although there are huge uncertainties involved in such a long-range exercise, it might be concluded that even by

TABLE 132. POPULATION AND LABOUR FORCE SUPPLY, DEVELOPED AND DEVELOPING COUNTRIES, 1975–2025

(*Millions*)

	Population	*Labour force*	*Participation rate (percentage)*
Developing countries[a]			
1975	2015.8[b]	719.1[b]	35.7
2000	3668.3[c]	1323.5[d]	36.1
2025	5461.5[c]	1993.4[e]	36.5
Developed countries[f]			
1975	1122.1[b]	515.5[b]	45.9
2000	1305.1[c]	597.7[d]	45.8
2025	1394.0[c]	637.1[e]	45.7
Total			
1975	3137.9[b]	1234.6[b]	39.3
2000	4973.4[c]	1921.2[d]	38.6
2025	6855.5[c]	2630.5[e]	38.4

[a] Excluding the centrally planned economies of Asia.
[b] Estimated.
[c] Population projection by the United Nations Secretariat.
[d] Labour force projections for 2000 by International Labour Organisation.
[e] Extrapolation.
[f] See footnote *b* to table 116.

TABLE 133. DEVELOPMENT OF LABOUR DEMAND, BY ECONOMIC SECTOR, DEVELOPED AND DEVELOPING COUNTRIES, 1960–2025

(*Millions*)

	Agriculture	*Industry*	*Services*	*Total*
Developing countries				
1960	372.0	58.9	94.9	526.0
1975	454.8	102.5	162.1	719.1
2000[a]	710.8	260.7	403.4	1374.9
2025[a]	885.8	510.4	690.2	2086.4
Developed countries[b]				
1960	124.0	151.3	161.1	436.4
1975	84.2	194.9	236.4	515.5
2000[a]	51.2	215.5	344.1	610.8
2025[a]	34.4	195.6	397.9	627.9
Total				
1960	496.0	210.2	256.0	962.4
1975	539.0	297.4	398.5	1234.6
2000[a]	762.0	476.2	747.5	1985.7
2025[a]	920.2	706.0	1088.1	2714.3

[a] Values are projections of labour force requirements.
[b] See footnote *b* to table 116.

TABLE 134. DEVELOPMENT OF LABOUR DEMAND, PERCENTAGE DISTRIBUTION BY ECONOMIC SECTOR, DEVELOPED AND DEVELOPING COUNTRIES, 1960–2025

	Agriculture	*Industry*	*Services*
Developing countries			
1960	70.7	11.2	18.0
1975	63.2	14.3	22.5
2000[a]	51.7	19.0	29.3
2025[a]	42.5	24.5	33.0
Developed countries[b]			
1960	28.4	34.7	36.9
1975	16.3	37.8	45.9
2000[a]	8.3	35.8	56.3
2025[a]	5.5	31.2	63.4
Total			
1960	51.5	21.8	26.6
1975	43.7	24.1	32.3
2000[a]	38.4	24.0	37.6
2025[a]	33.9	26.0	40.1

[a] Values are projections of labour force requirements.
[b] See footnote *b* to table 116.

the year 2025, a satisfactory match of supply and demand could be achieved. This statement must be qualified from at least two aspects:

(*a*) The underlying population projection shows a large reduction of population growth in developing countries, with the consequence that the proportion of people of working age will increase. Alternative calculations indicate that in the developing countries a range of up to 2,300 million or 2,400 million for the available labour force by the year 2025 is plausible;

(*b*) Abandoning the increased positive inducements on productivity development for the period 2000–2025 and returning to the levels of growth rates and elasticities of the previous period 1975–2000 would be quite sufficient to compensate for this additional labour force increase.

An interesting feature of these hypothetical developments up to the years 2000 and 2025 is the fact that while agriculture will remain the largest sector both in terms of people employed and in terms of the economically active in developing countries, the absorption of the increases of labour forces must be primarily by the rest of the economy. Between 1975 and 2000, agriculture will absorb 39.0 per cent of the additional labour force demand, compared with 24.1 per cent for industry and 36.8 per cent for the services sector. Between 2000 and 2025, only 24.6 per cent of the additional labour force requirements will be in agriculture, but 35.1 and 40.3 per cent will go into the other two sectors. This result serves to illustrate the important role industrialization and the subsequent structural transformation have to play in guaranteeing future employment in developing countries.

Summary

If these more or less optimistic conclusions concerning the world employment potential of the future are to be evaluated, a number of things must be borne in mind. It cannot be denied that the high economic growth of the Lima target scenario contains more than one element of optimism. On the other hand, it should be recalled that continuous collective efforts and international co-operation can make this target achievable. The assumption concerning productivity growth should not be considered too relaxed. It seems not implausible that productivity growth will fall short of the values used in the foregoing discussion and this shortfall would enlarge the labour force requirements.[13]

[13] A further consideration, from a traditional point of view, might be that the relative productivities between the sectors must stay within certain bounds. This point pertains especially to the developing countries. Until the year 2000, this problem does not appear to arise, but by 2025, the agriculture sector apparently will have fallen critically behind. Yet it appears reasonable to suppose that in this case relative productivities will be levelled to a certain extent by intersectoral migration. As this migration lowers the productivity and hence the international competitiveness of the industry sector of developing countries, the importance of their internal markets must rise. In order to assess the effect of these levelling tendencies, the actual labour productivities of the developed countries for the year 1975 were applied to the year 2025. Besides the expected large differences in the distribution of the labour force of developing countries, the main result was that roughly 2,663 million people could be employed. Considering that the over-all achievement of the productivities currently prevailing in developed countries would be a worth while objective in itself, this result serves to underline the optimistic conclusions reached above.

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