Department of Economic and Social Affairs
Population Division

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Changing population age structures and sustainable development

A Concise Report

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DESA

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Preface

In its decision 2016/101 (see E/2016/25), the Commission on Population and Development decided that the special theme for its fiftieth session, in 2017, would be "Changing population age structures and sustainable development". The present report is intended to inform the Commission's deliberations on the theme, as part of the Commission's ongoing follow-up and review of chapter VI, on population growth and structure, of the Programme of Action of the International Conference on Population and Development, held in Cairo, in 1994.

The present report provides a review of the typical changes in the age distribution of the human population that are taking place both globally and across a wide range of countries and regions. Such changes, which are influenced by various social and economic factors, have important implications for sustainable development. The report also serves to document the key trends and international differences in changing age structures, and the critical role of population policies, and of policies related to health, education, employment and social protection, in managing the associated challenges and enhancing the potential social and economic benefits of such changes.

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Contents

I. Introduction

1. A large majority of the world's countries are experiencing significant shifts in the distribution of their populations by age, moving from the youthful populations associated with the relatively high levels of fertility and mortality of the past, towards the older populations associated with the lower levels of fertility and mortality of recent times.

2. These changes are a manifestation of a demographic transition, characterized by long-term reductions in the mortality and fertility rates prevailing in a population, which brings important changes not only in the size of the population but also in its composition by age. In some cases, the age structure of a population is also affected by international migration, especially for countries with low levels of fertility that receive significant numbers of immigrants.[1]

3. As illustrated below, demographic transition is a universal phenomenon, even though its timing and speed have varied greatly across countries and regions. The resulting changes in the population age distribution and other associated demographic trends — including the postponement of marriage and childbearing to later ages, as well as changes in the size, composition and living arrangements of families — have important implications for the health and education of children and youth, for the size and productivity of the labour force, for the sustainability of financial transfer systems and for macroeconomic growth.

[1] Since migrants in most situations tend to be younger on average than the population of the host society, immigration typically results in a population that is more youthful than it would have been otherwise.

II. Changing population age structures

4. The demographic transition from a regime of high mortality and high fertility to one of low mortality and low fertility has direct effects on the population age distribution. The transition can be divided into three main phases. In the first phase, when mortality falls but fertility remains high, the age distribution shifts towards younger ages as the share of children[2] increases owing to the greater proportion of infants and children who survive through early childhood. In the second phase, fertility also begins to decline, reducing the number of children and youth as a proportion of the total population. Meanwhile, the proportion of adults in the prime ages for work and childbearing in the population begins to rise. During the third phase, if a lower level of fertility is maintained over many decades, the numbers of children, youth and working-age adults all decline as a proportion of the total, while the number and the proportion of older persons continues to rise.

5. The gradual shift from a younger to an older population age structure is encapsulated by the term "population ageing", which is often measured by the increase in the median age or in the proportion of older persons. There is great diversity internationally in the onset and speed of population ageing, which is most advanced in Japan and most countries of Europe, which are now well into the third phase of the demographic transition. The populations of Australia, Canada, New Zealand and the United States of America have grown older as well. However, because of fertility levels that are not quite as low as those of Japan or Europe, combined with a steady influx of immigrants, those four countries are experiencing a slower process of population ageing. Most countries in Asia and in Latin America and the Caribbean are now in the middle or late phases of the transition. Fertility reductions in these regions have been rapid by historical standards, and therefore their populations are expected to age more rapidly than in Europe, Japan and other developed countries. Most countries of sub-Saharan Africa are either in the first stage of the demographic transition or have just entered the second phase; their populations are still relatively young. If fertility falls as anticipated in the African region, these countries will undergo a similar long-term process of population ageing over the next several decades.

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[2] In the present report, unless otherwise noted, "children" are considered to be aged 0 to 14 years, "youth" are aged 15 to 24 years, the "working ages" are between 25 and 64 years, and "older persons" are aged 65 years or over.

6. Population ageing reflects one of the major achievements of humanity. Given the large increase in the proportion of children who survive to adulthood, couples can choose to bear the number of children they desire, with high levels of confidence that both the children and the mother will survive, eventually to advanced ages. The reduction of infant, child and maternal mortality and the promotion of reproductive health were major objectives of the Programme of Action of the International Conference on Population and Development. Later, these topics were featured as part of the Millennium Development Goals and have also been included within the 2030 Agenda for Sustainable Development and its Sustainable Development Goals. In turn, the resulting demographic changes, including those in the population age structure, generate a new set of opportunities and challenges for sustainable development.[3]

A. Global trends in population age structures

7. From 1980 to 2015, the proportion of children under the age of 15 in the global population fell from over one third to just over one quarter. It is projected to decline further to around one fifth soon after mid-century (see figure I). At the same time, although the share of older persons (persons) aged 65 years or over, was less than 6 per cent of the world's population in 1980, it represents more than 8 per cent of the total today and is expected to double to more than 16 per cent of the global population by 2050.

8. Although the global population of youth, aged 15 to 24 years, has been growing and now numbers around 1.2 billion, it is projected to fall slowly as a proportion of the total population, from a little over 16 per cent at present to less than 14 per cent in 2050. Following a gradual rise since 1980, the population in the working ages, from 25 to 64 years, is projected to remain stable as a proportion of the world's total population — just under one half — between now and the middle of the century.

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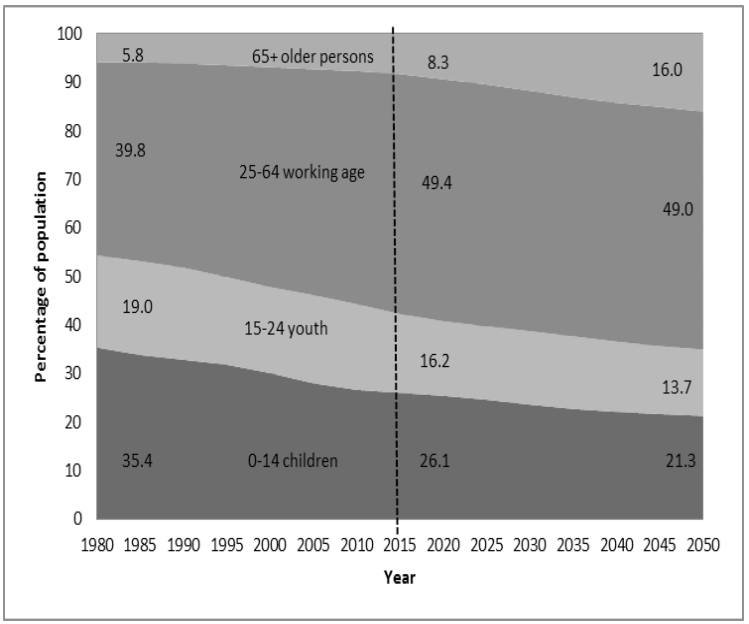
[3] Guy J. Abel and others, "Meeting the Sustainable Development Goals leads to lower world population growth", *Proceedings of the National Academy of Sciences of the United States of America*, vol. 113, No. 50 (December 2016).

B. Regional trends in population age structures[4]

9. Although all regions are expected to experience some degree of population ageing, current levels and trends vary widely. Europe, with 18 per cent of its population aged 65 years or over in 2015, continues to have

Figure I
Percentage distribution of global population by broad age group, from 1980 to 2050



Source: United Nations, *World Population Prospects: The 2015 Revision — Key Findings and Advance Tables*.

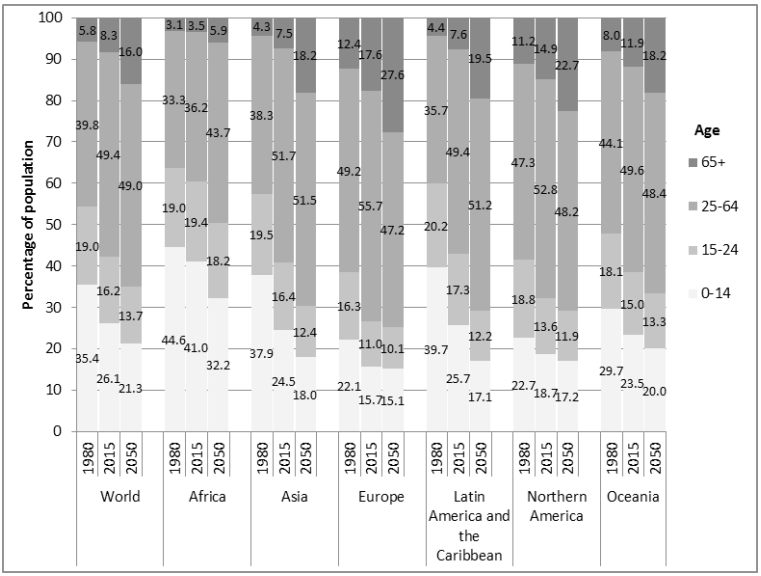
the oldest population of any major region and is projected to maintain that position for the foreseeable future (see figure II). Northern America has a slightly younger population, with older persons at 15 per cent of the total, owing to higher fertility, lower life expectancy and higher levels of

[4] More details on trends by region are available in the supplementary materials to the present report; see www.un.org/en/development/desa/population/commission/sessions/2017/index.shtml.

immigration compared with Europe over the past several decades. Population projections for the next few decades suggest that the relative positions of the two regions will remain the same in this regard, with the share of older persons in 2050 projected to stand around 23 per cent in Northern America and 28 per cent in Europe.

Figure II

Percentage distribution of population by broad age group, globally and for major regions, in 1980, 2015 and 2050



Source: United Nations, *World Population Prospects: The 2015 Revision — Key Findings and Advance Tables*.

10. Asia and Latin America and the Caribbean have similar age distributions today and are expected to maintain this similarity through 2050, with the share of older persons increasing more than twofold, from around 8 per cent today in both regions to about 18 per cent in Asia and 20 per cent in Latin America and the Caribbean in 2050. Africa currently has the youngest age distribution among major regions of the world, comparable with that of Asia or Latin America and the Caribbean around 1980. By 2050, Africa is expected to attain an age distribution like that of Latin America and the Caribbean in 2000 (data not shown), with children and youth still accounting for about half of the total population.

C. Age structures in urban and rural areas

11. Urban and rural areas of countries in the developed regions,[5] and urban areas of countries in the developing regions have all experienced population ageing to a greater or lesser extent. The population age structure in rural areas of developing countries remains distinct, however, as it is significantly younger than in urban areas (see figure III). By contrast, the urban and rural populations of developed countries have become more homogeneous in this regard. Women clearly outnumber men in urban and rural areas of developed countries, especially in the adult and the older age population, while there is a slight female predominance in the urban older population (but not in the rural older population) of the developing regions as a whole.

12. While the urban population age structures of both the more developed and the less developed regions have a narrow base owing to relatively low levels of fertility in urban areas, a "youth bulge" is clearly visible only for the urban areas of developing countries. This results from lower fertility in urban areas, compared with rural ones, and substantial rural-to-urban migration among young people in developing countries. The urban population age structure of the least developed countries shows some evidence of a recent decline in fertility in urban areas. In the more developed regions, the shape of the population age distribution no longer resembles a pyramid, as the long-standing low levels of fertility in both urban and rural areas have resulted in more rectangular age structures.

D. Trends in the population of children and youth[6]

13. The number of children (from 0 to 14 years of age) and young people (from 15 to 24 years of age) in the world is projected to rise slightly in future decades, while declining as a share of the total population. The continued increase in the global number of children and youth is due mainly to the robust growth of these age segments in Africa, with Northern America and Oceania also contributing to the increase. These increases will be only partially compensated by declining numbers of children and youth in Asia, Europe and Latin America and the Caribbean. Population projections

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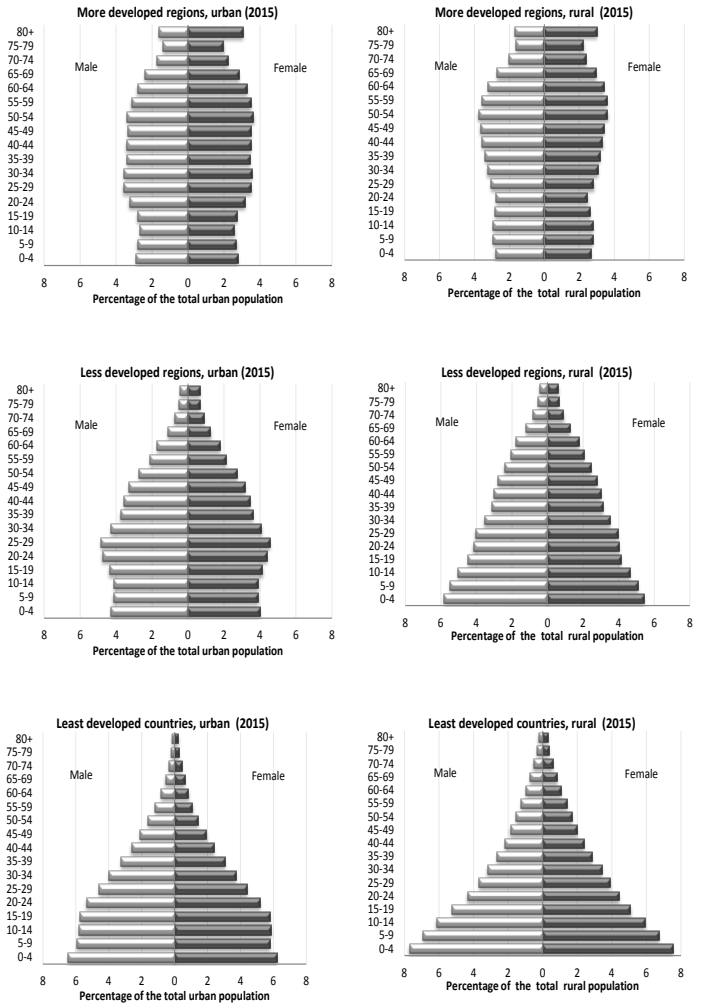
[5] Following common practice, "developed" or "more developed" regions in the present report refer to Europe and Northern America plus Australia, New Zealand and Japan, while the "developing" or "less developed" regions encompass all other parts of the world.

[6] Detailed figures of the population by broad age groups are given in the supplementary materials associated with the present report, available from www.un.org/en/development/desa/population/commission/sessions/2017/index.shtml.

suggest that in 2050 there will be just under 2.1 billion children and around 1.3 billion young people in the world.

Figure III
Percentage of the population by age for urban and rural areas of countries in three development groups, 2015



Source: United Nations. *Urban and rural population by age and sex*, version 3 (2014).

14. Because of these diverse regional trends, Africa's share of the world's children is expected to increase from 25 per cent in 2015 to 38 per cent in 2050, whereas Asia's share is projected to drop from 56 to 46 per cent. The share residing in Latin America and the Caribbean will decline from 9 per cent in 2015 to 6 per cent in 2050, while that of the other regions (Europe, Northern America and Oceania) is expected to remain in a range from 9 to 10 per cent in total.

15. The share of young persons aged 15 to 24 residing in Asia is expected to drop from 60 to 49 per cent, and in Latin America and the Caribbean from 9 to 7 per cent. By contrast, Africa, which today is home to 19 per cent of the world's youth, is expected to account for 34 per cent of all young persons in 2050. The share of youth in Europe, Northern America and Oceania is expected to remain between 10 and 11 per cent. The Arab region, which encompasses parts of Western Asia and Northern Africa, represents nearly 20 per cent of the world's young people (data not shown). Although fertility in the region is projected to decline through mid-century, some countries such as Algeria, Morocco, Tunisia and, most notably, Egypt, have reported increases in fertility in recent years, which will translate into growth of their youth populations in future years.

E. Trends in the working-age population

16. In contrast to the expected slow growth in numbers of children and youth, the working-age population, from 25 to 64 years, is projected to increase from 3.6 billion in 2015 to 4.8 billion in 2050. Most of this increase is expected to occur in Africa (more than 653 million) and in Asia (more than 440 million). Africa's working-age population is expected to increase from 429 million in 2015 to just under 1.1 billion in 2050. Consequently, Africa's share of the global population aged 25 to 64 is expected almost to double, from 12 per cent in 2015 to 23 per cent in 2050. Asia will continue to have the largest regional share of the working-age population, but this figure will drop from 62.5 per cent in 2015 to 57 per cent in 2050. In Latin America and the Caribbean, the working-age population is projected to grow by just under 90 million between 2015 and 2050, and to retain its share of the global total at around 8.5 per cent. By 2050, Northern America and Oceania will have relatively small shares of the global working age population, 4.4 per cent and 0.6 per cent, respectively. In Europe, the population aged 25 to 64 years is projected to start declining after 2015, attaining 7 per cent of the world total by 2050.

17. Because a large proportion of international migrants is young, substantial levels of immigration tend to diminish, though not eliminate, the tendency towards population ageing. Projections for the period between

2015 and 2050 suggest that in the absence of a net inflow of international migrants to the developed regions, the ratio of older to working-age persons in the population would be 4 per cent higher than expected under the projection scenario which assumes a continuation of similar levels of the net inflow of migrants to the developed regions (*World Migration Report 2015*).[7]

18. The effect of international migration on the age composition of the population has been notable in countries of Europe that have low levels of fertility and receive substantial numbers of migrants, and in some oil-producing countries of Western Asia that host large numbers of migrant workers. In the long run, however, plausible levels of international migration are likely to be insufficient to reverse the long-term trend towards population ageing.

F. Trends in the older population

19. The world's population aged 65 years or over (referred to as "older persons" or the "older population") is expected to increase 2.6-fold from 2015 to 2050, rising from 608 million to nearly 1.6 billion. About two thirds of this increase is expected to occur in Asia, where the number of older persons is projected to increase almost threefold, from 330 million in 2015 to 956 million in 2050. Similarly, the older population of Latin America and the Caribbean is expected to more than triple, while that of Africa will increase 3.5-fold. Smaller relative increases are expected in Oceania, where the older population is projected to increase slightly more than twofold, and in Europe and Northern America, where the number of older persons is expected to increase by 44 and 50 per cent, respectively. In Europe, only the population aged 65 or older is expected to increase: all of the younger age groups considered in the present report are expected to be smaller in 2050 than they are today.

20. Other measures of ageing, such as the median age or the old-age dependency ratio,[8] yield a broadly similar outlook on trends in population ageing to that provided by the proportion of older persons in the population. However, alternative "prospective" measures of ageing[9] that emphasize the average number of remaining years of life rather than the years already

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[7] International Organization for Migration, World Migration Report 2015: Migrants and Cities — New Partnerships to Manage Mobility (Geneva, 2015).

[8] For definitions of these and other demographic measures see https://esa.un.org/unpd/wpp/General/GlossaryDemographicTerms.aspx.

[9] Warren C. Sanderson and Sergei Scherbov, "The characteristics approach to the measurement of population aging", *Population and Development Review*, vol. 39, No. 4 (December 2013), and "Are we overly dependent on conventional dependency ratios?", *Population and Development Review*, vol. 41, No. 4 (December 2015).

lived, give a different perspective of the levels and trends of ageing. For example, when "older persons" are understood to be those whose remaining life expectancy is 15 years, and population ageing is measured as the change in the percentage of older persons so defined, the ageing appears to be much slower.[10] Indicators of prospective ageing and those based on cognitive ability by age[11] highlight to the fact that while the number and proportion of older persons is rising inexorably in all countries of the world, the overall health status, cognitive ability and potential productivity of the older population varies greatly across individuals of even the same age and has generally improved over time. A major implication is that population ageing does not need to have the dire socioeconomic consequences that are often attributed to this process. These features also imply that labour markets and health systems should adapt to accommodate and better meet the needs of the older population in all its diversity.

21. Another important characteristic of the older population is the female predominance in this age group: because women live on average longer than men, they significantly outnumber men at older ages. In 2015, women accounted for 55 per cent of the global population aged 65 years or over, and for 61 per cent of those aged 80 years or older. Europe has the highest proportion of women aged 65 or over, where they account for 59 per cent of that age group, followed by Latin America and the Caribbean (56 per cent), Northern America and Africa (55 per cent) and Asia and Oceania (53 per cent).

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[10] Warren C. Sanderson and Sergei Scherbov, "Age structure, mortality and prospective ageing", presentation at the United Nations expert group meeting on changing population age structures and sustainable development, New York, 13 and 14 October 2016.

[11] Vegard Skirbekk, "Ageing, health and work potential", presentation at the United Nations expert group meeting on changing population age structures and sustainable development, New York, 13 and 14 October 2016.

III. Fertility, health and education

22 A sustained fertility decline leading to smaller cohorts of children and youth is the main driver of long-term changes in population age distribution. The reduction in fertility is associated with various aspects of development. The existing research suggests that causation operates in both directions: improved health conditions and increased levels of education contribute to reductions in desired and actual family sizes, while reduced fertility often leads to higher per capita levels of spending on health and education.

23. A recent analysis of data for 80 countries in the period from 1970 to 2010 concluded that, controlling for time and per capita income, female educational attainment has a substantial downward effect on fertility.[12] On average, one additional year of female education was associated with a 2.4 per cent reduction in the total fertility rate. Male education was also found to have a negative effect, but much smaller in magnitude. Figure IV provides an illustration of observed fertility differentials by level of educational attainment in six developing countries. In all cases, the fertility of women in the highest educational category (more than secondary) was lower than for those in the lowest category (no education). However, the differences between those two groups, and compared with women with intermediate levels of education (primary and secondary), varied considerably across countries. Whereas levels of fertility maintained a stark inverse relationship to levels of education throughout the study interval in Ethiopia, Ghana, Kenya and Nepal, differences between educational groups in Bangladesh, and even more so in Indonesia, were smaller at the start and have narrowed in recent years.

24. Although educational attainment has a substantial impact on fertility levels and changes over time, other social, economic and cultural factors, as well as access to family planning, matter as well.

25. Data from the National Transfer Accounts[13] provide evidence of the association between reduced fertility and increased spending on human capital, the latter measured by the combined spending on health and education on children and youth. The association is illustrated in figure V, which shows large differences in human capital spending between countries with low and high levels of fertility.

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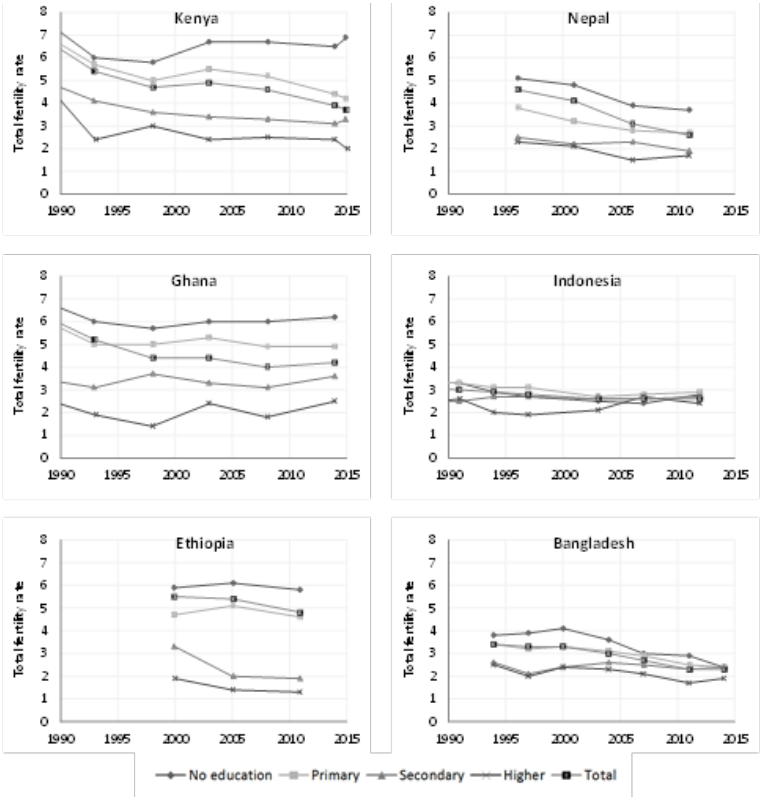
[12] This result is broadly supported by research, for example, that cited in David E. Bloom and Dara Lee Luca, "The global demography of ageing: facts, explanations, future", PGDA Working Paper, No. 130 (Cambridge Massachusetts, Harvard University, 2016).

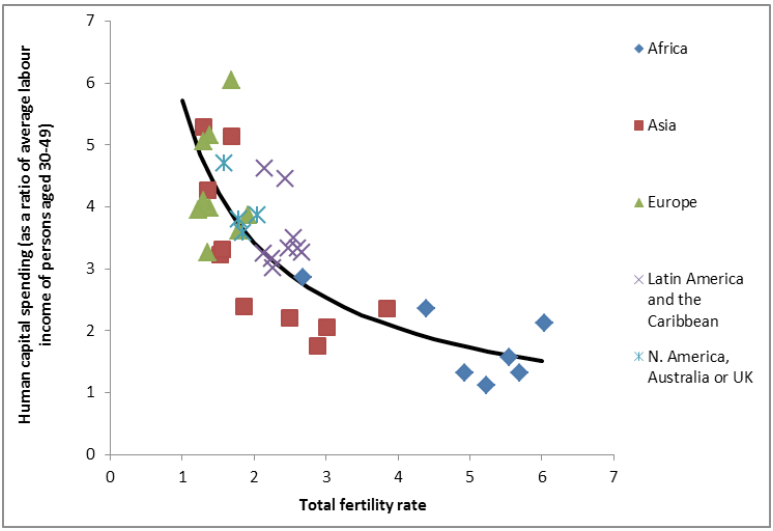
[13] See http://ntaccounts.org/web/nta/show/.

Figure IV
Lifetime total fertility (number of children per women) by level of female schooling, six developing countries, 1990 to 2015



Source: Elina Pradhan, "Link between education and fertility in low and middle-income countries", presentation at the United Nations expert group meeting on changing population age structures and sustainable development, New York, 13 and 14 October 2016.

Figure V
Total human capital spending versus fertility in 39 countries



Source: Andrew Mason, Ronald Lee and Jennifer Xue Jiang, "Demographic dividends, human capital and saving", *The Journal of the Economics of Ageing,* vol. 7 (April 2016), fig. 3.

26. While reductions in fertility tend to be associated with increased spending on health, the association with spending in education is particularly strong. Numerous other studies[14] have also found a significant negative relationship between educational attainment and fertility.

[14] Shareen Joshi and T. Paul Schultz, "Family planning and women's and children's health: long-term consequences of an outreach programme in Matlab, Bangladesh", *Demography*, vol. 50, No. 1 (February 2013), in addition to those cited above.

IV. Individual and household-level intergenerational support

A. Changes in intergenerational co-residence

27. The declining fertility and mortality that are an integral part of the demographic transition also affect patterns of co-residence across generations. In addition to the purely demographic changes, patterns of intergenerational co-residence are affected also by factors such as economic growth, industrialization and cultural norms.[15] For example, while mortality decline has increased the probability that a child will have two surviving parents, increasing rates of divorce or separation have diminished the likelihood that a child with two surviving parents will co-reside with both of them. For adults in the working age range, the mortality and fertility decline has led to a larger number of surviving parents and a smaller number of surviving siblings, resulting in an increased likelihood that a young adult may co-reside with a parent. From the perspective of the older generations, reductions in fertility have decreased the number of adult children, which has been offset only partially by their increased probability of survival to adulthood.

28. Net out-migration generally reduces the co-residence of youth and working-age adults with their parents, and sometimes also the co-residence of parents with their own children, when migrants leave their children in the care of grandparents or other relatives.

29. Illustrative evidence from 32 countries in different regions of the world is provided in figure VI, which shows increased co-residence between young adults and their parents combined with falling numbers of young and middle-aged adults co-residing with spouses and their own children between the 1980s and the 2000s. There has been a registered increase in the number of persons over age 50 living with their spouses in this group of countries.

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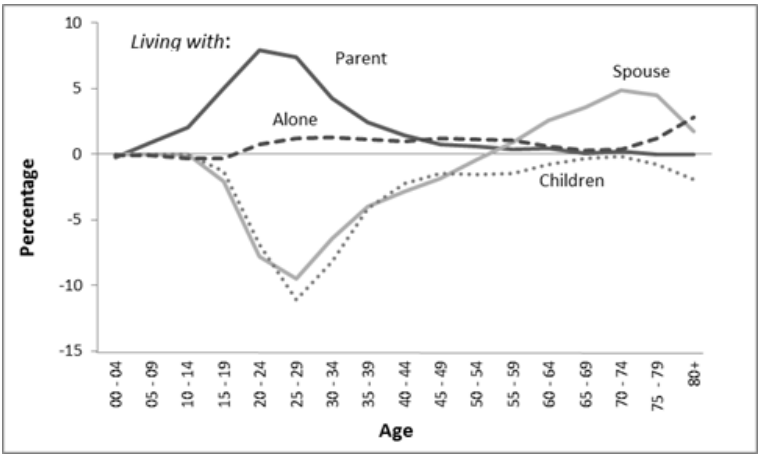
[15] Steven Ruggles and Misty Heggeness, "Intergenerational coresidence in developing countries", *Population and Development Review*, vol. 34, No. 2 (February 2008).

Figure VI
Changes from the 1980s to 2000s in the percentage of the population living with immediate relatives or alone, by age: aggregate of 32 countries

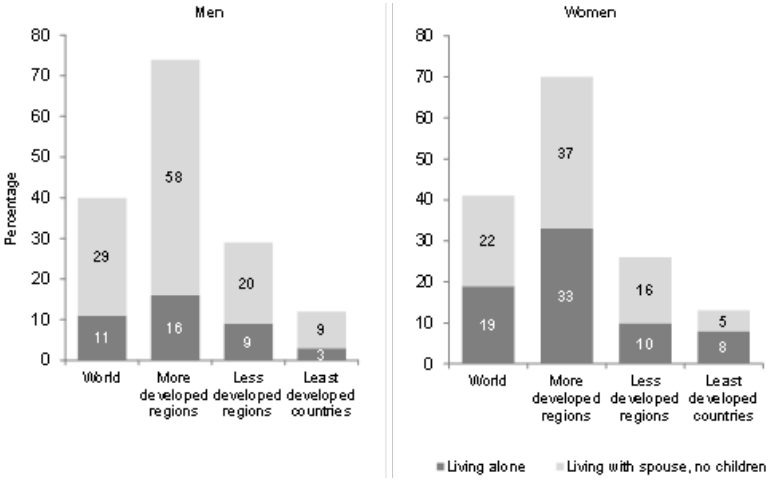


Source: Estimates based on microdata from 32 countries in all regions of the world, available from the International Public Use of Microdata Series database and the Eurostat Labour Force Surveys. The 32 countries are: Argentina, Austria, Brazil, Cameroon, Chile, Costa Rica, Ecuador, France, Greece, Haiti, Hungary, India, Indonesia, Ireland, Jamaica, Kenya, Malawi, Malaysia, Mongolia, Morocco, Panama, Portugal, Puerto Rico, Senegal, Switzerland, Thailand, Turkey, United Republic of Tanzania, United States of America, Uruguay, Venezuela (Bolivarian Republic of) and Viet Nam.

30. These trends are related to the delay in leaving the parental home and the increase in the average age at which unions are formed and childbearing begins. As the duration of education increases across successive cohorts, young adults delay their entry into the labour market and tend to remain longer in the parental home, depending at least partially on their parents. The extent and duration of their economic dependency has profound implications for intergenerational support and, potentially, for economic growth as well (see section V).

31. One of the features associated with population ageing and changes in residential arrangements is that independent living (namely, living alone or with a spouse only) among older people is becoming more common. Globally, about 40 per cent of the world's population aged 60 or over lived independently between 2000 and 2010 (figure VII).

Figure VII
Percentage of population aged 60 years or over living independently (alone or with spouse only), by sex: world and development region, circa 2005



Note: Estimates are for 101 countries, from 2000 to 2010 (modal year is 2005), based on microdata from censuses and surveys. Details are given on pp. 38 and 39 of *World Population Ageing 2013*.

32. The difference in the proportion of the population living independently in the more and less developed regions of the world is substantial. Between 2000 and 2010, almost three quarters of all older persons lived independently in the more developed regions, compared with roughly one quarter in the less developed regions and one eighth in the least developed countries.

33. Despite significant international variability, there is in general a positive association across countries between the proportion of older persons who live independently and the degree of population ageing. In countries where the number of persons aged 60 years or over accounted for less than 10 per cent of the population between 2000 and 2010, the number living independently seldom surpassed 40 per cent. By contrast, in all countries where older persons accounted for more than 20 per cent, older persons who lived independently constituted a majority. If this association between the degree of population ageing and the extent of independent living continues to hold in the future, it can be expected that a greater number of older persons will live independently in future decades in both the more and the less developed regions.

B. Gender and balancing of work-family obligations

34. In the ageing populations of the more developed countries (and of some developing countries), women have increased their participation in the labour force while, on average, they are having children later in life.[16] These changes, together with the extended lifespans of parents and grandparents, have produced what is referred to as the "sandwich generation". The situation particularly affects women who take care of dependent children and elderly parents, while also playing a more active role in the workforce.

35. While women's work in the household is generally not accounted for in standard economic statistics, there is increasing evidence of the sizeable contribution of women to both market and non-market production which, when properly valued, can amount to a large fraction of total work effort. In Senegal, for example, women contribute as much as 34 per cent of the total economy's market work, 87 per cent of all household production and 58 per cent of total aggregate work.[17]In the case of Mexico, household production, most of which is contributed by women, represents an estimated 22 per cent of gross domestic product (GDP). In some countries, such as Brazil, there is evidence that women's household work on average increases when they marry as well as when they have children, whereas men's household work declines somewhat when they marry, and does not seem to change with the birth of children.[18]

36. In this context, policies that support the participation of women in the labour force, of parental leave for both father and mother, and as affordable child care and long-term care for the elderly could contribute to lessening gender inequalities in the distribution of household and market work. These policies could also augment the demographic dividend (see chapter V) by increasing total labour force participation even after the size of the working-age population has ceased to grow, and thereby help economies to deal with the fiscal challenges associated with population ageing.

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[16] The mean age at which childbearing begins in developed countries increased from 26.5 years in the period 1980-1985 to 29.2 years in the period 2010-2015, and it is expected to rise to 31 years in the period 2045-2050.

[17] Gretchen Donehower, "Gender, age and economic activity", presentation at the United Nations expert group meeting on changing population age structures and sustainable development, New York, 13 and 14 October 2016.

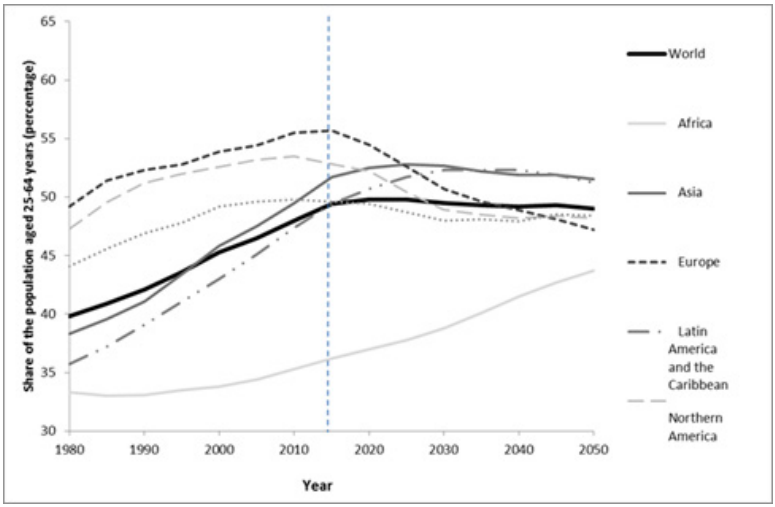
[18] Simone Wanjman, "Demographic dynamics of family and work in Brazil" presentation at the United Nations expert group meeting on changing population age structures and sustainable development, New York, 13 and 14 October 2016.

V. Consequences for the population and the macroeconomy

37. One of the features of the changing population age structures, addressed in section II above, is the end of the global rise in the proportion of the population in the working ages (25 to 64 years). This is happening at a time in which total labour force participation rates have been falling at the world scale and in some of the major economies of the world, including China, India, Japan and the United States.[19]

38. While the absolute numbers of people in the working ages will continue to rise over the coming decades, the share of the working-age population in the world is expected to remain relatively constant through 2050, staying stable or declining in the majority of regions, the main exception being Africa (see figure VIII), which will experience a substantial increase.

Figure VIII
Working-age population as a share of total population (percentage), by region



Source: United Nations, *World Population Prospects: The 2015 Revision — Key Findings and Advance Tables.*

[19] World Bank, World Development Indicators 2017 database, available from http://data.worldbank.org/data-catalog/world-development-indicators.

39. Countries in Africa and from other regions with vigorous growth in working-age population and relatively young age structures[20] have the potential to realize a sizeable "demographic dividend", namely, a boost to economic growth resulting from population changes associated with the demographic transition. In these countries, policies to ensure universal access to reproductive health services, including family planning, as well as others to expand education and employment opportunities, should receive priority consideration. These policies would enable or accelerate, as the case may be, the first demographic dividend, namely, the increase in the ratio of producers to consumers generated by the shift of the population age structure at the intermediate stages of the demographic transition. Even when an independent effect of age structure on economic growth is not verified, improvements in educational attainment contribute to productivity and income growth, implying that a substantial portion of the demographic dividend may be in fact an "education dividend".[21]

40. Latin America and the Caribbean and Asia have experienced large increases in the share of their working-age population in recent decades, but are expected to see modest relative increases through the 2020s and to experience declines thereafter. Countries in these regions should prioritize policies to facilitate the second demographic dividend, which results from increased investments in the education and health (human capital) of children and youth, as well as from the increased accumulation of assets generated by population ageing and prolonged retirement associated with extended lifespans. Policies on removing barriers to female labour force participation, in addition to their inherent value and contribution to reducing gender inequalities, could yield additional macroeconomic benefits.

41. Europe and Northern America are expected to see a sharp fall in the share of the working-age population between 2015 and 2050, while Oceania is expected to experience a more modest decline. Countries in these regions will face the challenge of relative scarcity of labour supply while their populations continue to age. Policies to facilitate safe, regular and orderly migration, to support the life-long learning and employment of older persons, together with family-friendly policies, would complement fiscal policies for the long-term sustainability of social security systems such as those addressed below.

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[20] Including some in Asia, Latin America and the Caribbean, and the Arab region (see E/ESCWA/SDD/2016/Technical Paper.3).

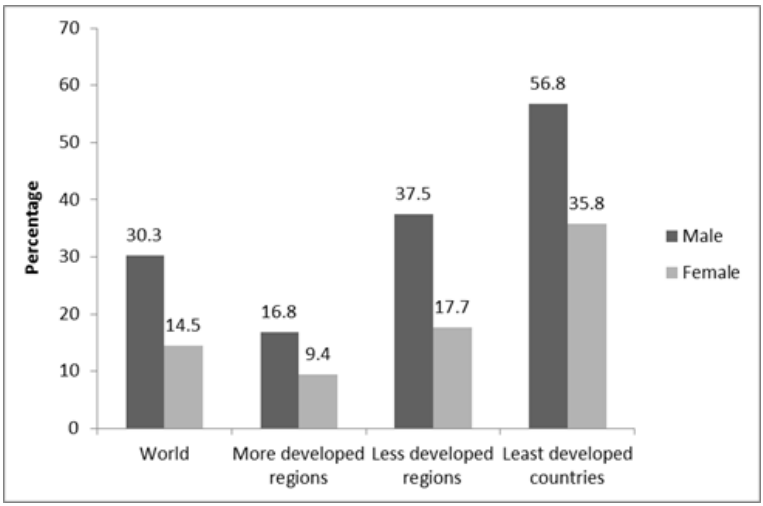
[21] Jesus Crespo Cuaresma, Wolfgang Lutz and Warren Sanderson, "Is the demographic dividend an education dividend?", *Demography*, vol. 51 (February 2014).

A. Work and old-age income security in ageing populations

42. The working-age population is ageing, with an increasing number of workers past the age of 50 or 60, raising questions about the future of labour productivity. Economic activity at older ages varies greatly across countries. For the world as a whole, the labour force participation rate[22] of persons aged 65 years or over was 30.3 per cent for men and 14.5 per cent for women in 2015.[23] In the more developed regions, the participation rates were 16.8 per cent for older men and 9.4 per cent for older women, compared with 37.5 per cent for older men and 17.7 per cent for older women in the less developed regions. In the least developed countries, 59.8 per cent of older men and 35.8 per cent of older women participated in the labour force in 2015.

43. Labour force participation among older men was highest in Africa (see figure IX), followed by Latin America and the Caribbean, Asia, and

Figure IX
Labour force participation of persons aged 65 years or older, by sex, 2015



Source: United Nations, *World Population Ageing 2015.*

[22] Defined as the share of the working-age population that is either employed or seeking employment.

[23] Profiles of Ageing 2015 database, available from https://esa.un.org/unpd/popdev/Profilesofageing2015/index.html.

Northern America, and was lowest in Oceania and Europe. Labour force participation was lower for older women than for older men in all regions but followed a similar pattern across regions.

44. Labour force participation of men aged 65 years or over has increased gradually from 1990 to 2015 in Europe, Oceania and Northern America, while it declined steadily in Asia, Africa and Latin America and the Caribbean. Older women's labour force participation increased in all regions between 1990 and 2015, reflecting the gradual trend towards higher levels of labour market activity among women of all ages.

B. Pensions in ageing societies

45. Social protection for all, including the need to ensure social protection floors to maintain a minimum standard of living, is a key goal of the 2030 Agenda for Sustainable Development. In recent decades, many developing countries with relatively young populations have expanded the coverage of contributory pension schemes or have established non-contributory "social" pensions. Meanwhile, many developed countries with a greater proportion of older populations have reformed their pension systems by raising statutory retirement ages in response to increases in life expectancy, increasing required contributions and the length of the minimum contributory period, and reducing other incentives for early retirement. Some Governments have also introduced reforms to augment the role of private pensions.

46. The availability (or population coverage) and adequacy (or generosity) of pensions influence labour force participation at older ages. When pensions are not available or provide a low benefit, as in many developing countries, retirement is not a viable option for a majority of the population. In developed countries, which have high levels of coverage and generous benefits, continuing to work at older ages is less necessary, and labour force participation is therefore lower. This inverse relationship can also be observed in the changes over time within countries or regions. For example, in most countries of the Organization for Economic Cooperation and Development (OECD), after a long period of steady decline in response to the increased availability and generosity of pension benefits, the participation of older men in the labour force has increased recently in response to a rise in the statutory retirement age and other restrictions in benefits. Meanwhile, the participation of older women in the labour force in OECD countries has increased steadily over the past 25 years, reflecting pension system reforms that encourage women to continue to work at older ages.

47. Government spending on public pensions also varies widely across countries, reflecting differences in population ageing, the extent of population coverage and the generosity of benefits. Public spending on

pensions in most European countries ranged from 5 per cent to 12 per cent of GDP. While Japan had the oldest population age distribution in the world in 2015, its level of public pension expenditure (10.2 per cent of GDP) was lower than in Italy (15.8 per cent of GDP), owing to Japan's less generous pension benefits relative to pre-retirement earnings. In most countries of Latin America and the Caribbean, public spending on pensions varied from 1 per cent to 8 per cent of GDP. The relatively low level of spending on pensions in this region reflected a combination of incomplete pension coverage (generally limited to those in the formal sector) and somewhat younger populations than in Europe.

48. An area of increasing policy concern related to ageing is long-term care. Despite the overall improvements in health noted previously, a significant proportion of older people will experience declines in capacity to the point where they require long-term care and support. This care can often be delivered within their homes or communities and should be provided in a manner that respects the basic rights and human dignity of older persons and that does not unduly burden women as caregivers. Governments and other stakeholders should support family caregivers so that such caregivers can provide better care and experience less stress. They should also provide community-based and respite care, institutional care for the severely disabled and support for community self-help groups and promote accreditation and standards for private care providers.[24]

C. Macroeconomic implications of changing population age structures

49. Internationally comparable evidence on the size of the first demographic dividend can be obtained by standardized measures of the "support ratio"[25] based on age profiles of consumption and production combined with estimates and projections of population size disaggregated by age. Following this approach, the United Nations report entitled World Population Ageing 2015 (ST/ESA/SER.A/390), shows that many countries in Africa and some in Asia and in Latin American and the Caribbean are expected, on the one hand, to benefit from increasing support ratios through 2050. On the other hand, countries projected to experience population ageing and declining economic support ratios are expected to see negative macroeconomic impacts from

[24] World Health Organization (WHO) *World Report on Ageing and Health* (Geneva, 2015); see also Global strategy and action plan on ageing and health (2016-2020), summary available from http://who.int/ageing/global-strategy/en/.

[25] Ratio of equivalent producers to equivalent consumers in the population (see details in *National Transfer Accounts Manual: Measuring and Analysing the Generational Economy* (United Nations publications, Sales number E.13.XIII.6).

changes in the population age distribution. The decline in the support ratio is expected to be especially pronounced in China, Germany, Italy, the Republic of Korea, Slovenia, Spain and Thailand, where it could slow economic growth by 0.5 percentage points or more per year between 2015 and 2050.

50. The second demographic dividend can remain positive long after the phase of the first dividend has elapsed. Recent evidence on the size and duration of both the first and the second dividends[26] suggests that:

(a) The "window of opportunity" for the demographic dividends opened in Europe in the early 1960s, then in Asia, Oceania and the Americas in the mid-1970s, and in Africa in the early to mid-1990s;

(b) The largest (peak) annual increases in economic growth associated with the demographic dividends are estimated to have occurred in Asia (as high as 2.3 per cent per year), owing to the region's exceptionally rapid demographic transition and expansion of education. For the other regions, the peak dividends are estimated to range from 1.5 per cent to 1.8 per cent per year;

(c) Even though Africa's demographic transition has been delayed and is projected to proceed at a slower pace than in other developing regions, it could yield the largest total demographic dividend over the long run. This is partly a reflection of the lower starting value of the support ratio in Africa compared with other regions. To realize this potential, expanded family planning programmes, sufficient opportunities for productive employment and effective means for the accumulation of human and physical capital during the dividend period will be required;

(d) The second demographic dividend is potentially much larger and longer-lasting than the first. However, its realization is less certain, as it presumes that favourable policies, such as those mentioned above, and an overall economic environment conducive to sustained growth will be in place over the course of the demographic transition. Although this would be consistent with the successful implementation of the 2030 Agenda for Sustainable Development in countries currently at the early stages of the demographic transition, it cannot be considered a foregone result.[27]

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[26] Andrew Mason and others "Support ratios and demographic dividends: Estimates for the World". Manuscript, 14 November 2016.

[27] See Garenne (2016) "Demographic dividend in Africa: macro and microeconomic effects", n-IUSSP, December 2016, UNFPA (2014) State of the World Population Report 2014, The Power of 1.8 Billion and Zulu (2016) "Africa's demographic transition and demographic dividend". Presentation at the United Nations expert group meeting on changing population age structures and sustainable development, New York, 13 and 14 October 2016, among others.

VI. Need for data disaggregated by age and sex

51. To fulfil the pledge of leaving no one behind, it is important to formulate policies and assess progress made towards the achievement of the Sustainable Development Goals distinguishing the population in different age groups, in particular children, youth and older persons. To document changes in population age structures and to evaluate the impacts of those changes, as described in the present report, age-disaggregated data are essential (see E/CN.9/2016/3).

VII. Conclusions and recommendations

52. Persistent changes in the population age distribution are a key feature of the demographic transition from relatively high to relatively low levels of fertility and mortality. These changes are attributable to the historic reduction in death rates and, most critically, to reduced levels of fertility. In countries that are net receivers of significant numbers of international migrants, migration may also have an impact on the population age distribution.

53. Although the demographic transition is a universal phenomenon, its timing and speed — and its implications for sustainable development — vary greatly across countries and regions. The world is now seeing a relatively slow pace of growth in the population of children and youth, while the population aged 65 years or over is growing more rapidly. The rate of growth in this age segment is especially high in Africa and in parts of Asia and Latin America. The share of older persons in the population is highest in Europe and other developed countries, reflecting the earlier start of the demographic transition in those populations.

54. Globally, the growth in the number of children and youth has decelerated and even turned negative in some countries and regions. This deceleration presents an historic opportunity to invest in human capital by improving access to health and education and enhancing the prospects for productive employment available to younger cohorts. **Governments should actively pursue these opportunities both for their intrinsic value in fulfilling basic rights and as an investment in future economic growth and in the well-being of present and future generations.**

55. Absolute numbers of children and youth are still growing rapidly in many African countries and in parts of Asia. Countries where fertility remains high are in the early stages of the demographic transition. **The Governments of these countries should consider adopting policies to support universal access to sexual and reproductive health-care services, including family planning, in accordance with the objectives of the Programme of Action of the International Conference on Population and Development and the Goals and targets of the 2030 Agenda for Sustainable Development.**

56. Population ageing is a major global demographic trend that brings both opportunities and challenges. One challenge faced by countries where population ageing is proceeding rapidly is the increased fiscal pressure on public support systems for older persons, including pensions and health-care programmes, raising questions about their financial sustainability. **Governments should anticipate demographic trends and their likely**

impacts on social security systems and consider possible increases in the statutory age of retirement in response to increasing longevity and other reforms to ensure the economic security of future generations of older persons. Mindful that women constitute a majority of the older population, and mindful of the persistent gender gap in labour force participation, system coverage and benefits, **Governments should consider policies to promote gender equality in pension systems.**

57. Where contributory pensions exclude important segments of the workforce owing to socioeconomic constraints to stable labour force participation, informality or other factors, **Governments should consider social pensions to sustain a minimum level of well-being for all older persons, in accordance with the Madrid International Plan of Action on Ageing and with Sustainable Development Goal 1 on ending poverty, including through social protection systems and floors.**

58. **All countries, but especially those in advanced stages of population ageing and facing a relative scarcity of labour should consider policies to facilitate safe, orderly and regular migration, and to support life-long learning and employment of older persons, as well as family-friendly policies that can complement fiscal policies for the long-term sustainability of social security systems.**

59. Government policies need to address the difficulties faced by young and middle-aged adults, particularly women, in balancing the demands of work with family obligations, including the support and care provided for children, older parents and grandparents. **Governments should consider policies in support of affordable child-care programmes, paternal and maternal leave programmes, part-time and flexible employment opportunities for both men and women, and long-term care programmes.** These and other policies mentioned above, would also contribute to the empowerment of women, to the recognition of women's overall economic contributions and to a reduction of gender inequalities in the household, the labour market and society as a whole.

60. Changes over time in the population age distribution can produce two broad macroeconomic benefits. A first demographic dividend can provide a boost to economic growth during a period when the share of children and youth has fallen as a result of a recent drop in fertility, while the share of older persons in the population is still not very high, yielding relatively high and increasing economic support ratios. **Governments should take full advantage of this time-bound window of opportunity by expanding investments in health and education for children and youth, and over the life course, as such investments may improve both personal well-being and labour force productivity.**

61. Countries may also benefit from a second demographic dividend. Those that have invested in the human capital of their population, and where older persons have accumulated significant assets, population ageing can help to intensify capital accumulation in the macroeconomy, driving or accelerating present and future economic growth. **To reap the benefits of both dividends, Governments should implement policies to ensure the productive employment of youth and adults and to encourage personal saving.**

62. Population ageing also has implications for the health of the population. The number of people requiring extended care due to disability or functional limitation is likely to increase in all countries. **National health systems should implement programmes to encourage healthy lifestyles that start in childhood and continue into adulthood, empowering individuals to cope better with the decline of intrinsic capacity in old age. Health-care systems should emphasize the maintenance of maximum attainable levels of functional capacity throughout the life course, especially at older ages.**

63. **Governments, supported by the United Nations and other international organizations as appropriate, should promote the collection, dissemination and analysis of demographic data disaggregated by age, sex, and other relevant characteristics, as an aid to designing policies and assessing progress towards the achievement of the Sustainable Development Goals, especially those pertaining to particular age groups, such as children, youth and older persons.**