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World Population Prospects The 2002 Revision

Highlights



NOTE

The designations employed in this report and the material presented in it do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. The term “country” as used in the text of this report also refers, as appropriate, to territories or areas. The designations “more developed”, “less developed” and “least developed” countries, areas or regions are intended for statistical convenience and do not necessarily express a judgement about the stage reached by a particular country or area in the developing process.

PREFACE

This report presents the highlights from the results of the *2002 Revision* of the official world population estimates and projections prepared by the Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat. The *2002 Revision* is the eighteenth round of global demographic estimates and projections undertaken by the Population Division since 1950.

The full results of the *2002 Revision* will be presented in a series of three volumes currently under preparation. The first volume¹ will provide the comprehensive tables presenting the major demographic indicators for each country for 1950-2050; the second volume² will contain the distributions by age and sex of the population of each country for the period 1950-2050, and the third volume³ will be devoted to an analysis of the results obtained.

Data will also be distributed in digital form. Interested users can purchase a CD-Rom containing the major results of the *2002 Revision*. A description of data contained in the CD-Rom and an order form will be posted on the Population Division's web site (see address below).

Responsibility for the *2002 Revision* rests with the Population Division. Preparation of the *2002 Revision* was facilitated by the collaboration of the regional commissions, the specialized agencies and other relevant bodies of the United Nations with the Population Division.

In particular, a major source of official national population statistics used in the preparation of these estimates and projections is the *United Nations Demographic Yearbook* and its accompanying databases, produced and maintained by the United Nations Statistics Division, Department of Economic and Social Affairs. The Population Division is grateful to the Statistics Division for its continuing cooperation.

Selected output from the *2002 Revision* as well as other population information may be accessed on the world wide web site of the Population Division at www.unpopulation.org. For further information about the *2002 Revision*, please contact Mr. Joseph Chamie, Director, Population Division, United Nations, New York, NY 10017, USA (fax: 1 212 963 2147).

¹*World Population Prospects: The 2002 Revision*, vol. I, *Comprehensive Tables* (United Nations publication, forthcoming).

²*World Population Prospects: The 2002 Revision*, vol. II, *Sex and Age Distribution of the World Population* (United Nations publication, forthcoming).

³*World Population Prospects: The 2002 Revision*, vol. III, *Analytical Report* (United Nations publication, forthcoming).

EXECUTIVE SUMMARY

The *2002 Revision* is the eighteenth round of official United Nations population estimates and projections prepared by the Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat. These are used throughout the United Nations system as the basis for activities requiring population information.

The *2002 Revision* of the official United Nations population estimates and projections breaks new ground in terms of the assumptions made on future human fertility and the impact of the HIV/AIDS epidemic. For the first time, the United Nations Population Division projects that future fertility levels in the majority of developing countries will likely fall below 2.1 children per woman, the level needed to ensure the long-term replacement of the population, at some point in the twenty-first century. By 2050, the medium variant of the *2002 Revision* projects that 3 out of every 4 countries in the less developed regions will be experiencing below-replacement fertility.

This change in assumptions represents the third and final phase in a process of assessment of future trends in fertility. In 1997 the Population Division convened a meeting of experts to review the guidelines for the projection of fertility in countries with below-replacement fertility.¹ As a result of the deliberations of that meeting the fertility of low-fertility countries was maintained below replacement level during the whole projection period in the *1998 Revision*. In 2001, a similar meeting of experts was convened to discuss prospects for countries where fertility had not yet begun to decline or where fertility declines were incipient.² Already the *2000 Revision* projected that fertility in those countries would decline more slowly than in the *1998 Revision* and their pace of fertility decline is not projected to be much faster in the *2002 Revision*. Lastly, in 2002 a meeting of experts discussed guidelines on how to project the future fertility of intermediate-fertility countries, that is, those that had already experienced significant fertility decline but had not yet reached levels of fertility below replacement.³ The projections of fertility in the *2002 Revision* reflect the conclusions reached at that meeting.

A second important change in the *2002 Revision* is that it anticipates a more serious and prolonged impact of the HIV/AIDS epidemic in the most affected countries than previous revisions. The impact of the disease is explicitly modelled for 53 countries, up from the 45 considered in the *2000 Revision*. The dynamics of the epidemic are assumed to remain unchanged until 2010. Thereafter prevalence levels are assumed to decline in a manner consistent with modifications of behaviour that reduce the rates of recruitment into the high risk group as well as the chances of infection among those engaging in high risk behaviour. The resulting HIV prevalence levels remain relatively high until 2010 and then decline, but are still substantial by mid-century (see annex table 17).

As a consequence of these changes, the *2002 Revision* projects a lower population in 2050 than the *2000 Revision* did: 8.9 billion instead of 9.3 billion according to the medium variant. About half of the 0.4 billion difference in these projected populations results from an increase in the number of projected deaths, the majority stemming from higher projected levels of HIV

¹ Below Replacement Fertility, *Population Bulletin of the United Nations*, Special Issue Nos. 40/41, 1999 (United Nations, 2000).

² United Nations Workshop on Prospects for Fertility Decline in High Fertility Countries, New York, 9-11 July 2001 (United Nations, ESA/P/WP.167).

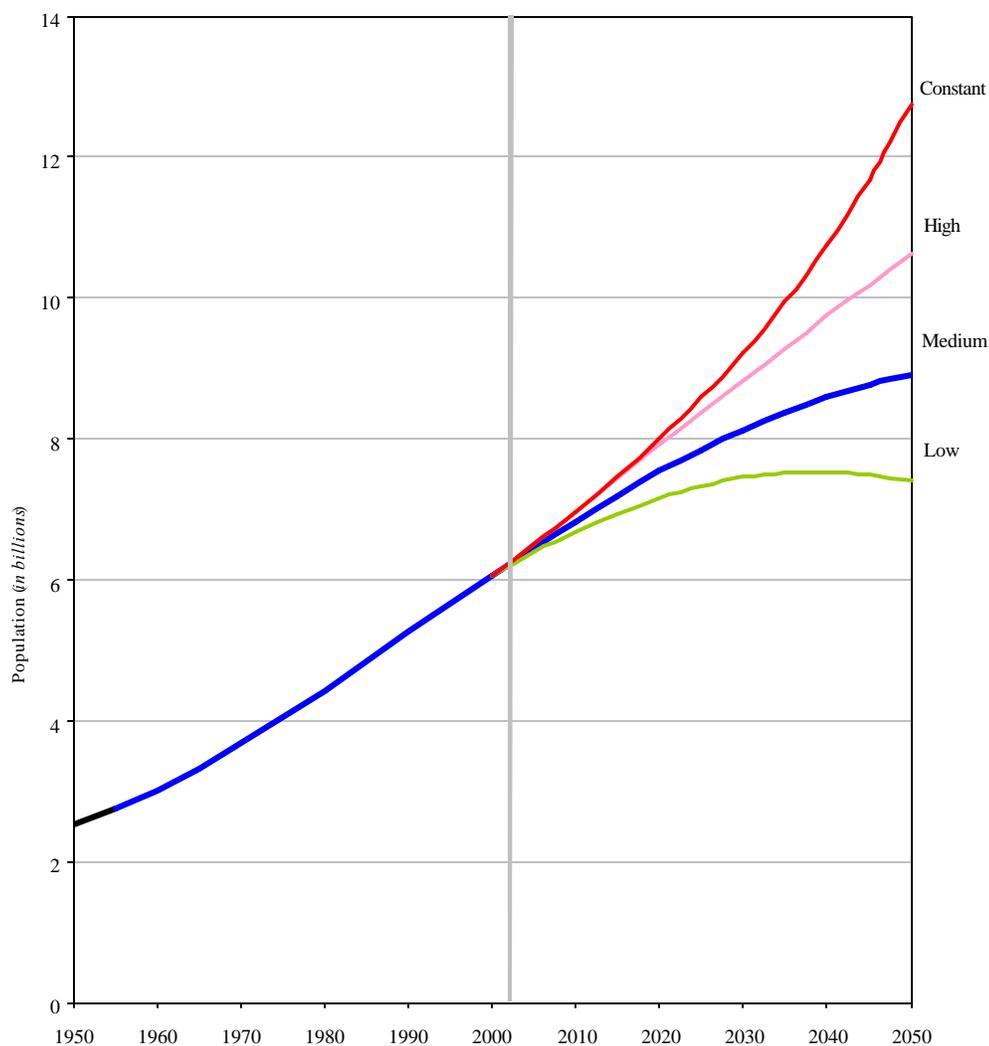
³ Completing the Fertility Transition (United Nations, ESA/P/WP.1/Rev.1).

prevalence. The other half of the difference reflects a reduction in the projected number of births, primarily as a result of lower expected future fertility levels.

The results of the *2002 Revision* confirm key conclusions from previous revisions and provide new insights into the sensitivity of population projections to future trends in fertility and mortality. The main findings of the *2002 Revision* are summarized below.

1. Despite the lower fertility levels projected and the increased mortality risks to which some populations will be subject, the population of the world is expected to increase by 2.6 billion during the next 47 years, from 6.3 billion today to 8.9 billion in 2050. However, the realization of these projections is contingent on ensuring that couples have access to family planning and that efforts to arrest the current spread of the HIV/AIDS epidemic are successful in reducing its growth momentum. The potential for considerable population increase remains high. According to the results of the *2002 Revision*, if fertility were to remain constant in all countries at current levels, the total population of the globe could more than double by 2050, reaching 12.8 billion. Even a somewhat slower reduction of fertility than that projected in the medium variant would result in additional billions of people. Thus, if women were to have, on average, about half a child more than according to the medium variant, world population might rise to 10.6 billion in 2050 as projected in the high variant. The low variant, where women have, on average, half a child less than in the medium variant, would result in a 2050 population of 7.4 billion (figure I).
2. World population is currently growing at a rate of 1.2 per cent annually, implying a net addition of 77 million people per year. Six countries account for half of that annual increment: India for 21 per cent; China for 12 per cent; Pakistan for 5 per cent; Bangladesh, Nigeria and the United States of America for 4 per cent each.
3. The increasing diversity of population dynamics among the countries and regions of the world is evident in the results of the *2002 Revision*. Whereas today the population of the more developed regions of the world is rising at an annual rate of 0.25 per cent, that of the less developed regions is increasing nearly six times as fast, at 1.46 per cent, and the subset of the 49 least developed countries is experiencing even more rapid population growth (2.4 per cent per year). Such differences, although somewhat dampened, will persist until 2050. By that time, the population of the more developed regions will have been declining for 20 years, whereas the population of the less developed regions will still be rising at an annual rate of 0.4 per cent. More importantly, the population of the least developed countries will likely be rising at a robust annual rate of over 1.2 per cent in 2045-2050.
4. As a result of these trends, the population of more developed regions, currently at 1.2 billion, is anticipated to change little during the next 50 years. In addition, because fertility levels for most of the developed countries are expected to remain below replacement level during 2000-2050, the populations of 30 developed countries are projected to be smaller by mid-century than today (e.g., 14 per cent smaller in Japan; 22 per cent smaller in Italy, and between 30 and 50 per cent smaller in the cases of Bulgaria, Estonia, Georgia, Latvia, the Russian Federation and Ukraine).

Figure I. Estimated and projected population of the world by projection variant, 1950-2050



Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (2003). *World Population Prospects: The 2002 Revision. Highlights*. New York: United Nations.

- The population of the less developed regions is projected to rise steadily from 4.9 billion in 2000 to 7.7 billion in 2050 (medium variant). Particularly rapid growth is expected among the least developed countries whose population is projected to rise from 668 million to 1.7 billion despite the fact that their fertility is projected to decline markedly in the future (from 5.1 children per woman today to 2.5 children per woman in 2045-2050). With sustained annual growth rates higher than 2.5 per cent between 2000 and 2050, the populations of Burkina Faso, Mali, Niger, Somalia, Uganda and Yemen are projected to quadruple, passing from 85 million to 369 million in total.

6. Large population increments are expected among the most populous countries even if their fertility levels are projected to be low. Thus, during 2000-2050, eight countries (India, Pakistan, Nigeria, the United States of America, China, Bangladesh, Ethiopia and the Democratic Republic of Congo, in order of population increment) are expected to account for half of the world's projected population increase.
7. The past 50 years witnessed a remarkable reduction of fertility levels in the less developed regions, with total fertility falling from 6 to 3 children per woman. Over the next 50 years, fertility in the less developed regions is expected to reach replacement level in 2030-2035 and fall below it thereafter. However, average fertility in the less developed regions as a whole is still expected to be slightly above 2 children per woman in 2045-2050, mainly because of the increasing heterogeneity of population dynamics among developing countries. Thus, the 49 least developed countries are expected to have a total fertility of 2.5 children per woman in 2045-2050, well above replacement level. That is, the *2002 Revision* foresees that by mid-century there will still be a significant number of countries where the transition to below-replacement fertility will not be completed.
8. Increasing diversity is also evident with respect to future mortality levels. At the world level, life expectancy at birth is likely to rise from 65 years today to 74 years in 2045-2050. But whereas more developed regions, whose life expectancy today is estimated at 76 years, will see it rise to 82 years, that of less developed regions will remain considerably below, reaching 73 years by mid-century (up from 63 years today). In the group of least developed countries, many of which are highly affected by the HIV/AIDS epidemic, life expectancy today is still below 50 years and is not expected to exceed 67 years by 2050. So, although the gap in life expectancy between the different groups of countries is expected to narrow, major differences in the probabilities of survival will remain evident by mid-century.
9. The 2002 Revision indicates a worsening of the impact of the HIV/AIDS epidemic in terms of increased morbidity, mortality and population loss. Although the probability of being infected by HIV is assumed to decline significantly in the future (particularly after 2010), the long-term impact of the epidemic remains dire. Over the current decade, the number of excess deaths because of AIDS among the 53 most affected countries is estimated at 46 million and that figure is projected to ascend to 278 million by 2050. Despite the devastating impact of the HIV/AIDS epidemic, the populations of the affected countries are generally expected to be larger by mid-century than today, mainly because most of them maintain high to moderate fertility levels. However, for the seven most affected countries in Southern Africa, where current HIV prevalence is above 20 per cent, the population is projected to increase only slightly, from 74 million in 2000 to 78 million in 2050, and outright reductions in population are projected for Botswana, Lesotho, South Africa and Swaziland.
10. The deeper reductions of fertility projected in the *2002 Revision* result in a faster ageing of the population of developing countries than in previous revisions. Globally, the number of older persons (60 years or over) will nearly triple, increasing from 606 million in 2000 to nearly 1.9 billion by 2050. Whereas 6 of every 10 of those older persons live today in less developed regions, by 2050, 8 of every 10 will do so. An even more marked increase is expected in the number of the oldest-old (80 years or over) at the global level:

from 69 million in 2000 to 377 million in 2050. In less developed regions, the rise will be from 32 million to 265 million, again implying that most oldest old will live in less developed countries by 2050.

11. In more developed regions, the population aged 60 or over currently constitutes 19 per cent of the population; by 2050 it will account for 32 per cent of the population. The elderly population in more developed regions has already surpassed the child population (persons aged 0-14) and by 2050 there will be 2 elderly persons for every child. In the less developed regions, the proportion of the population aged 60 or over will rise from 8 per cent in 2000 to close to 20 per cent in 2050.
12. Increases in the median age, the age at which 50 per cent of the population is older and 50 per cent is younger than that age, reflect the ageing of the population. At the world level, the median age rose by scarcely three years between 1950 and 2000, from 23.6 years to 26.4 years, largely because most populations in less developed countries remained young. Over the next 50 years, however, the world's median age will rise by nearly 10 years, to reach 37 years in 2050. Among developed countries, 13 are expected to have a median age of 50 years or more, with Japan, Latvia and Slovenia (each with a median age of about 53 years), and the Czech Republic, Estonia, Italy and Spain (each with a median age of about 52 years) leading the list. In addition, three developing countries (Armenia, the Republic of Korea and Singapore) will also be in that group. At the other end of the spectrum, Angola, Burkina Faso, Mali, Niger, Somalia, Uganda and Yemen expect to have still young populations, with median ages lower than 23 years in 2050.
13. International migration is projected to remain high during the first half of the century. The more developed regions are expected to remain net receivers of international migrants, with an average gain of about 2 million migrants per year over the next 50 years. Averaged over the 2000-2050 period, the main net gainers of international migrants are projected to be the United States (1.1 million annual net migrants), Germany (211 thousand), Canada (173 thousand), the United Kingdom (136 thousand) and Australia (83 thousand), whereas the major net senders are projected to be China (-303 thousand annual net number of migrants), Mexico, (-267 thousand), India (-222 thousand), the Philippines (-184 thousand) and Indonesia (-180 thousand).

CONTENTS

	<i>Page</i>
Preface.....	iii
Explanatory notes	xiv
Executive Summary.....	v
I. WORLD POPULATION TRENDS.....	1
II. FERTILITY	7
III. THE DEMOGRAPHIC IMPACT OF HIV/AIDS.....	10
IV. POPULATION AGEING.....	15
V. ASSUMPTIONS UNDERLYING THE 2002 REVISION	18
VI. OBTAINING DATA FROM WORLD POPULATION PROSPECTS: THE 2002 REVISION.....	22

TABLES

No.

1. Estimated and projected population of the world, major development groups and major areas, 1950, 2000, 2003 and 2050 according to fertility variant	1
2. Estimated and projected total fertility for the world, major development groups and major areas, 1995-2000 and 2045-2050 according to fertility variant	4
3. Expectation of life at birth for the world, major development groups and major areas, 1995-2000 and 2045-2050	4
4. Distribution of countries and areas and of the world population according to the level of total fertility in 1950-1955, 1970-1975 and 1995-2000	7
5. Distribution of countries and areas and of the world population according to the level of total fertility in 2045-2050, low, medium and high variants	9
6. Difference in projected population with and without AIDS and percentage difference for groups of affected countries in major areas, 2000, 2015 and 2050	11
7. Excess deaths in a projection with AIDS in relation to a projection assuming no AIDS for groups of affected countries in major areas, 1995-2000, 2000-2005 and 2010-2015.....	11
8. Expectation of life at birth with and without AIDS for selected affected countries, 2000-2005, 2010-2015 and 2045-2050.....	12
9. Median age by major area, 1950, 2000 and 2050 (medium variant)	15
10. Average annual growth rates of the total population and the population in broad age groups, by major area, 2000-2050 (medium variant)	17
11. Projection variants in terms of assumptions for fertility, mortality and international migration	20

FIGURES

1. Annual growth rate for the world and major development groups, 1950-2050	2
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<i>No.</i>		<i>Page</i>
2.	Total fertility trajectories in the medium variant for the world and major development groups, 1950-2050	3
3.	Expectation of life at birth for the world and major development groups, 1950-2050.....	5
4.	Annual population growth rate projected with and without AIDS, Botswana, 1980-1985 to 2010-2015	12
5.	Life expectancy at birth in Zimbabwe with and without AIDS, 1980-2050	13
6.	Population with and without AIDS, South Africa, 1980-2050	14

ANNEX TABLES

1.	Total population by sex and sex ratio, by country, 2003 (medium variant).....	25
2.	Total population by country, 1950, 2000, 2015, 2025 and 2050 (medium variant)....	30
3.	Total fertility, by country, for selected periods (medium variant)	36
4.	Life expectancy at birth (both sexes combined), by country, for selected periods	41
5.	Infant mortality rate, by country, for selected periods	46
6.	Annual population growth rate, by country, for selected periods (medium variant)...	51
7.	Percentage distribution of the population in selected age groups, by country, 2000 and 2050 (medium variant).....	57
8.	Median age of the population, by country, 1950, 2000 and 2050 (medium variant)...	62
9.	Countries with a population of 50 million or more, 1950, 2000 and 2050 (medium variant)	67
10.	Countries accounting for 75 per cent of population growth in the world in 1950-1955, 2000-2005 and 2045-2050 (medium variant)	69
11.	Ten countries or areas with the highest and ten countries or areas with the lowest total fertility, 2000-2005 and 2045-2050 (medium variant).....	70
12.	Ten countries or areas with the highest and ten countries or areas with the lowest life expectancy at birth, 2000-2005 and 2045-2050	71
13.	Ten countries or areas with the highest and ten countries or areas with the lowest rates of population growth, 2000-2005 and 2045-2050 (medium variant).....	72
14.	Ten countries or areas with the highest and ten countries or areas with the lowest rates of natural increase, 2000-2005 and 2045-2050 (medium variant)	73
15.	Ten countries or areas with the oldest and ten countries or areas with the youngest populations, 2000 and 2050 (medium variant)	74
16.	Countries or areas whose population is projected to decrease between 2000 and 2050 (medium variant).....	75
17.	HIV prevalence in countries most affected by the HIV/AIDS epidemic for year of peak prevalence, 2001 and 2050	77
18.	Life expectancy at birth in the countries most affected by the HIV/AIDS epidemic, projected with AIDS and without AIDS, 2000-2005, 2010-2015 and 2045-2050	79
19.	Difference in life expectancy at birth without and with AIDS in the countries most affected by the HIV/AIDS epidemic, 2000-2005, 2010-2015 and 2045-2050.....	81
20.	Number of deaths in the countries most affected by the HIV/AIDS epidemic, estimated and projected with AIDS and without AIDS, 1980-2000, 2000-2015 and 2015-2050.....	83

<i>No.</i>		<i>Page</i>
21.	Excess number of deaths estimated and projected with AIDS versus without AIDS in the countries most affected by the HIV/AIDS epidemic, 1980-2000, 2000-2015 and 2015-2050.....	85
22.	Population in the countries most affected by the HIV/AIDS epidemic, estimated and projected with AIDS and without AIDS, 2000, 2015 and 2050.....	87
23.	Difference in estimated and projected population without and with AIDS in the countries most affected by the HIV/AIDS epidemic, 2000, 2015 and 2050.....	89

Explanatory notes

Tables presented in this report make use of the following symbols:

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

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

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

A minus sign (-) before a figure indicates a decrease.

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

Years given start on 1 July.

Use of a hyphen (-) between years, for example, 1995-2000, signifies the full period involved, from 1 July of the first year to 1 July of the second year.

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

Countries and areas are grouped geographically into six major areas: Africa; Asia; Europe; Latin America and the Caribbean; Northern America; and Oceania. These major areas are further divided into 21 geographical regions. In addition, for statistical convenience, the regions are classified as belonging to either of two categories: more developed or less developed. The less developed regions include all the regions of Africa, Asia (excluding Japan), and Latin America and the Caribbean, as well as Melanesia, Micronesia and Polynesia. The more developed regions comprise Australia/New Zealand, Europe, Northern America and Japan.

The group of least developed countries currently comprises 49 countries: Afghanistan, Angola, Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, Cape Verde, Central African Republic, Chad, Comoros, Democratic Republic of the Congo, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Haiti, Kiribati, Lao People's Democratic Republic, Lesotho, Liberia, Madagascar, Malawi, Maldives, Mali, Mauritania, Mozambique, Myanmar, Nepal, Niger, Rwanda, Samoa, Sao Tome and Principe, Senegal, Sierra Leone, Solomon Islands, Somalia, Sudan, Togo, Tuvalu, Uganda, United Republic of Tanzania, Vanuatu, Yemen and Zambia.

The following abbreviations have been used:

AIDS	Acquired immunodeficiency syndrome
HIV	Human immunodeficiency virus
UNAIDS	Joint United Nations Programme on HIV/AIDS

I. WORLD POPULATION TRENDS

The world population reached 6.3 billion at the beginning of 2003 and is projected to grow to 8.9 billion by 2050, according to the medium variant (table 1). In that variant, total fertility at the world level is expected to decline from 2.83 children per woman in 1995-2000 to 2.02 children per woman in 2045-2050, and the expectation of life at birth is expected to increase from 65 years to 74 years. As a consequence of the expected reduction of fertility, the population growth rate is projected to drop from 1.35 per cent per year in 1995-2000 to 0.33 per cent per year in 2045-2050.

TABLE 1. ESTIMATED AND PROJECTED POPULATION OF THE WORLD, MAJOR DEVELOPMENT GROUPS AND MAJOR AREAS, 1950, 2000, 2003 AND 2050 ACCORDING TO FERTILITY VARIANT

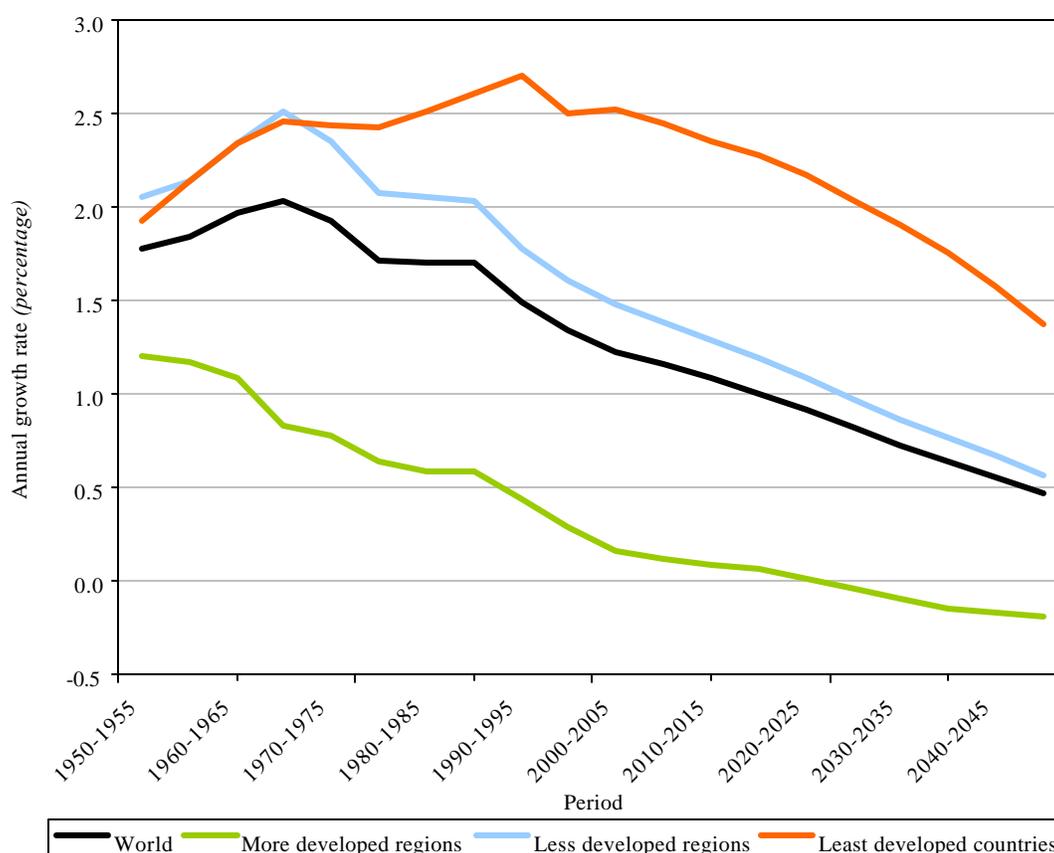
Major area	Estimated population (millions)			Population in 2050 (millions)			
	1950	2000	2003	Low	Medium	High	Constant
World	2 519	6 071	6 301	7 409	8 919	10 633	12 754
More developed regions	813	1 194	1 203	1 084	1 220	1 370	1 185
Less developed regions	1 706	4 877	5 098	6 325	7 699	9 263	11 568
Least developed countries	200	668	718	1 417	1 675	1 960	3 019
Other less developed countries	1 505	4 209	4 380	4 908	6 025	7 303	8 549
Africa	221	796	851	1 516	1 803	2 122	3 279
Asia	1 398	3 680	3 823	4 274	5 222	6 318	7 333
Latin America and the Caribbean	167	520	543	623	768	924	1 032
Europe	547	728	726	565	632	705	597
Northern America	172	316	326	391	448	512	453
Oceania	13	31	32	40	46	52	58

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (2003). *World Population Prospects: The 2002 Revision. Highlights*. New York: United Nations.

Population growth is projected to slow down in both the more developed and the less developed regions. However, whereas the growth rate remains positive for the less developed regions until 2050, it turns negative after 2030 for the more developed regions. By 2045-2050, the population in the more developed regions is projected to be declining at a rate of -0.14 per cent per year, whereas the population of the less developed regions will be growing at a robust rate of 0.40 per cent per year (figure 1).

The difference in growth trajectories between the more developed and the less developed regions is mainly the product of their current levels of fertility and the path fertility is expected to follow in the future. Although considerable differences in fertility exist among the countries of the more developed regions, in virtually all of them fertility is currently below replacement level (i.e. below 2.1 children per woman) and, although it is projected to rise somewhat in the future, it will remain below replacement level until 2050. Thus, for the more developed regions as a whole, total fertility is expected to decline from 1.58 children per woman in 1995-2000 to 1.56 children per woman in 2005-2010 and then to rise slowly to 1.85 children per woman in 2045-2050 (figure 2).

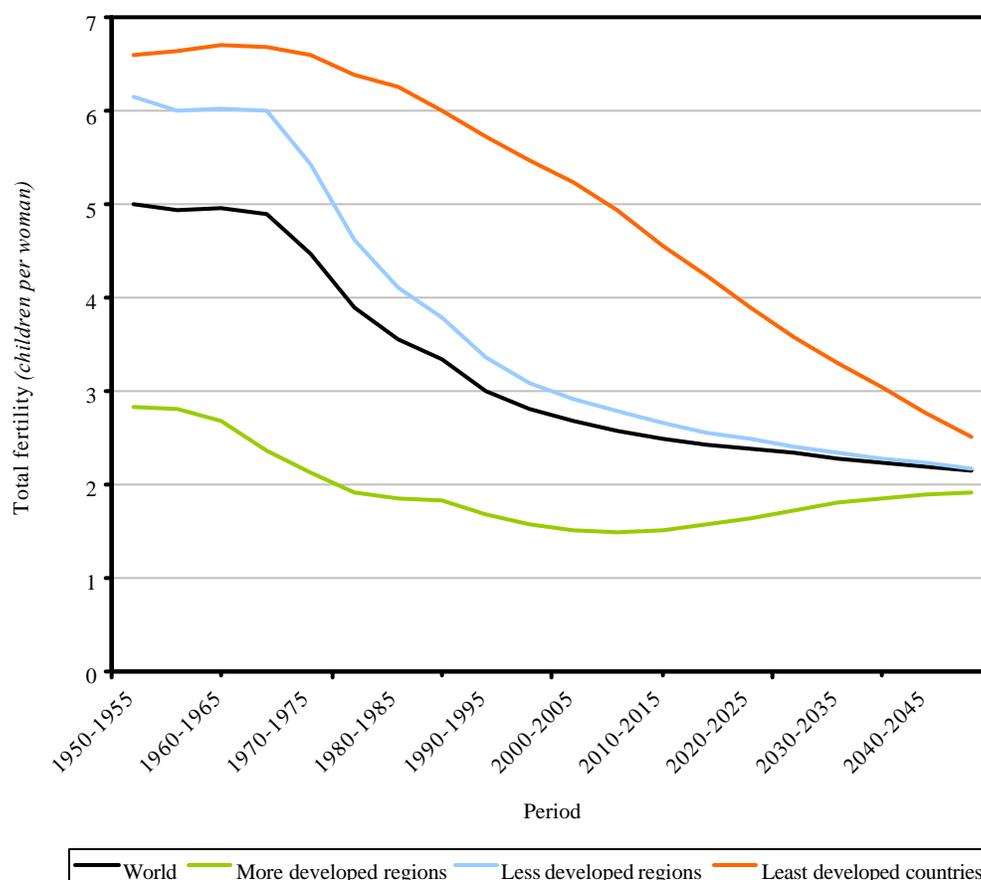
Figure 1. Annual growth rate for the world and major development groups, 1950-2050



Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (2003). *World Population Prospects: The 2002 Revision. Highlights*. New York: United Nations.

In contrast, in the less developed regions as a whole, fertility is still above replacement level (at 3.11 children per woman in 1995-2000 and 2.92 in 2000-2005) and is expected to remain above replacement level until 2030-2035, when it reaches 2.22 children per woman. At that time, the net reproduction rate is expected to be 1 daughter per woman for the first time, implying that true replacement level is reached, given the expected mortality level for the period. After 2035, the net reproduction rate in the less developed regions drops below 1 as total fertility continues to decline, reaching 2.04 children per woman in 2045-2050. However, these averages mask the considerable heterogeneity that characterizes fertility levels in developing countries. Indeed, the less developed regions include both low-fertility countries such as China, where fertility is already below replacement level, and a number of high-fertility countries, such as Afghanistan, Angola, Burkina Faso, Burundi, Guinea-Bissau, the Democratic Republic of the Congo, Mali, Niger, Somalia, Uganda or Yemen, where fertility is high and has either shown no signs of declining yet or is only beginning to decline. For the latter group, fertility levels over the 2000-2010 decade are expected to remain high and although important reductions of fertility are projected to occur by 2050, their total fertility by 2045-2050 is expected to be in the range of 2.5 to 3.9 children per woman, still moderately high.

Figure 2. Total fertility trajectories in the medium variant for the world and major development groups, 1950-2050



Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (2003). *World Population Prospects: The 2002 Revision. Highlights*. New York: United Nations.

Most high-fertility countries, including those that have not yet experienced a decline of fertility or where the decline is incipient, belong to the group of least developed countries. Relatively high fertility is expected to characterize that group of countries in the future (table 2). In 1995-2000, the 49 least developed countries had a total fertility of 5.46 children per woman, which is projected to decline to 2.47 children per woman in 2045-2050, a level consistent with a net reproduction rate of 1.1 daughters per woman and that is, therefore, above replacement level. In contrast, the rest of the countries in the less developed regions exhibit as a group a total fertility of 2.79 children per woman in 1995-2000 and are projected to have 1.90 children per woman in 2045-2050, a level consistent with a net reproduction rate of 0.89 daughters per woman and clearly below replacement level. In fact, the net reproduction rate of the less developed countries that do not belong to the group of the least developed is projected to reach a net reproduction rate of 1 daughter per woman in 2015-2020 and to have, therefore, a fertility under replacement level thereafter.

TABLE 2. ESTIMATED AND PROJECTED TOTAL FERTILITY FOR THE WORLD, MAJOR DEVELOPMENT GROUPS AND MAJOR AREAS, 1995-2000 AND 2045-2050 ACCORDING TO FERTILITY VARIANT

Major area	Total fertility (average number of children per woman)				
	1995-2000	2045-2050			
		Low	Medium	High	Constant
World.....	2.83	1.54	2.02	2.50	3.83
More developed regions.....	1.58	1.35	1.85	2.35	1.70
Less developed regions.....	3.11	1.56	2.04	2.52	4.02
Least developed countries.....	5.46	2.00	2.47	2.95	5.84
Other less developed countries.....	2.79	1.40	1.90	2.39	3.42
Africa.....	5.22	1.92	2.40	2.88	5.75
Asia.....	2.72	1.42	1.91	2.41	3.41
Latin America and the Caribbean.....	2.72	1.36	1.86	2.36	2.94
Europe.....	1.42	1.34	1.84	2.34	1.45
Northern America.....	2.01	1.35	1.85	2.35	2.02
Oceania.....	2.45	1.41	1.92	2.42	3.12

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (2003). *World Population Prospects: The 2002 Revision. Highlights*. New York: United Nations.

TABLE 3. EXPECTATION OF LIFE AT BIRTH FOR THE WORLD, MAJOR DEVELOPMENT GROUPS AND MAJOR AREAS, 1995-2000 AND 2045-2050

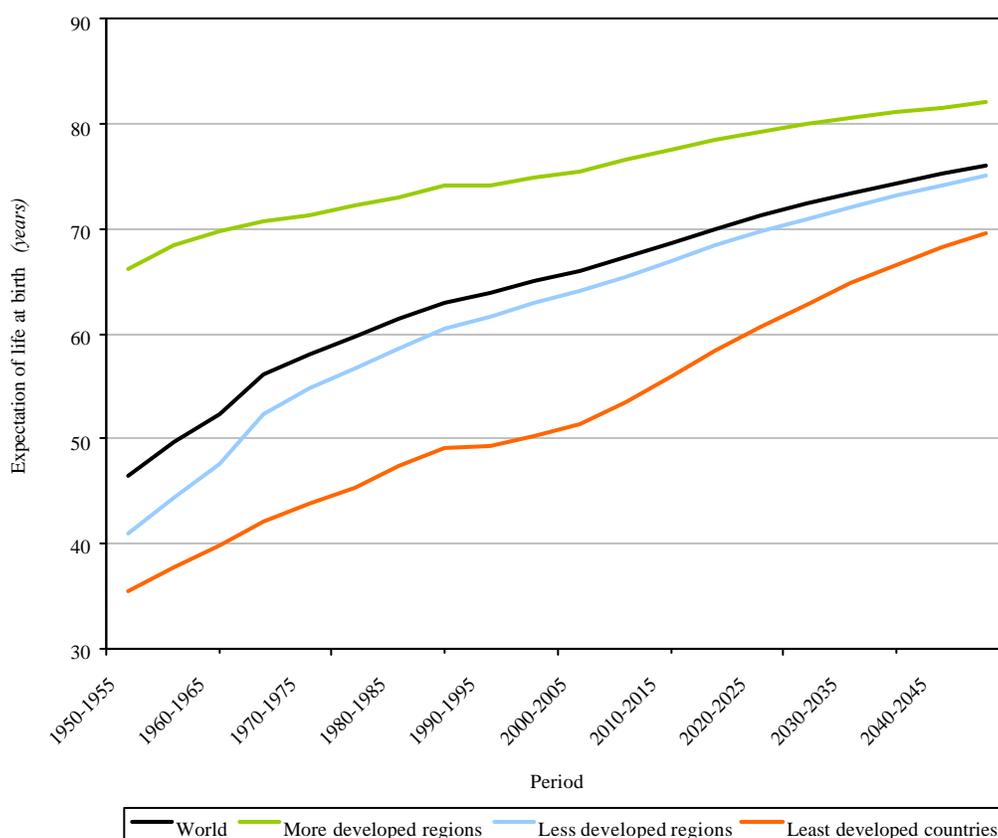
Major area	1995-2000	2045-2050
World.....	64.6	74.3
More developed regions.....	74.8	81.6
Less developed regions.....	62.5	73.1
Least developed countries.....	48.7	66.4
Other less developed countries.....	65.4	75.1
Africa.....	50.0	64.9
Asia.....	65.7	76.0
Latin America and the Caribbean.....	69.4	78.5
Europe.....	73.2	80.5
Northern America.....	76.4	81.8
Oceania.....	73.2	80.9

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (2003). *World Population Prospects: The 2002 Revision. Highlights*. New York: United Nations.

Equally striking are the differences in expectation of life at birth (table 3 and figure 3). The more developed regions experience the lowest mortality and have, therefore, higher levels of life expectancy at birth than the less developed regions as a whole (75 years versus 63 years in 1995-2000). Although the gap between the two groups of countries is expected to narrow over the next 50 years, by 2045-2050 the more developed regions are still expected to have considerably higher life expectancy at birth than the less developed regions (82 years versus 73 years).

Within both the more developed and the less developed regions, certain groups of countries have higher mortality than the rest. For example, in the more developed regions, Eastern Europe has experienced increased mortality over the past decade and exhibits relatively low levels of life expectancy at birth (68 years in 1995-2000). By 2045-2050, Eastern Europe's projected life expectancy, at 77 years, is the lowest among those of the more developed regions.

Figure 3. Expectation of life at birth for the world and major development groups, 1950-2050



Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (2003). *World Population Prospects: The 2002 Revision. Highlights*. New York: United Nations.

Among the less developed regions, those that are highly affected by the HIV/AIDS epidemic have some of the lowest life expectancies recorded in recent times and are projected to experience continued high mortality over the next 50 years. Sub-Saharan Africa, in particular, with 37 highly affected countries in 2001, had an estimated life expectancy of 47 years in 1995-2000, two years lower than it was 10 years earlier (49 years). Furthermore, life expectancy is expected to keep on declining over the next decade, to 46 years on average. Although the incidence of HIV infection is projected to decline, particularly after 2010, by 2045-2050 life expectancy in sub-Saharan Africa is still expected to be the lowest among the world's major areas (63 years).

The 49 least developed countries, which include 28 of the countries that are highly affected by HIV/AIDS, already experience fairly high mortality levels. Their life expectancy at birth was 49 years in 1995-2000 and is expected to remain relatively low during the next 50 years, reaching 66 years in 2045-2050.

Despite being subject to high mortality, the population of the least developed countries is expected to more than double between 2000 and 2050, rising from 668 million to 1.68 billion. The high fertility levels prevailing there are largely responsible for the increase. Growth will also be substantial in the rest of the developing countries, whose population is projected to increase from 4.2 billion to 6 billion between 2000 and 2050. Consequently, the population of the less developed regions as a whole is projected to increase from 4.9 billion in 2000 to 7.7 billion in 2050. Such an increase in size is moderate if one considers that, were fertility to remain constant at current levels in the less developed countries, their total population would rise to 11.6 billion in 2050, 3.9 billion more than projected under the medium variant.

In the more developed regions, the population is projected to grow slightly between 2000 and 2030, rising from 1.19 billion to 1.24 billion, only to decline thereafter to reach 1.22 billion by 2050. If fertility were to remain constant at the levels reached in 1995-2000, the total population in 2050 would not be very different (1.18 billion), partly because a considerable part of the population growth in the more developed regions is associated with the projected net inflow of international migrants.

The difference between the projected population in 2050 according to the *2002 Revision* (8.9 billion) and that projected in the *2000 Revision*⁴ (9.3 billion) is a deficit in the *2002 Revision* of 403 million people. The higher mortality levels projected for the countries affected by the HIV/AIDS epidemic in the *2002 Revision* are responsible for about half that deficit or 193 million additional deaths. The rest of the difference is attributable to less births projected in the *2002 Revision* than in the *2000 Revision*, most of which are the result of the lower levels of fertility projected in the former. The HIV/AIDS epidemic also contributes to reduce the number of projected births by reducing the population of women in the reproductive ages, but this effect is smaller than that associated with the reduction of fertility.

⁴ *World Population Prospects: The 2000 Revision*, vol. I, *Comprehensive Tables* (United Nations publication, Sales no. E.01.XIII.8); vol. II, *Sex and Age* (Sales no. E.01.XIII.9); and vol. III, *Analytical Report* (Sales no. E.01.XIII.20).

II. FERTILITY

According to the *2002 Revision*, total fertility—that is, the average number of children a woman would bear if fertility rates remained unchanged during her lifetime—was 2.83 children per woman in 1995-2000 at the world level. This average results from very varied experiences at the country level. In 1995-2000, 59 countries or areas (44 of them located in the more developed regions) experienced fertility levels below 2.1 children per woman or replacement level⁵, whereas 133 countries or areas (132 of which are located in the less developed regions) experienced total fertility levels at or above 2.1 children per woman. Among the latter, 47 had total fertility levels at or above 5 children per woman, and the majority of them are among the countries classified as least developed (table 4).

TABLE 4. DISTRIBUTION OF COUNTRIES AND AREAS AND OF THE WORLD POPULATION ACCORDING TO THE LEVEL OF TOTAL FERTILITY IN 1950-1955, 1970-1975 AND 1995-2000

Range of total fertility	Population (millions)			Number of countries		
	1953	1973	1998	1950-1955	1970-1975	1995-2000
Greater than 7.....	139	151	80	34	33	7
Between 6 and 7.....	1 044	585	221	68	48	17
Between 5 and 6.....	552	919	412	30	29	23
Between 4 and 5.....	34	1 100	170	15	18	24
Between 3 and 4.....	283	87	1 445	16	15	22
Between 2.1 and 3.....	572	353	950	24	30	40
Less than 2.1	10	684	2 594	5	19	59
TOTAL	2 635	3 880	5 873	192	192	192
	<i>Percentage</i>					
Greater than 7.....	5.3	3.9	1.4	17.7	17.2	3.6
Between 6 and 7.....	39.6	15.1	3.8	35.4	25.0	8.9
Between 5 and 6.....	20.9	23.7	7.0	15.6	15.1	12.0
Between 4 and 5.....	1.3	28.3	2.9	7.8	9.4	12.5
Between 3 and 4.....	10.8	2.2	24.6	8.3	7.8	11.5
Between 2.1 and 3.....	21.7	9.1	16.2	12.5	15.6	20.8
Less than 2.1	0.4	17.6	44.2	2.6	9.9	30.7

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (2003). *World Population Prospects: The 2002 Revision. Highlights*. New York: United Nations.

In 2000, the 59 countries where total fertility was below replacement level accounted for 44 per cent of the world's population, or 2.6 billion people, whereas the countries with fertility at or above-replacement level had 3.3 billion persons in 2000, or 56 per cent of the total. Because of their low fertility and the expectation that it will not rise markedly in the future, the countries with below-replacement fertility are projected to have only a slightly larger population in 2050 than

⁵ Replacement-level fertility is the level that needs to be sustained over the long run to ensure that a population replaces itself. For most countries, replacement level is close to 2.1 children per woman.

today (2.8 billion people). In contrast, the countries whose fertility is currently above replacement level are expected to experience a marked population increase, reaching 6 billion by 2050 and accounting then for 68 per cent of the global population.

The pace of fertility decline during 1950-2000 has varied significantly among developing countries. Although most countries in the less developed regions are already far advanced in the transition from high to low fertility, there are 24 countries that still had total fertility levels of 6 children or higher in 1995-2000 and 15 among them have yet to exhibit significant fertility reductions. Although the fertility of those 24 countries is projected to decline markedly during 2000-2050, none is expected to reach 2.1 children per woman by 2050 in the medium variant. As a result of those trends, their population is expected to rise from 301 million in mid-1997 to a billion in 2050.

The 24 countries involved—Afghanistan, Angola, Benin, Burkina Faso, Burundi, Chad, Congo, Democratic Republic of the Congo, Djibouti, Ethiopia, Guinea, Guinea-Bissau, Liberia, Madagascar, Malawi, Mali, Mauritania, Niger, Rwanda, Sierra Leone, Somalia, Uganda, Yemen and Zambia—with the sole exception of Congo, all belong to the group of least developed countries, and several are already highly affected by the HIV/AIDS epidemic. Moreover, a number of them have been experiencing civil strife and political instability in recent years, factors that militate against the provision of basic services for the population. Clearly, the continuation of rapid population growth poses serious challenges to their future development.

Despite the importance high-fertility countries have for the future of world population, in 1995-2000 they accounted for a low 5.2 per cent of the world population. Also small was the share of countries with total fertility levels ranging from 5 to 6 children per woman, which amounted to 7 per cent of the world population. In 1995-2000, the bulk of the population of the developing world lived in countries where total fertility levels ranged from 2.1 to 5 children per woman, countries that accounted for 44 per cent of the world population. In the 2002 Revision, the total fertility of those countries is projected to decline below 2.1 children per woman by 2050, that is, their future fertility is no longer constrained to remain at replacement level (2.1 children per woman) once that level is reached. Although not all the countries with a 1995-2000 total fertility in the range of 2.1 to 5 children per woman reach the floor level of 1.85 children per woman (see assumptions in chapter V), the majority does. Consequently, by 2045-2050, the medium variant projects that 84 per cent of the world's population will live in countries or areas with a total fertility below 2.1 children per woman. A total of 154 countries or areas will be in that group, among which 123 are projected to have a total fertility of 1.85 children per woman in 2045-2050 (table 5). The remaining 38 countries or areas are projected to have total fertility levels at or above 2.1 children per woman in 2045-2050. By that time, they will account for 16 per cent of the world's population, nearly double the share they had in 2000 when those 38 countries accounted for about 8 per cent of the world population.

At the world level, the effect of projecting that the majority of developing countries will reach total fertility levels below 2.1 children per woman in the medium variant before 2050 leads to a total fertility of 2.02 children per woman in 2045-2050. In more developed regions, total fertility in the medium variant is projected to be 1.85 children per woman by then, whereas in the less developed regions total fertility remains above 2 children per woman until 2050 (2.04 children per woman in 2045-2050). That is, although the difference in total fertility between the more and the less developed regions narrows considerably, by mid-century the less developed

regions as a whole are still expected to have a higher total fertility than the more developed regions. That difference is maintained in all projection variants. Total fertility in the low variant is expected to be 1.35 children per woman in more developed regions and 1.56 children per woman in the less developed regions. In the high variant, total fertility is projected to be 2.35 in the more developed regions and 2.52 in the less developed regions.

TABLE 5. DISTRIBUTION OF COUNTRIES AND AREAS AND OF THE WORLD POPULATION ACCORDING TO THE LEVEL OF TOTAL FERTILITY IN 2045-2050, LOW, MEDIUM AND HIGH VARIANTS

<i>Range of total fertility</i>	<i>Population in 2048 (millions)</i>	<i>Number of countries in 2045-2050</i>	<i>Percentage of population</i>	<i>Percentage of countries</i>
Low variant				
Between 3 and 4.....	45	1	0.6	0.5
Between 2.1 and 3.....	515	11	6.9	5.7
Less than 2.1.....	1 394	57	18.7	29.7
Equal to 1.35.....	5 501	123	73.8	64.1
TOTAL	7 454	192	100.0	100.0
Medium variant				
Between 3 and 4.....	209	4	2.4	2.1
Between 2.1 and 3.....	1 218	34	13.8	17.7
Less than 2.1.....	856	31	9.7	16.1
Equal to 1.85.....	6 567	123	74.2	64.1
TOTAL	8 849	192	100.0	100.0
High variant				
Between 4 and 5.....	55	1	0.5	0.5
Between 3 and 4.....	912	14	8.8	7.3
Between 2.35 and 3.....	1 672	54	16.1	28.1
Equal to 2.35.....	7 773	123	74.6	64.1
TOTAL	10 413	192	100.0	100.0

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (2003). *World Population Prospects: The 2002 Revision. Highlights*. New York: United Nations.

III. THE DEMOGRAPHIC IMPACT OF HIV/AIDS

Compared to previous revisions, the *2002 Revision* anticipates a more serious and prolonged impact of the HIV/AIDS epidemic in the most affected countries. The impact of HIV/AIDS is explicitly modelled for 53 countries, up from 45 in the 2000 Revision. In most of these countries, HIV prevalence in 2001 was estimated to be 2 per cent or more among the population aged 15-49 (see annex table 17). In addition, a few populous countries with lower prevalence levels were included because they had a large number of persons living with HIV (more than one million persons).

Of the 53 countries, 38 are in Saharan Africa (Angola, Benin, Botswana, Burundi, Burkina Faso, Cameroon, Central African Republic, Chad, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Malawi, Mali, Mozambique, Namibia, Nigeria, Rwanda, Sierra Leone, South Africa, Sudan, Swaziland, Togo, Uganda, United Republic of Tanzania, Zambia, Zimbabwe), five in Asia (Cambodia, China, India, Myanmar and Thailand), eight in Latin America and the Caribbean (Bahamas, Belize, Brazil, Dominican Republic, Guyana, Haiti, Honduras, Trinidad and Tobago), and one each in Europe (Russian Federation) and Northern America (United States of America). Of the 37.1 million adults in the world infected by HIV by 2001, 34.6 million or 93 per cent resided in these 53 countries⁶.

The dynamics of the HIV/AIDS epidemic, as estimated by UNAIDS, are assumed to remain unchanged until 2010. Thereafter prevalence levels are assumed to decline in a manner consistent with modifications of behaviour that reduce the rates of recruitment into high risk groups as well as the chances of infection among those engaging in high risk behaviour. In many countries, the estimated peak prevalence has already passed (annex table 17), but prevalence levels are assumed to remain relatively high until 2010 when more rapid decline will begin. By 2050, prevalence levels are lower but still substantial in the most highly affected countries.

The *2002 Revision* confirms yet again the devastating toll AIDS has in terms of increased morbidity, mortality and population loss. The population of the 53 affected countries in 2050 is projected to be 479 million lower than it would have been in the absence of AIDS. Between 2000 and 2050, 278 million excess deaths—persons who are projected to die earlier than they would have in the absence of AIDS—will occur. Over the same period, there will be a deficit of 178 million births due to the early deaths of women of childbearing age and the effect of HIV on the fertility of women living with the disease.

In the 38 highly affected countries of Africa, the population by 2015 is projected to be 91 million less, or 10 per cent lower, than it would have been without AIDS (table 6). The number of excess deaths in these countries will be nearly 15 million during 2000-2005 (table 7), representing an increase of 36 per cent over the number of deaths projected in the absence of AIDS. The demographic impact of AIDS is even more dramatic in the seven countries of Africa with the highest HIV prevalence levels (at or above 20 per cent), namely, Botswana, Lesotho, Namibia, South Africa, Swaziland, Zambia and Zimbabwe. In these countries, the population in

⁶ *Report on the Global HIV/AIDS Epidemic 2002* (Geneva, UNAIDS 2002).

TABLE 6. DIFFERENCE IN PROJECTED POPULATION WITH AND WITHOUT AIDS AND PERCENTAGE DIFFERENCE FOR GROUPS OF AFFECTED COUNTRIES IN MAJOR AREAS, 2000, 2015 AND 2050

Country group	2000		2015		2050	
	Population difference (thousands)	Percentage difference	Population difference (thousands)	Percentage difference	Population difference (thousands)	Percentage difference
All 53 affected countries	23 001	1	128 524	3	479 374	8
38 countries in Africa.....	16 087	3	91 310	10	319 919	19
5 countries in Asia	4 836	0	28 533	1	136 921	4
8 countries in Latin America and the Caribbean.....	908	0	3 646	2	9 118	3
7 countries with prevalence of 20 per cent or more.....	3 329	3	26 233	19	77 502	36

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (2003). *World Population Prospects: The 2002 Revision. Highlights*. New York: United Nations

TABLE 7. EXCESS DEATHS IN A PROJECTION WITH AIDS IN RELATION TO A PROJECTION ASSUMING NO AIDS FOR GROUPS OF AFFECTED COUNTRIES IN MAJOR AREAS, 1995-2000, 2000-2005 AND 2010-2015

Country group	1995-2000		2000-2005		2010-2015	
	Excess deaths (thousands)	Percentage increase	Excess deaths (thousands)	Percentage increase	Excess deaths (thousands)	Percentage increase
All 53 affected countries	11 165	7	19 754	12	32 270	19
38 countries in Africa.....	8 126	21	14 807	36	18 933	43
5 countries in Asia.....	2 034	2	3 461	4	10 872	11
8 countries in Latin America and the Caribbean.....	482	7	697	10	774	10
7 countries with prevalence of 20 per cent or more	2 105	50	4 840	112	6 583	144

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (2003). *World Population Prospects: The 2002 Revision. Highlights*. New York: United Nations

2015 is projected to be 19 per cent lower than without AIDS. The death toll in these 7 countries during 2000-2005 will be 112 per cent higher than the number of deaths projected in the absence of AIDS. In most of the affected countries of Africa, high fertility rates will offset the deaths due to AIDS, and population will continue to grow throughout the projection period. However, in Botswana, Lesotho, South Africa, and Swaziland, the population in 2050 is projected to be below that in 2000.

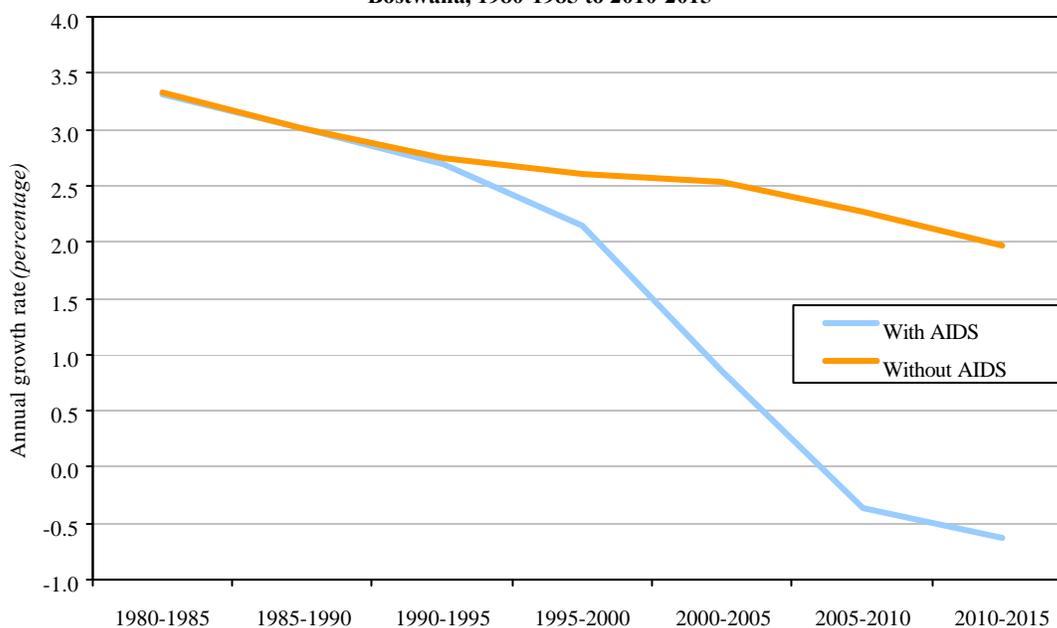
In Botswana, the country with the highest HIV prevalence, over one out of every three adults is HIV-positive. Life expectancy has dropped from 65 years in 1990-1995 to 56.3 years in 1995-2000 and is projected to fall further, to 39.7 years, in 2000-2005 (table 8), a figure about 28 years lower than the life expectancy projected in the absence of AIDS. Because of increased mortality, population growth in Botswana has already been significantly reduced, and population decline is projected to begin in 2005-2010. The average annual population growth rate dropped from 3.3 per cent per year in 1980-1985 to 2.1 per cent in 1995-2000, and will drop to -0.4 per cent in 2005-2010 (figure 4). At the end of the projection period, in 2050, Botswana's population

TABLE 8. EXPECTATION OF LIFE AT BIRTH WITH AND WITHOUT AIDS FOR SELECTED AFFECTED COUNTRIES, 2000-2005, 2010-2015, AND 2045-2050

Country	2000-2005		2010-2015		2045-2050	
	With AIDS	Without AIDS	With AIDS	Without AIDS	With AIDS	Without AIDS
Botswana	39.7	68.1	31.6	70.7	43.6	76.2
South Africa	47.7	66.6	41.5	69.9	55.7	76.0
Zimbabwe	33.1	67.6	31.8	70.5	45.7	76.2

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (2003). *World Population Prospects: The 2002 Revision. Highlights*. New York: United Nations.

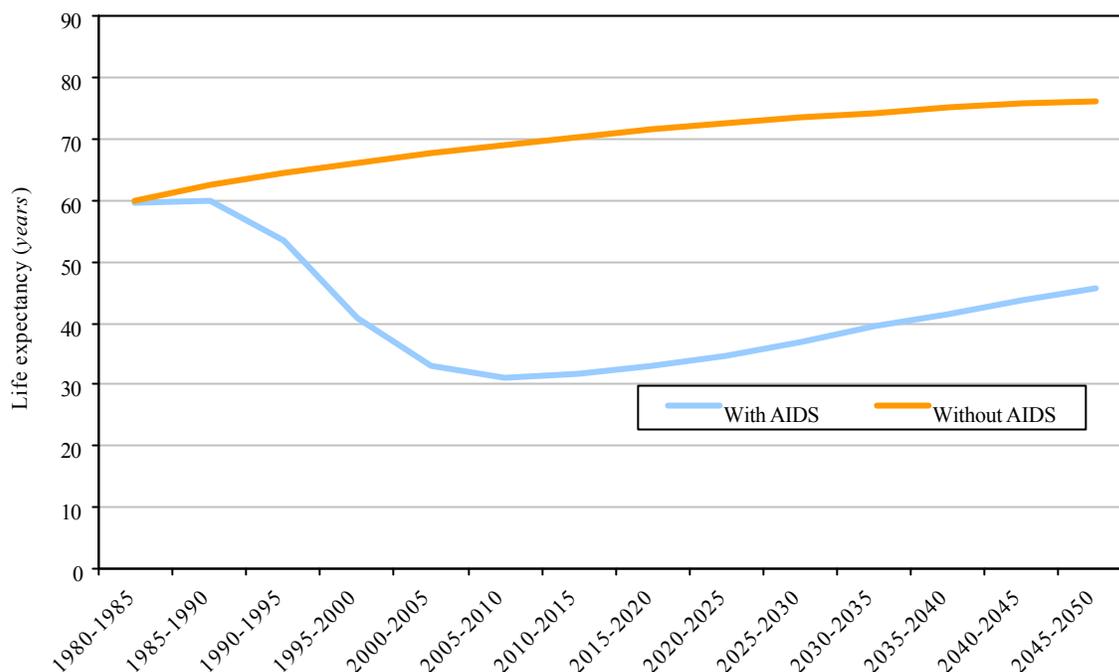
Figure 4. Annual population growth rate projected with and without AIDS, Botswana, 1980-1985 to 2010-2015



Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (2003). *World Population Prospects: The 2002 Revision. Highlights*. New York: United Nations.

in the medium variant will be 1.4 million, 20 per cent lower than the population in 2000, and 63 per cent lower than the population projected for 2050 without AIDS.

In Zimbabwe, another country with very high HIV prevalence, one out of every three adults is infected. Life expectancy at birth, estimated at 41 years in 1995-2000, is 25 years lower than it would have been without AIDS (66 years), and it is expected to decline further to 33 years in 2000-2005. Despite a decline in the prevalence of HIV after 2010, the dramatic effect of AIDS on life expectancy is projected to diminish only minimally in the future. In 2045-2050, the life expectancy projected with AIDS will still be 30 years lower than that projected in the absence of AIDS (figure 5). As in Botswana, the impact of HIV/AIDS on population growth has been

Figure 5. Life expectancy in Zimbabwe with and without AIDS, 1980-2050

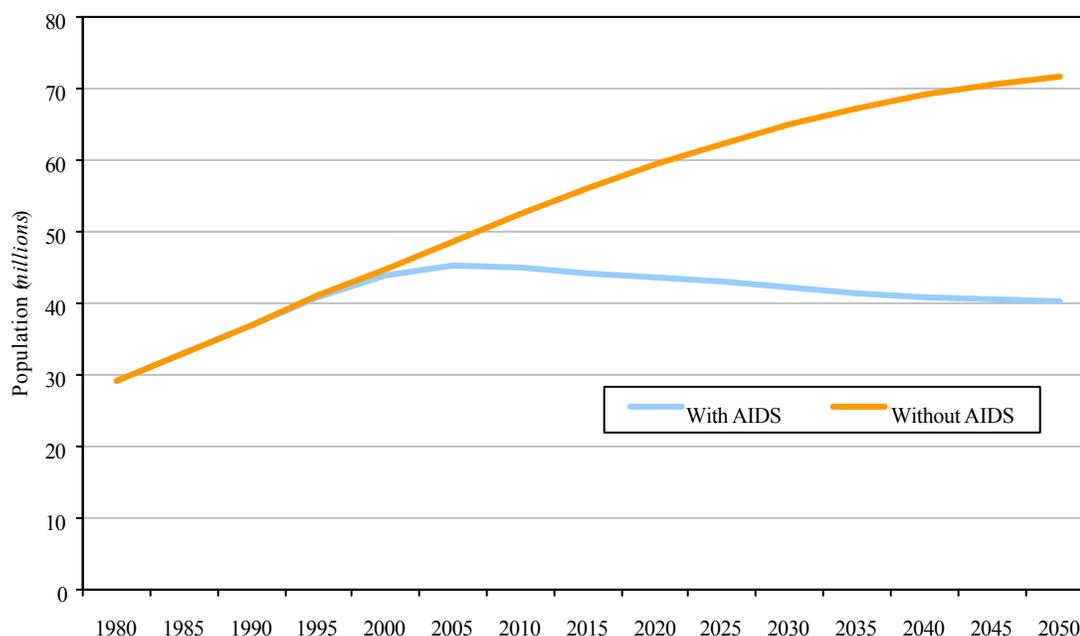
Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (2003). *World Population Prospects: The 2002 Revision. Highlights*. New York: United Nations.

staggering. Estimated at 3.9 per cent per year in 1980-1985, the annual growth rate fell to 1.5 per cent in 1995-2000 and will likely fall further to just 0.5 per cent in 2000-2005. By 2050, Zimbabwe's projected population will be 61 per cent lower than the population projected without AIDS.

In South Africa, the epidemic started later than in other countries of the region. By 2001, one out of every five adults was infected by the disease. Because of its late start, the major demographic impact of the epidemic is yet to come. Although life expectancy was barely affected in 1990-1995, by 2005-2010, it is projected to drop to 41.5 years, 26.8 years lower than it would have been without AIDS. South Africa is expected to begin experiencing population decline in 2005-2010 (figure 6). Population decline is projected to persist until the end of the projection period. In 2050, South Africa's population will be 9 per cent lower than the population in 2000, and 44 per cent lower than the population projected for 2050 in the absence of AIDS.

Compared to Africa, the relative impact of the HIV/AIDS epidemic in Asia and in Latin America and the Caribbean is still low. Thus, whereas by 2015 the population of the 38 highly affected African countries is projected to be 10 per cent lower than it would have been in the absence of the disease, that of the five Asian countries affected will be just 1 per cent lower, and that of the eight affected countries in Latin America and the Caribbean will be 2 per cent lower (table 6). However, because of the large populations of Brazil, China and India, the impact of the disease in terms of the estimated number of excess deaths is substantial. In Asia an estimated 3.5 million excess deaths will occur in 2000-2005 because of AIDS, and in Latin America and the

Figure 6. Population with and without AIDS, South Africa, 1980-2050



Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (2003). *World Population Prospects: The 2002 Revision. Highlights*. New York: United Nations.

Caribbean the equivalent figure will be nearly 0.7 million (table 7). India alone is expected to experience 2.3 million excess deaths during this period because of the AIDS epidemic. In comparison, the 38 affected countries in Africa are expected to experience 14.8 million excess deaths during 2000-2005. In the Russian Federation and the United States of America, the two more developed countries added to the list of AIDS-affected countries in the *2002 Revision*, excess deaths in 2000-2005 are expected to be 0.3 million and 0.5 million, respectively.

Lastly, it should be emphasized that, although the demographic impact of HIV/AIDS outside of Africa remains relatively low, the number of countries where the prevalence of the disease has become significant continues to grow, and the later start of these epidemics means that the most dramatic impact of AIDS will come in the future. For example, the number of excess deaths in the affected countries of Asia is projected to peak at 17 million in 2020-2025. Clearly, the spread of HIV in Asia and Latin America and the Caribbean will require careful monitoring. While it is not yet certain that such spread will follow the pattern observed in Africa, rapid and effective responses may be required to avert the devastation that Africa is already experiencing.

IV. POPULATION AGEING

As world fertility continues to decline and life expectancy rises, the population of the world will age faster in the next 50 years than during the past half century. An increase in the median age—the age that divides the population into two equal halves—is used as an indicator of the shift of the population age distribution towards older ages, which is known as “population ageing”. Over the past half century, the median age for the world increased by 2.8 years, from 23.6 years in 1950 to 26.4 years in 2000. Over the next 50 years, the median age is expected to rise by 10.4 years, reaching 36.8 years in 2050 (table 9).

TABLE 9. MEDIAN AGE BY MAJOR AREA, 1950, 2000 AND 2050
(medium variant)

	Median age (years)		
	1950	2000	2050
World total	23.6	26.4	36.8
More developed regions.....	28.6	37.3	45.2
Less developed regions	21.3	24.1	35.7
Least developed countries	19.5	18.1	27.1
Africa	19.0	18.3	27.5
Asia	22.0	26.1	38.7
Latin America and the Caribbean	20.1	24.2	39.8
Europe.....	29.2	37.7	47.7
Northern America	29.8	35.4	40.2
Oceania.....	27.8	30.7	39.9

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (2003). *World Population Prospects: The 2002 Revision. Highlights*. New York: United Nations.

The proportion of children (i.e., persons aged 0-14) has declined from 34 per cent in 1950 to 30 per cent in 2000, just as the proportion of older persons (those aged 60 years or over) has increased from 8 per cent to 10 per cent. Over the next 50 years, the proportion of children is projected to drop by a third, reaching 20 per cent in 2050, whereas the proportion of older persons will likely double, reaching 21 per cent.

The more developed regions have been leading the process of population ageing. In 1950, the proportion of children in these regions was 27 per cent while that of older persons was 12 per cent. By 2000, the proportion of older persons in the more developed regions had surpassed that of children (19 per cent versus 18 per cent) and in 2050, the proportion of older persons is expected to be double that of children (32 per cent versus 16 per cent). As a result of these changes, the median age in the more developed regions, which rose from 28.6 years in 1950 to 37.3 in 2000, is projected to reach the unprecedented level of 45.2 years in 2050.

Until 2000, population ageing has been considerably slower in the less developed regions where fertility is still relatively high. The proportion of children declined from 38 per cent in 1950 to 33 per cent in 2000, while the proportion of older persons increased from 6 to 8 per cent. A period of more rapid population ageing lies ahead. By 2050, the proportion of older persons in

the less developed regions will rise to 20 per cent, whereas the proportion of children is expected to decline to 21 per cent. The median age, which had changed little during 1950-2000 (passing from 21.3 years to 24.1), is projected to increase by almost 12 years, to reach 35.7 years in 2050. Thus, by mid-century the less developed regions will likely have an age structure similar to that of today's more developed regions.

Population ageing will result in a rapid increase of the number of people aged 60 years or over. At the global level, that number will rise from 606 million in 2000 to 1.9 billion in 2050. The absolute increase will be less marked in the more developed regions, where the number of older persons is projected to rise from 232 million in 2000 to 394 million in 2050, but it will be dramatic in the less developed regions, where the older population will more than quadruple, from 375 million in 2000 to 1.5 billion in 2050.

Europe is the major area of the world where population ageing is most advanced. The proportion of children is projected to decline from 17 per cent in 2000 to 15 per cent in 2050, while the proportion of older persons will increase from 20 per cent in 2000 to 35 per cent in 2050. By then, there will be 2.4 older persons for every child and more than one in every three persons will be aged 60 years or over. As a result, the median age will rise from 37.7 years in 2000 to 47.7 in 2050.

Japan is currently the country with the oldest population, with a median age of 41.3 years, followed by Italy, Switzerland, Germany and Sweden, with median ages of about 40 years each. In 2050, Japan is projected to maintain its title as having the oldest population, with a median age of 53.2 years. Armenia, the Czech Republic, Estonia, Greece, Italy, Latvia, Singapore, Slovenia, Spain, with median ages greater than 51 years in 2050, will also have populations where persons aged 50 or over predominate. In fact, in Italy, Japan and Greece there are already at least 1.5 persons aged 60 or over for every child, and by 2050 Japan, Slovenia, Italy and Spain are each expected to have more than four older persons per child.

Africa remains the major area with the youngest population. However, the proportion of children there is expected to decline from 43 per cent in 2000 to 28 per cent in 2050, and the proportion of older persons will likely double from 5 per cent to 10 per cent over the next 50 years.

The oldest old

In 2000, 69 million persons in the world were aged 80 or over (the oldest old) and they were the fastest growing segment of the population (table 10). By 2050, they are projected to reach 377 million, increasing more than 5.5 times. Although the proportion of the oldest old is still low (1.1 per cent of the world population), it will rise to 4.2 per cent in 2050. Currently, the oldest old already constitute 3.2 per cent of the population of Northern America and 2.9 per cent of the population of Europe. In Sweden, 5.1 per cent of the population is aged 80 or over, while in Denmark, Norway, Switzerland and the United Kingdom, the equivalent proportion is over 4 per cent. China has currently the largest number of people aged 80 years or over (11.4 million), followed by the United States of America (9.1 million), India (6.1 million), Japan (4.8 million), the Russian Federation (2.9 million) and Germany (2.9 million). Together, these countries account for 54 per cent of today's oldest old.

TABLE 10. AVERAGE ANNUAL GROWTH RATES OF THE TOTAL POPULATION AND THE POPULATION IN BROAD AGE GROUPS, BY MAJOR AREA, 2000-2050 (MEDIUM VARIANT)
(percentage)

Major area	Age group				Total population
	0-14	15-59	60+	80+	
World.....	-0.04	0.72	2.29	3.39	0.77
More developed regions.....	-0.26	-0.32	1.06	2.24	0.04
Less developed regions.....	-0.01	0.92	2.79	4.20	0.91
Least developed countries.....	0.99	2.19	3.24	3.90	1.84
Africa.....	0.78	1.98	3.03	3.85	1.64
Asia.....	-0.28	0.63	2.61	4.06	0.70
Latin America and the Caribbean.....	-0.36	0.70	2.98	4.09	0.78
Europe.....	-0.62	-0.71	0.81	2.08	-0.28
Northern America.....	0.30	0.49	1.65	2.39	0.70
Oceania.....	0.06	0.66	2.02	2.83	0.78

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (2003). *World Population Prospects: The 2002 Revision. Highlights*. New York: United Nations.

In 2050, 21 countries or areas are projected to have at least 10 per cent of their population aged 80 years or over: Austria, Belgium, the Channel Islands, Cuba, Finland, France, Germany, Greece, Guadeloupe, Hong Kong SAR of China, Italy, Japan, Macao SAR of China, Martinique, Norway, the Republic of Korea, Singapore, Slovenia, Spain, Sweden and Switzerland. Furthermore, five countries will have more than 10 million people aged 80 years or over: China (98 million), India (47 million), the United States of America (29 million), Japan (17 million) and Brazil (13 million). Together they will account for 54 per cent of all the oldest old people in the world.

The number of older persons declines rapidly as age increases. Octogenarians (aged 80-89) outnumber nonagenarians (aged 90-99) by a wide margin, and the proportion of centenarians (over 100) among the oldest old is small. It is estimated that in 2000 about 88 per cent (61 million) of the 69 million persons aged 80 or over were octogenarians and about 11 per cent (7.8 million) were nonagenarians. The proportion of centenarians among the oldest old was small, 0.24 per cent or 167,000.

The number of octogenarians is projected to increase to 311 million in 2050, 5.1 times the number in 2000, whereas the number of nonagenarians will reach 63 million, an eight-fold increase. But the number of people aged 100 years or over will grow the fastest, so that by 2050 it will be 20 times as large as in 2000.

Although the proportion of people who survive past their 100th birthday is small, their number is not negligible. In 2000 there were an estimated 167,000 centenarians in the world; by 2050 they are projected to number 3.3 million. Japan will have the highest proportion of centenarians in 2050 (nearly 1 per cent of the population). It will be followed by France, Malta, Martinique, Norway, Sweden and Switzerland, where centenarians are projected to account for proportions ranging from 0.17 to 0.22 per cent of the population. In 2050, the largest centenarian populations will be in Japan (1,016,000), the United States of America (471,000), China (459,000), India (131,000), France (123,000) and Germany (114,000).

V. ASSUMPTIONS UNDERLYING THE 2002 REVISION

The *2002 Revision* includes six projection variants. Four differ among themselves with respect to the assumptions made regarding the future course of fertility. The fifth differs with respect to the assumptions made about the future course of mortality, and the sixth differs with respect to the future course of migration.

To describe the different projection variants, the various assumptions made regarding fertility, mortality and international migration are described first.

A. Fertility assumptions

Fertility assumptions are described in terms of the following groups of countries:

1. *High-fertility countries*: Countries that until 2000 had had no fertility reduction or only an incipient decline;
2. *Medium-fertility countries*: Countries where fertility has been declining but whose level was still above 2.1 children per woman in 1995-2000;
3. *Low-fertility countries*: Countries with total fertility at or below 2.1 children per woman in 1995-2000.

Medium-fertility assumptions:

1. Total fertility in high-fertility and medium-fertility countries is assumed to decline following a path derived from models of fertility decline established by the United Nations Population Division on the basis of the past experience of all countries with declining fertility during 1950-2000. The models relate the level of total fertility during a period to the average expected decline in total fertility during the next period. Under the medium variant, whenever the total fertility projected by a model falls below 1.85 children per woman, the value actually used in projecting the population is set to 1.85. That is, 1.85 children per woman represents a floor value below which the total fertility of high and medium-fertility countries is not allowed to drop before 2050. However, it is not necessary for all countries to reach the floor value by 2050. If the model of fertility change used produces a total fertility above 1.85 children per woman for 2045-2050, that value is used in projecting the population.
2. Total fertility in low-fertility countries is generally assumed to remain below 2.1 children per woman during most of the projection period and reach 1.85 children per woman by 2045-2050. For low-fertility countries whose total fertility in 1995-2000 is estimated to be below 1.85 children per woman, projected total fertility often declines further before increasing slowly to reach 1.85 in 2045-2050.

High-fertility assumptions:

Under the high variant, total fertility is projected to remain 0.5 children above the total fertility in the medium variant over most of the projection period. By 2045-2050, total fertility in the high variant is therefore half a child higher than that of the medium variant. That is, countries reaching a total fertility of 1.85 children per woman in the medium variant have a total fertility of 2.35 children per woman in the high variant at the end of the projection period.

Low-fertility assumptions:

Under the low variant, total fertility is projected to remain 0.5 children below the total fertility in the medium variant over most of the projection period. By 2045-2050, total fertility in the low variant is therefore half a child lower than that of the medium variant. That is, countries reaching a total fertility of 1.85 children per woman in the medium variant have a total fertility of 1.35 children per woman in the low variant at the end of the projection period.

Constant-fertility assumption:

For each country, total fertility remains constant at the level estimated for 1995-2000.

B. Mortality assumptions***Normal-mortality assumption:***

Mortality is projected on the basis of the models of change of life expectancy produced by the United Nations Population Division. A medium pace of mortality decline is generally used to project future mortality levels. However, for countries highly affected by the HIV/AIDS epidemic, the slow pace of mortality decline has generally been used to project the reduction of general mortality risks not related to HIV/AIDS.

In addition, for the countries highly affected by the HIV/AIDS epidemic, estimates of the impact of HIV/AIDS are made explicitly through assumptions about the future course of the epidemic—that is, by projecting the yearly incidence of HIV infection. The model developed by the UNAIDS Reference Group on Estimates, Modelling and Projections⁷ has been used to fit past HIV prevalence estimates obtained from UNAIDS so as to derive the parameters determining the past dynamics of the epidemic. For most countries, the model is fitted assuming that the relevant parameters have remained constant in the past. For projection purposes, the parameters are kept constant until 2010. Thereafter, the parameter PHI, which reflects the rate of recruitment of new individuals into the high-risk or susceptible group, is projected to decline by a third over intervals of increasing length. In addition, the parameter R, which represents the force of infection, is projected to decline by 15 per cent over the same intervals. A reduction in R is based on the assumption that changes in behaviour among those subject to the risk of infection will reduce the chances of transmitting the virus.

⁷ Improved methods and assumptions for estimation of the HIV/AIDS epidemic and its impact: Recommendations of the UNAIDS Reference Group on Estimates, Modelling and Projections. *AIDS*, vol. 16, pp. W1-W14 (UNAIDS Reference Group on Estimates, Modelling and Projections, 2002).

Constant-mortality assumption:

For each country, mortality remains constant at the level estimated in 1995-2000.

C. International migration assumptions

Normal-migration assumption:

The future path of international migration is set on the basis of past international migration estimates and an assessment of the policy stance of countries with regard to future international migration flows.

Zero-migration assumption:

For each country, international migration is set to zero for the period 2000-2050.

Table 11 presents in a schematic way the different assumptions underlying the six projection variants. As shown, the four fertility variants (low, medium, high and constant-fertility) share the same assumptions regarding mortality and international migration. They differ among themselves only with respect to the assumptions regarding fertility. A comparison of their results allows therefore an assessment of the effects that different fertility paths have on other demographic parameters.

In addition to the four fertility variants, a constant-mortality variant and a zero-migration variant have also been prepared. They both have the same fertility assumption (i.e. the medium fertility). Furthermore, the constant-mortality variant has the same international migration assumption as the medium variant. Consequently, the results of the constant-mortality variant can be compared with those of the medium variant to assess the effect that changing mortality has on other demographic parameters. Similarly, the zero-migration variant differs from the medium variant only with respect to the underlying assumption regarding migration. Therefore, the zero-migration variant allows an assessment of the effect that non-zero migration has on other demographic parameters.

TABLE 11. PROJECTION VARIANTS IN TERMS OF ASSUMPTIONS FOR FERTILITY, MORTALITY AND INTERNATIONAL MIGRATION

<i>Projection variant</i>	<i>Assumptions</i>		
	<i>Fertility</i>	<i>Mortality</i>	<i>International migration</i>
Low	Low	Normal	Normal
Medium	Medium	Normal	Normal
High	High	Normal	Normal
Constant-fertility	Constant	Normal	Normal
Constant-mortality	Medium	Constant	Normal
Zero -migration	Medium	Normal	Zero

Source: Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat (2003). *World Population Prospects: The 2002 Revision. Highlights*. New York: United Nations.

Summary of the methodological changes made for the 2002 Revision

The following changes and adjustments were made in the *2002 Revision* in relation to procedures followed in the *2000 Revision*:

1. In the medium variant, the future fertility paths for countries with total fertility above 2.1 children per woman are projected using models derived from the past experience of all countries where fertility has already declined.
2. Countries with current total fertility above 2.1 children per woman are no longer constrained to stop their future fertility decline at 2.1 children per woman. Instead, their fertility levels can continue to decline until they reach 1.85 children per woman, the floor value below which total fertility is not allowed to fall in the medium variant. As in the *2000 Revision*, not all countries need to reach either a total fertility of 2.1 or 1.85 children per woman during the projection period in the medium variant.
3. The total fertility of all low-fertility countries is assumed to converge to 1.85 children per woman by the end of the projection period instead of reaching different target values as in the *2000 Revision*.
4. For all countries, total fertility in the high and low variants is projected to be 0.5 children above and 0.5 children below, respectively, from the total fertility of the medium variant. In the *2000 Revision*, a difference of 0.4 of a child was used in the case of low-fertility countries.
5. The estimation and projection of the impact of HIV/AIDS was modified to incorporate the model developed by the UNAIDS Reference Group on Estimates, Modelling and Projections. Use of the new model allows the formulation of projection hypotheses on the basis of parameters that are meaningful with respect to the dynamics of the epidemic.

VI. OBTAINING DATA FROM WORLD POPULATION PROSPECTS: THE 2002 REVISION

The results of the *2002 Revision* will be issued in a series of publications entitled *World Population Prospects: The 2002 Revision* that will consist of three volumes: Volume I: *Comprehensive Tables*, Volume II: *The Sex and Age Distribution of the World Population*, and Volume III: *Analytical Report*. In addition, a chart entitled *World Population 2002*, will be issued.

Highlights from the *2002 Revision* have been posted on the Population Division's web site (www.unpopulation.org). In addition, the data of the *2002 Revision* will be released in digital form. The list of data sets produced in digital form and an order form for their purchase will be posted on the Population Division's web site.