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Population 2030

Demographic challenges and opportunities for sustainable development planning



United Nations • New York, 2015

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PREFACE

The Population Division of the Department of Economic and Social Affairs (DESA) of the United Nations Secretariat is responsible for providing the international community with up-to-date and scientifically objective information on population and development. The Population Division provides guidance on population and development issues to the United Nations General Assembly, the Economic and Social Council and the Commission on Population and Development and undertakes regular studies on population estimates and projections, fertility, mortality, migration, reproductive health, population policies and population and development interrelationships.

This paper reports on research undertaken to draft the report of the Secretary-General on "Integrating population issues into sustainable development, including in the post-2015 development agenda" (E/CN.9/2015/3*), presented at the 48th session of the Commission on Population and Development, 13-17 April 2015. This paper examines, at greater length than the Secretary-General's report, the United Nations' latest population projections for countries and regions for the period 2015-2030—the implementation period of the 2030 Agenda—in order to identify the coming challenges to and opportunities for sustainable development associated with demographic trends over the near-term. Drawing on the 2015 Revision of World Population Prospects, it discusses the projected numbers of births, children of primary-school age, adolescents and youth, women of reproductive age, older persons and urban dwellers. By considering these demographic trends within the context of each country's existing capacity to meet the needs of its population, as assessed primarily through progress achieved towards the Millennium Development Goals (MDG) targets, this report identifies where efforts must be intensified to expand basic services to growing numbers of people, as well as where population factors are likely to present opportunities to accelerate development progress. Moreover, this paper compares recent population growth to trends in carbon emissions in energy use in order to understand the implications of demographic trends for environmental sustainability.

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I. Introduction

Discussions of population and sustainable development once were dominated by a concern that world population growth would eventually exceed the planet's carrying capacity, in particular with respect to the availability of natural resources. Especially since the mid-twentieth century—a time of unprecedented global population growth—many worried about humans' capacity to produce enough food to sustain the growing numbers of people, particularly in Africa and Asia, where population growth was fastest and food security already tenuous (Ehrlich, 1968, World Bank 1984). Between 1950 and 2015, however, the world's population nearly tripled from 2.5 billion people to 7.3 billion people (United Nations, 2015a), and the direst predictions of decades earlier have not come to pass, largely owing to new technologies that have enhanced the efficiency of global food production to a degree previously thought impossible (Lam 2011).

Although the global rate of population increase has slowed considerably, the world is still expected to add around 83 million people in 2015. Lessons of the past several decades have spurred an evolution in concerns about continued population growth, which today tend to focus less specifically on the volume of food production and more broadly on the numerous pressures exerted by growing populations on the natural environment – land, forests, biodiversity, ground water, oceans, air quality and climate - through unsustainable production and consumption patterns (UNFPA Technical Division, 2012). Generally speaking, the human impact on the environment is determined by three intersecting factors: 1) population growth and 2) economic growth, which together shape production and consumption demands; and 3) technological advancements, which influence the efficiency and impact of the consumption of resources (Commoner et al. 1971; Ehrlich and Holdren, 1971). According to the United Nations' median projection (2015a), the world's population will grow to around 8.5 billion in 2030, the target date for the 17 sustainable development goals (SDGs) outlined in the 2030 Agenda for Sustainable Development (General Assembly resolution 70/1). The degree to which that population growth will stress natural resources and harm the environment will thus depend on: 1) the consumption and production patterns that accompany population growth and economic growth over that period; and 2) success in developing and implementing the technological advancements needed to improve efficiency and reduce humanity's global environmental footprint.

Predicting economic growth and technological change is notoriously difficult, even over the short term. The country-level and regional-level forecasts of gross domestic product (GDP) produced by the World Bank and the International Monetary Fund (IMF) extend no more than a few years into the future and are subject to a high degree of uncertainty (World Bank Group, 2014; IMF, 2015). In stark contrast, the near future of world population is relatively certain. This is because the size and age structure of the population over the next 15 years are largely the result of demographic processes (particularly fertility and mortality) that have already taken place in the past. Consequently, between now and 2030 we can predict with confidence which populations will grow and which will decline, as well as their age structures and, to a lesser extent, their spatial distributions. Shifts in each of these demographic characteristics shape the demand for the goods and services that are critical to progress in sustainable development, such as health care, education, employment and social protection, as well as the production and consumption patterns that characterize the economy.

While population growth poses challenges to sustainable development, some of the demographic changes anticipated to take place over the coming years may also present

opportunities to facilitate the financing and delivery of services, such as health and education, and to accelerate economic growth and poverty reduction. The "demographic dividend," for example, describes the period of time following sustained fertility decline, during which economic growth may be accelerated because the working-age population grows as a share of the total population. Trends in urbanization represent another potential development opportunity arising from demographic processes since cities offer economies of scale to supply infrastructure and basic services to a large population at much lower costs than would be required to reach the same number of people dispersed over rural areas. Understanding the present and future demographic dynamics particular to each country can inform development planning and policymaking, identifying areas where programmes must be scaled up to reach growing numbers of people in need, as well as areas where the shifting demographic profile offers opportunities to accelerate progress in some areas of sustainable development.

This report examines the United Nations' population projections for countries and regions for the period 2015-2030—the implementation period of the 2030 Agenda—in order to identify the coming challenges to and opportunities for sustainable development associated with demographic trends over the near-term. It discusses the projected numbers of births, children of primary school age, adolescents and youth, women of reproductive age, older persons and urban dwellers. By considering these demographic trends within the context of each country's existing capacity to meet the needs of its population, as assessed primarily through progress achieved towards the Millennium Development Goals (MDG) targets, this report identifies where efforts must be intensified to expand basic services to growing numbers of people, as well as where population factors are likely to present opportunities to accelerate development progress. Moreover, this report compares recent population growth to trends in carbon emissions in energy use in order to understand the implications of demographic trends for environmental sustainability. The report concludes with a summary of the demographic priorities facing Governments as they prepare to accommodate their future populations, which for many countries differ from the present not only in size, but also in the age structures and spatial distributions that shape their opportunities and needs.

II. Population and the development goals

The world's population in 2015 stands at 7.3 billion people and it is projected to increase to 8.5 billion in 2030. The degree of uncertainty associated with that projection is small and depends primarily on the future levels of fertility in today's largest high-fertility countries, such as Nigeria and Pakistan (Raftery et al., 2012). Figure 1 shows the total population estimated for the world and six regions from 1950 to 2015 and projected to 2030, with the dotted series around each dashed line marking the range of uncertainty represented by the 95 per cent prediction interval. At the global level, the 95 per cent prediction interval indicates a total population that is as many as 8.6 billion people in 2030 or, at the lower bound, as few as 8.4 billion people in 2030. The majority of that uncertainty at the global level comes from uncertainty in the projected growth of the populations of Africa and Asia. Africa is projected to see the largest relative increase in the size of its population over the coming 15 years: the median projection of 1.68 billion people in 2030 is 42 per cent larger than the 2015 population of 1.19 billion. The 95 per cent prediction interval for Africa anticipates that the population in 2030 will fall between 1.65 billion and 1.71 billion. The projected relative population increase in Asia between 2015 and

2030, at 12 per cent, is much less than in Africa, but because the region is home to nearly 60 per cent of the world's population, the uncertainty projected for Asia contributes substantially to global population projection uncertainty. While the median population projection indicates that Asia will be home to 4.9 billion people in 2030, up from 4.4 billion in 2015, the 95 per cent prediction interval extends from 4.8 billion on the lower bound to 5.0 billion on the upper bound.

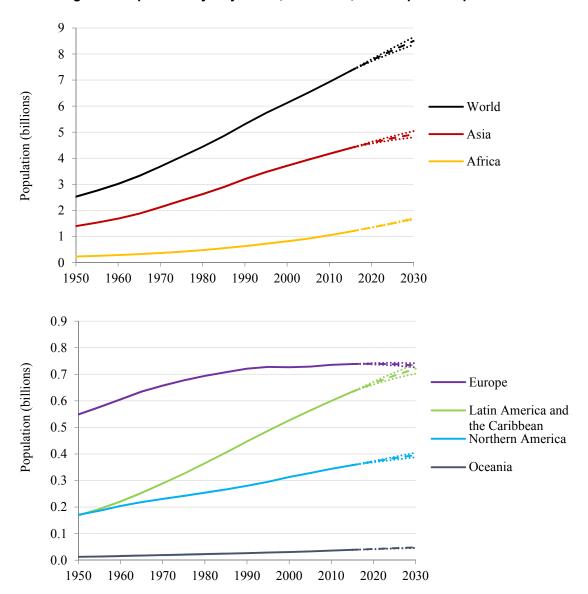


Figure 1. Population by major area, 1950-2030, with 95 per cent prediction intervals[†]

The populations of Latin America and the Caribbean, of Northern America and of Oceania are each projected to grow over the coming 15 years as well. The median projection indicates that the population of Latin America and the Caribbean will increase from 634 million

[†]Dashed line represents the median projection, while dotted lines represent the 95 per cent prediction intervals. Data source: United Nations (2015). *World Population Prospects: The 2015 Revision*.

in 2015 to 721 million in 2030, while the lower and upper bounds of the 95 per cent prediction interval in 2030 range from 702 million to 739 million. Northern America is projected to grow from 358 million people in 2015 to 396 million in 2030, with the prediction interval ranging from 387 million to 405 million. Oceania's population of 39 million in 2015 is projected to grow to 47 million by 2030 with uncertainty ranging from 46 million to 49 million.

In contrast to the other regions, the population of Europe is projected to decline slightly between 2015 and 2030, from 738 million to 734 million. Uncertainty in future fertility rates, particularly in countries where fertility is well below the replacement level of 2.1 children per woman, mean that the decline in Europe's population could be even steeper – to 726 million in 2030 at the lower bound of the 95 per cent prediction interval – or Europe's population could even grow somewhat – to 742 million in 2030 at the upper bound of the 95 per cent prediction interval.

The concentration of recent population growth in the developing regions, and in Asia and Africa in particular, has posed challenges to the ability of countries within those regions to attain progress in development, including towards the internationally agreed development goals and targets outlined in the follow-up to the United Nations Millennium Declaration (General Assembly resolution 55/2). An example of such challenge can be seen in the progress achieved towards Millennium Development Goal 1, to reduce extreme poverty and hunger. The targets under MDG1, like many of the MDG targets, were formulated in proportional terms: target 1a, for example, was to halve, between 1990 and 2015, the proportion of people whose income is less than \$1.25 per day, while target 1c was halve the proportion of people who suffer from hunger. At the global level, the world has met target 1a and has come close to meeting target 1b in 2015 (United Nations, 2015b), but progress has been uneven across regions and countries, and at least part of that unevenness can be reasonably attributed to differences in population growth rates.

The observation that many of the MDG targets were formulated in proportional terms – that is, with population size in the denominator – is important for how we understand the implications of population trends for progress towards the development goals. The case of the hunger reduction target 1c provides an illustration. In a country that is experiencing little to no population growth, reducing the proportion of people suffering from hunger can be achieved by providing nutrition to greater absolute numbers of people. In this instance the numerator—the number of people suffering from hunger—declines, while the denominator—total population—remains unchanged, yielding a reduction in the proportion of hungry people. But in a population that is growing rapidly, simply increasing the numbers of people with adequate food may not be sufficient to increase the proportion covered. Indeed, if the total population—the denominator—is growing faster than the number of people with access to nutrition, then the proportion hungry will actually increase over time. Thus in a context of rapid population growth, policies and programmes to reduce poverty and hunger must expand even faster than the population is growing for progress to be achieved towards the proportional targets elaborated in the MDGs.

The implications of the population growth challenge to progress towards reducing extreme poverty and hunger are evident in an examination of the disparities across countries in progress towards reducing the proportion of the population that is undernourished. Figure 2 displays the population growth ratio – the ratio of the population in 2015 to the population in 1990 – on the vertical axis against the relative change in the percentage of the population that

was undernourished between 1991 and 2015 (the earliest and latest years for which data are available) for all countries where more than 10 per cent of the population was undernourished in 1991. Marker sizes in the figure are proportional to the population size in 2015.

Many of the countries that saw the least progress towards reducing the proportion of the population that was undernourished also experienced rapid population growth since 1990. In Afghanistan, for example, the percentage undernourished fell by just 9 per cent, from 29.5 per cent in 1991 to 26.8 per cent in 2015, at the same time that the total population of the country grew by a factor of 2.7. In the United Republic of Tanzania the population also more than doubled between 1990 and 2015, while the proportion undernourished *increased* by 33 per cent from 24.2 per cent to 32.1 per cent. Of the 13 countries that, like Tanzania, experienced an increase in the proportion undernourished between 1991 and 2015, all but two saw their populations grow by more than 60 per cent over the last 25 years; five saw their populations more than double.

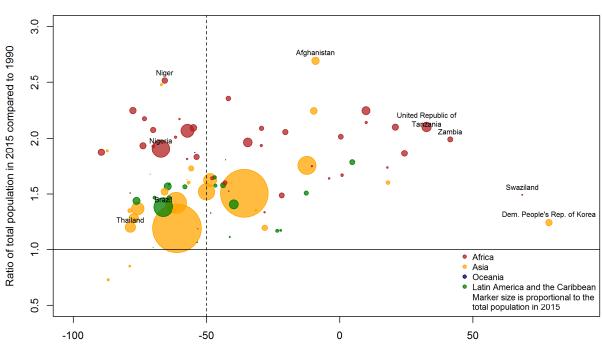


Figure 2. Ratio of total population in 2015 to population in 1990 by the percentage change in the proportion undernourished between 1991 and 2015, 86 countries or areas*

Change in the proportion of the population undernourished between 1991 and 2015 (per cent)

^{*}Included countries or areas met the following criteria: 1) population greater than 90,000 in 2015; 2) proportion undernourished greater than 10 per cent in 1991; and 3) estimates of the proportion undernourished available for both 1991 and 2015.

Data sources: United Nations (2015). World Population Prospects: The 2015 Revision and the 2015 Millennium Development Goals Indicators database.

By comparison, population growth has tended to be slower on average among the countries that achieved the MDG1 target of a 50 per cent or greater reduction in the proportion undernourished between 1991 and 2015. Half saw their populations grow by less than 60 per cent between 1990 and 2015 and one-quarter saw growth of less than 40 per cent. Thailand, for example, achieved a 79 per cent reduction in the proportion undernourished, from 34.6 per cent in 1991 to 7.4 per cent in 2015, while the population grew by just 20 per cent between 1990 and 2015. Similarly, Brazil saw a 66 per cent reduction in the proportion undernourished, from 14.8 to 5.0 per cent, and a 38 per cent increase in the total population.

To be sure, rapid population growth is not the only factor impeding progress towards reducing poverty and hunger in many countries, and progress is possible even in the context of a rapidly growing population. In Nigeria, for example, the population nearly doubled between 1990 and 2015, but the proportion undernourished decreased by 67 per cent, from 21.3 per cent in 1991 to 7.0 per cent in 2015. Similarly, in Niger the population grew by a factor of 2.5 between 1990 and 2015, but the country achieved a 66 per cent reduction in the proportion undernourished, from 27.7 per cent in 1991 to 9.5 per cent in 2015. Thus while rapid population growth appears to challenge progress in reducing hunger, it certainly does not preclude it when the right policies and programmes are in place to ensure people's access to nutrition.

Just as rapid population growth over the past decades has challenged progress towards the achievement of the MDGs, future trends in population growth portend particular challenges and opportunities to progress towards the SDGs. The association between population growth and national income gives an introduction to the challenges anticipated to come. Figure 3 shows the ratio of the projected population in 2030 to the estimated population in 2015 by the level of gross national income (GNI) per capita in 2014 for the 183 countries for which GNI information is available for that year in the World Bank's *World Development Indicators* database. Marker sizes in the figure are proportional to the population size projected for 2030.

The countries that are anticipated to experience the largest population increases between 2015 and 2030 tend to be those with the lowest levels of GNI in the world. Indeed, a majority (59 per cent) of the countries projected to see their populations grow by more than 40 per cent by 2030 are in the "low-income" group, defined by the World Bank in 2015 as having GNI below US\$1,045 per person. Niger is the country anticipated to see the largest increase in population: the total population in 2030 is projected to be nearly 81 per cent larger than in 2015, and it is among the poorest countries in the world, with GNI per capita of US\$430 in 2014. Uganda and Burundi are two additional examples of low-income countries where the population is projected to grow by more than 50 per cent between 2015 and 2030.

Among countries in the lower-middle income range, which the World Bank in 2015 defined as having GNI per capita between US\$1,045 and US\$4,125, there is substantial heterogeneity in the projected population growth rates. In Nigeria and in Zambia, for example, the populations are projected to increase by 44 and 56 per cent, respectively, while India's population is expected to grow by 17 per cent. In Ukraine, which is also in the lower-middle income category, the population is projected to shrink by 9 per cent between 2015 and 2030.

Somewhat less heterogeneity in projected population growth is expected among countries with upper-middle income and high-income levels. Apart from a few outliers such as Angola and Iraq where the increase in population between 2015 and 2030 is projected to exceed 40 per cent, population growth is expected to be much slower among this group of countries. In Brazil,

for example, the population is projected to increase by 10 per cent between 2015 and 2030, China by 2.9 per cent, and in the Russian Federation the population is projected to decline by 3 per cent over the next 15 years. At the top end of the national income distribution, the population of the United States is projected to grow by 10 per cent between 2015 and 2030, while the populations of Germany and of Japan are projected to decline by 2 per cent and 5 per cent, respectively.

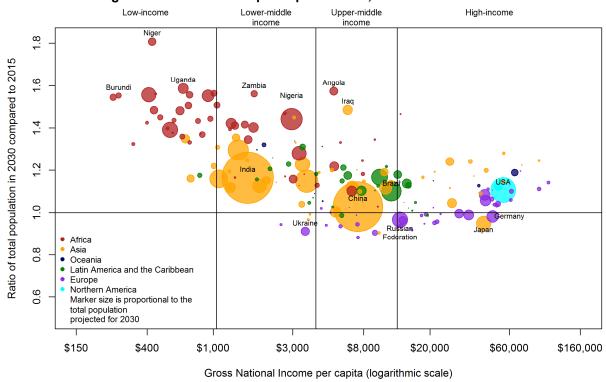


Figure 3. Ratio of projected population in 2030 to estimated population in 2015 by the level of gross national income per capita in 2014, 183 countries or areas

Data sources: United Nations (2015). World Population Prospects: The 2015 Revision and World Bank (2015). World Development Indicators database.

The low-income countries that are projected to experience substantial population growth over the next 15 years will be particularly challenged to scale up food and housing programmes, water and sanitation infrastructure, and health and education systems and to grow their economies to ensure adequate resources to meet the needs of growing numbers of people. But population growth is not the only demographic change with implications for sustainable development, since shifting age structures and spatial distributions can have important effects as well. In high-fertility countries like Uganda and Nigeria the growing population will retain its youthful age structure, posing challenges to systems that must deliver basic services to growing numbers of children. In other countries, like India, China and Brazil that have seen declines in

^{*}Included countries or areas met the following criteria: 1) population greater than 90,000 in 2015; and 2) estimate of GNI per capita available for 2014.

fertility over the latter half of the 20th century, children account for a shrinking proportion of the overall population, while the share of adults is growing, offering opportunities to accelerate progress in children's well-being, but posing challenges to meet the needs of growing numbers of older persons. Still other countries, like Germany and Japan, that have sustained very low fertility over a long period, are anticipating rapid population ageing and, in some cases, even a decline in the size of the population overall, with far-reaching economic, social and political implications (United Nations, forthcoming). Moreover, a spatial shift in the distribution of population is occurring nearly everywhere, as urbanization trends draw an increasing proportion of people towards cities, facilitating peoples' access to the many advantages of urban life, but also complicating efforts to address urban poverty and to achieve environmentally sustainable levels of production and consumption.

Demographic projections allow countries to anticipate the coming shifts in population size, age structure and spatial distribution that will unfold over the coming decades. The following sections of this report explore various demographic shifts in age groups and urbanization anticipated to take place between 2015 and 2030 and discuss their implications for progress in development.

III. Preparing for the next two billion babies

Between 2015 and 2030 close to 2.1 billion babies will be born worldwide. While the number of births projected globally between 2015 and 2030 is only slightly larger (3 per cent) than the number of births that occurred worldwide between 2000 and 2015, there are important differences across countries and regions. Specifically, Africa is projected to see a 24 per cent increase in the number of births in 2015-2030 compared to 2000-2015, while Oceania's births will increase by 10 per cent and Northern America's by 3 per cent (table 1). In contrast, Europe, Asia and Latin America and the Caribbean are each expected to see slight reductions in the number of babies born in 2015-2030 compared to 2000-2015. Taken together, these trends mean that the percentage of the world's babies that are born in Africa is expected to increase from 27 per cent in 2000-2015 to 32 per cent in 2015-2030, while Asia's share of the world's births will decline from 56 to 51 per cent, Latin America and the Caribbean's from 8.3 to 7.4 per cent and Europe's from 5.7 to 5.3 per cent. The share of the world's babies that are born in Oceania and Northern America is projected to remain largely unchanged.

Table 1. Births by region, 2000-2015 and 2015-2030

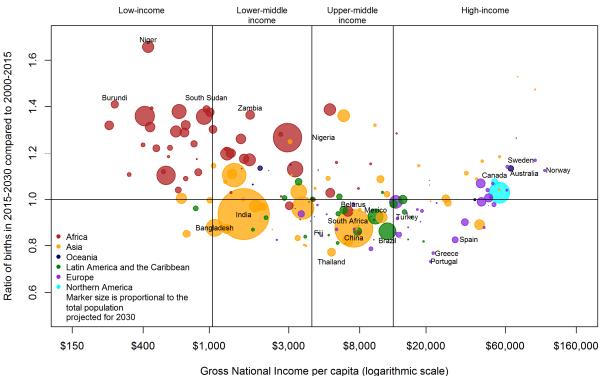
	Births over	Births over	Ratio of	Distribution	Distribution
	the period	the period	2015-	of births in	of births in
	2000-2015	2015-2030	2030/2000-	2000-2015	2015-2030
	(millions)	(millions)	2015	(per cent)	(per cent)
World	2038.2	2091.6	1.03	100.0	100.0
Africa	544.8	675.8	1.24	26.7	32.3
Asia	1132.7	1069.8	0.94	55.6	51.1
Europe	115.9	111.2	0.96	5.7	5.3
Latin America and the Caribbean	168.7	155.5	0.92	8.3	7.4
Northern America	66.8	69.0	1.03	3.3	3.3
Oceania	9.3	10.2	1.10	0.5	0.5

Data source: United Nations (2015). World Population Prospects: The 2015 Revision.

Even within regions, there is substantial heterogeneity in the fertility trends that will shape the number of births over the coming years. Figure 4 shows the ratio of the projected number of births in 2015-2030 relative to the estimated number of births in 2000-2015 for 183 countries or areas classified by region and level of GNI per capita in 2014. Fertility drives population growth, thus the countries that are projected to experience the largest population growth shown previously in figure 3 are many of the same that are projected to see a substantial increase in the number of births in figure 4. Furthermore, as with the population growth ratio, the ratio of projected future births relative to past births tends to be highest among low-income countries and declines as the level of GNI per capita increases.

Niger has the largest projected increase in the number of births, with 66 per cent more births anticipated over the period 2015-2030 compared to 2000-2015. Nineteen countries are projected to see a greater than 30 per cent increase in births over the coming 15 years relative to the past 15 years. A majority (68 per cent) of them are low-income; 15 of the 19 are located in Africa.

Figure 4. Ratio of projected births in 2015-2030 to estimated births in 2000-2015 by the level of gross national income per capita in 2014, 183 countries or areas



^{*}Included countries or areas met the following criteria: 1) population greater than 90,000 in 2015; and 2) estimate of GNI per capita available for 2014.

Data sources: United Nations (2015). World Population Prospects: The 2015 Revision and World Bank (2015). World Development Indicators database.

Ongoing fertility declines are evident in the large number of countries that are expected to have fewer births over the period 2015-2030 relative to the period 2000-2015. All levels of income and all regions except Northern America are represented among the 100 countries for which the ratio of future births to past births is less than 1.0. Both India and China are projected to have fewer births in 2015-2030 than in 2000-2015, as are Bangladesh, Belarus, Brazil, Fiji, Mexico, South Africa, Spain, Thailand and Turkey, to name several.

High-income countries are roughly evenly split between those that are projected to see declines in the number of births and those that will likely see increases. Australia, Canada, Norway and Sweden—countries where fertility rates have leveled off at just below the replacement level—are examples of those where the number of births in 2015-2030 is expected to exceed that in 2000-2015. Spain, Greece and Portugal—countries where total fertility rates have fallen below 1.5 children per woman since at least the 1990s—are among the high-income countries where the number of births in 2015-2030 is projected to be more than 15 per cent less than the number in 2000-2015.

Sadly, projections suggest that around 60 million of the 2.1 billion babies born between 2015 and 2030 are not expected to survive to their first birthdays and approximately 85 million are likely to die before age 5. While reductions in infant and child mortality risks are anticipated in all regions, huge disparities will persist such that a baby born in Africa in 2025-2030 will be more than ten times more likely to die before age 5 relative to a baby born in Europe or in Northern America (figure 5). Projections indicate that 63 out of every 1,000 babies born in Africa between 2025 and 2030 will die before age 5, as well as 25 of every 1,000 babies born in Asia, 21 out of every 1,000 born in Oceania and 16 of every 1,000 born in Latin America and the Caribbean.

42 Before age 1 59 Before age 5 90 Before age 1 31 Asia Before age 5 39 Before age 1 Before age 5 2010-2015 2025-2030 Before age 1 20 16 Before age 5 Infant mortality 26 Before age 1 Child mortality Before age 5 Before age 1 Before age 5 100 0 20 40 60 80 Deaths per 1,000 live births

Figure 5. Infant and child mortality rates by region, 2010-2015 (estimated) and 2025-2030 (projected)

Data source: United Nations (2015). World Population Prospects: The 2015 Revision.

A number of factors are anticipated to continue to challenge progress on reducing child mortality in developing regions, and in sub-Saharan Africa in particular, such as inadequate nutrition and health care, but high fertility will also impede progress in many countries that are already struggling to protect and preserve children's health. Indeed, many of the countries with the highest mortality rates among children are the same countries that will see the largest increases in the number of births (and thus the numbers of children at risk of dying) over the near future. Figure 6 shows the ratio of the projected number of births over 2015-2030 to estimated births during 2000-2015, by the under-five mortality rate in 2010-2015. Countries with the highest levels of child mortality will face the greatest strain on health systems as the number of births continues to increase: virtually every country where child mortality is still above 100 deaths per 1,000 live births will experience a significant increase in births over the next 15 years.

Angola had the highest child mortality rate in the world in 2010-2015, with nearly 156 deaths to children under five for every 1,000 live births, and the country is expected to see 39 per cent more births over 2015-2030 compared to 2000-2015. Child mortality risks are similarly high in Chad, with 155 deaths to children under five for every 1,000 live births in 2010-2015, and Chad is anticipated to have 37 per cent more births over the next 15 years than over the previous 15 years. Burundi, the Democratic Republic of the Congo, Mali, Niger, Somalia, and South Sudan are each facing a similar situation, with large (more than 30 per cent) projected increases in the numbers of children born within a context of extremely high child mortality risks (greater than 100 deaths per 1,000 live births). Programmes in these countries must be scaled up to a degree that exceeds the rates of growth in the numbers of children if they are to be successful at reducing infant and child mortality rates over the short and long terms.

Ratio of births in 2015-2030 compared to 2000-2015 1.6 Dem. Republic 4. 1.2 0. Africa Asia Latin America and the Caribbear Europe Northern America 9.0 Marker size is proportional to the number of births projected for 2015-2030 0 50 100 150

Figure 6. Ratio of projected births in 2015-2030 to estimated births in 2000-2015 by the level of under-five mortality in 2010-2015, 201 countries or areas

Under-five mortality rate in 2010-2015 (deaths per 1,000 live births)

*Countries or areas with total population greater than 90,000 in 2015.

Data source: United Nations (2015). World Population Prospects: The 2015 Revision.

The regional trends in the numbers of births and anticipated future progress in reducing under-five mortality rates are expected to lead to an increasing concentration of global child deaths in Africa (figure 7). Over the period 2010-2015, a majority of child deaths globally (52 per cent) occurred in Africa, up from 46 per cent in 2000-2005. Africa was followed by Asia, with 43 per cent of global child deaths in 2010-2015. Fifteen years later, in 2025-2030, the share of global child deaths in Africa is anticipated to grow to 60 per cent and the share of child deaths in Asia is projected to fall to 35 per cent.

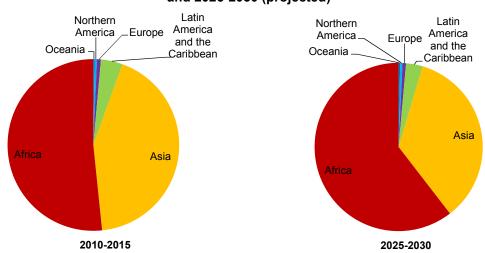


Figure 7. Distribution of child deaths (under age 5) by region, 2010-2015 (estimated) and 2025-2030 (projected)

Data source: United Nations (2015). World Population Prospects: The 2015 Revision.

Preventing mortality among the world's present and future children hinges on continued success in delivering proven life-preserving interventions to address the specific health risks children face. Infants and children need quality health care in the form of primary health screenings, vaccinations, oral rehydration therapy, nutritional support, and antibiotics, when indicated. Critically, the countries with the highest rates of increase in the number of births also tend to be those that still struggle to deliver adequate care to infants and children. The coverage of measles immunizations among 1-year-olds is a key indicator of the health care children receive and was used to monitor progress towards MDG4 – to reduce child mortality. Figure 8 shows the ratio of the number of births projected during 2015-2030 to estimated births during 2000-2015, against the proportion of 1-year-olds immunized against measles in 2013.

More than half of the countries where less than three-quarters of 1-year-olds were immunized against measles in 2013 are projected to see 20 per cent or more births in 2015-2030 compared to 2000-2015. Immunization programmes must be scaled up in these countries in order not only to make up for current shortfalls in coverage, but also to prepare for the increasing demand posed by growing numbers of births in the coming years. The challenge will be particularly great in Equatorial Guinea and in Somalia, where less than half of 1-year-olds had

received a measles vaccination in 2013 and where the number of births in the coming 15 years is projected to be 28 and 33 per cent greater, respectively, than in the previous 15 years. Numerous other countries face a similar challenge, including several in sub-Saharan Africa, but also Iraq and Timor-Leste in Asia and Papua New Guinea in Oceania. In contrast, in Haiti, where measles immunization covered just 65 per cent of 1-year-olds in 2013, there is an opportunity to scale up vaccination programmes to close that gap without having to simultaneously accommodate increasing demand, given that the number of births anticipated over the near future in Haiti is slightly fewer than the number of births over the recent past. South Africa and India, with 66 per cent and 74 per cent, respectively, of 1-year-olds vaccinated against measles in 2013, are also presented with an opportunity to expand vaccination coverage in a context of declining numbers of births.

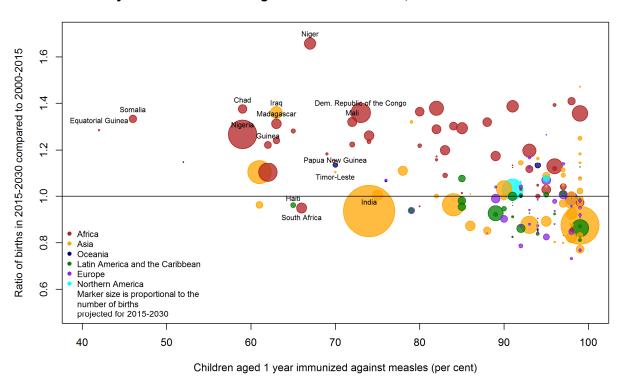


Figure 8. Ratio of projected births in 2015-2030 to estimated births in 2000-2015 by the proportion of 1-year-olds immunized against measles in 2013, 183 countries or areas

Data sources: United Nations (2015). World Population Prospects: The 2015 Revision and the 2015 Millennium Development Goals Indicators database.

Among the interventions needed to protect and preserve the health of young children, immunizations are some of the easiest and least costly to provide, in part because each child needs to be reached only two or three times for each vaccination series¹. Other interventions can be more difficult or costly to provide as they require ongoing access and support throughout

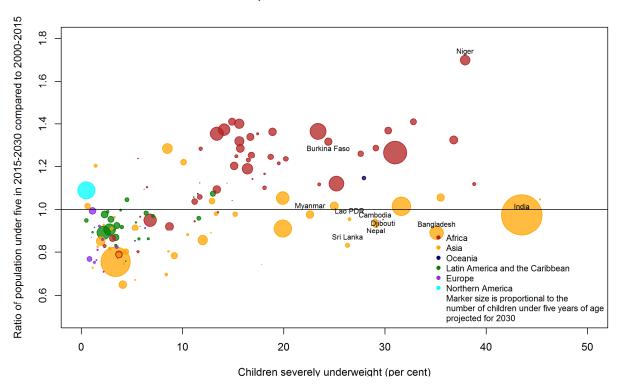
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^{*}Included countries or areas met the following criteria: 1) population greater than 90,000 in 2015; and 2) estimate of measles immunization coverage available for 2013.

¹ see WHO recommendations for recommended routine immunization schedules: http://www.who.int/immunization/policy/Immunization_routine_table2.pdf?ua=

childhood. The challenges posed by increasing numbers of births to efforts to deliver repeated or continuous interventions to children is illustrated in the prevalence of child hunger. Figure 9 shows the ratio of the projected number of children under five years of age in 2030 to the estimated number in 2015 against the proportion of children under 5 who were severely underweight in the most recent year for which data are available in the MDG Indicators database.²

Figure 9. Ratio of projected number of children under five in 2030 to estimated number of children under five in 2015 by the proportion of children severely underweight (most recent estimate since 2000), 137 countries or areas.



*Included countries or areas met the following criteria: 1) population greater than 90,000 in 2015; and 2) estimate of the proportion of children severely underweight available for the year 2000 or later.

Data sources: United Nations (2015). World Population Prospects: The 2015 Revision and the 2015 Millennium Development Goals Indicators database.

In 26 countries, more than one in five children was severely underweight at the most recent data point measured. In ten of those countries the number of children under five years of age is projected to increase by more than 20 per cent between 2015 and 2030. In Burkina Faso, for example, where 24.4 per cent of children were severely underweight in 2012, the number of children under five is projected to increase by 32 per cent, from 3.1 million children in 2015 to 4.1 million children in 2030. Achieving progress towards reducing hunger in Burkina Faso thus depends not only on feeding the approximately 750,000 children that lack adequate nutrition

14

² Estimates of the proportion of children severely underweight refer to the year 2000 or later. For half of countries, the most recent estimate available refers to 2010 or later.

today, but also meeting the nutritional needs of an additional one million children in the coming years. Niger is also especially challenged in this regard: 37.9 per cent of the 4.1 million children under 5 years of age are severely underweight, and the number of children is projected to grow by 70 per cent over the coming 15 years, such that the country will need to ensure adequate nutrition to 7.0 million children under five in 2030.

At the same time, owing to reduced fertility rates, several countries with high proportion of severely underweight children will soon have an opportunity to ensure adequate nutrition to their children without simultaneously facing a growing number of young mouths to feed. In India, for example, 43.5 per cent of children under five were severely underweight, implying approximately 53 million undernourished children in 2015. But recent reductions in fertility in India, from close to 6 children per woman in the 1950s to around 2.4 in 2015, mean that the projected number of children under five in 2030 is 3 per cent smaller than the number in 2015. India thus has an opportunity to reach a larger proportion of children with any expansion of nutrition programmes. Other countries are similarly positioned to improve the nutrition available to their young children without needing to serve a growing population of children under five, such as Bangladesh, Cambodia, Djibouti, Lao People's Dem. Republic, Myanmar, Nepal, and Sri Lanka.

IV. Preparing for the next two billion school-aged children

Between 2015 and 2030 close to two billion children will celebrate their 5th birthdays. Parents, communities and Governments strive to meet the needs of children, chief among them access to high-quality education. The two billion new primary school-aged children anticipated globally over the next 15 years represent 29 million more 5-year-old children than required entry to primary school during 2000-2015 (table 2). Almost all of these additional children will reside in Africa, the region with the lowest primary school enrollment ratio in the world. Indeed, the projected number of children turning five over the next 15 years in Africa, at 587 million, is 25 per cent greater than the number of children who turned five over the previous 15 years, portending greatly increased demands coming to school systems in the region.

Table 2. Children turning 5-years-old by region, 2000-2015 and 2015-2030

	Children	Children			
	turning 5	turning five		Distribution	Distribution
	over the	over the	Ratio of	of 5-year-	of 5-year-
	period 2000-	period 2015-	2015-	olds in 2000-	olds in 2015-
	2015	2030	2030/2000-	2015 (per	2030 (per
	(millions)	(millions)	2015	cent)	cent)
World	1982.0	2010.9	1.01	100.0	100.0
Africa	468.5	587.2	1.25	23.6	29.2
Asia	1135.9	1071.9	0.94	57.3	53.3
Europe	120.7	116.5	0.97	6.1	5.8
Latin America and the Caribbean	177.7	156.6	0.88	9.0	7.8
Northern America	69.8	68.5	0.98	3.5	3.4
Oceania	9.3	10.1	1.09	0.5	0.5

Data source: United Nations (2015). World Population Prospects: The 2015 Revision.

Oceania also is expected to see an increase in the number of primary school-aged children, with 9 per cent more 5-year-olds projected over the coming 15 years relative to the previous 15 years. The number of 5-year-olds projected over 2015-2030 is smaller than the number over 2000-2015 in Asia, in Europe, in Latin America and the Caribbean and in Northern America. The Latin America and the Caribbean region is projected to see the largest decline in the number of children turning five (12 per cent), from 178 million in 2000-2015 to 157 million in 2015-2030, suggesting a likely reduction in future demands placed on primary school systems in the region.

Figure 10 illustrates the challenge to be faced by many countries in Africa where the numbers of primary school-aged children are growing in the context of still weak education systems. It shows the ratio of the projected number of children turning five over the period 2015-2030 to the estimated number who turned five in 2000-2015 against the proportion of primary school-aged children enrolled in school in or around 2013.³ This indicator was among those used to monitor progress towards MDG2, to achieve universal primary education, and it will likely be among the indicators chosen to assess progress towards the fourth SDG, to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

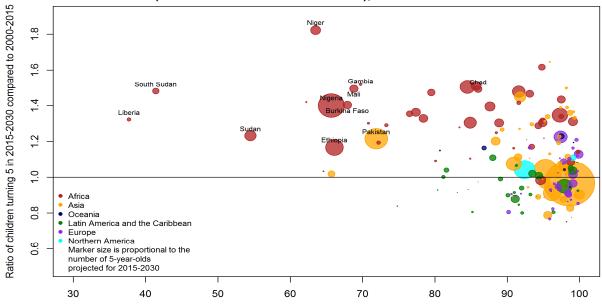
According to the most recent estimates, in 21 countries less than 80 per cent of primary school-aged children were enrolled in school. Three-quarters of these low-enrollment countries are projected to see growth in the number of 5-year-olds in excess of 20 per cent and in one-third of low-enrolment countries, the number of 5-year-olds will increase by more than 40 per cent. Liberia and South Sudan face a particularly critical situation with respect to increasing primary school enrolment over the near future. Current enrolment is especially low in these two countries – less than half of primary school aged children are enrolled according to the most recent estimates – and the number of children in need of schooling is growing rapidly. In Liberia, the number of 5-year-olds over 2015-2030 is projected to be 32 per cent greater than in 2000-2015, and the corresponding projected increase for South Sudan is 48 per cent.

While the current level of primary school enrolment is instructive to understand the challenges facing many countries in improving their children's education, it provides only a partial picture of children's access to inclusive and equitable quality education. To understand how well children are learning, one can look to the literacy rates among young people in a country. Similar to figure 10, figure 11 shows the ratio of the projected number of children turning five over 2015-2030 to the number who turned five over 2000-2015, this time against the percentage of the 15-24-year-olds in a country who are literate⁴. In 31 countries, less than 80 per cent of 15-24-year-olds were literate according to the most recent data available, indicating that the educational system was leaving a substantial proportion of the population behind whether with respect to access or with respect to quality. More than 70 per cent of these low-literacy countries are projected to see an increase in the number of 5-year-olds of more than 20 per cent and more than one-third of low-literacy countries will see an increase of more than 40 per cent over the next 15 years, including Angola, Burkina Faso, Chad, the Democratic Republic of the Congo, Gambia, Mali, Niger, Nigeria, Senegal, the United Republic of Tanzania and Zambia.

³ Primary school enrolment estimates refer to the year 2003 or later. For half of countries, the most recent estimate available refers to 2013 or later.

⁴ Literacy estimates refer to the most recent year available since 2000. For half of the countries, the estimate refers to the year 2011 or later.

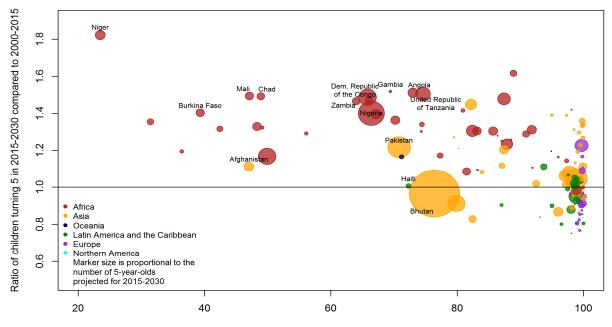
Figure 10. Ratio of projected number of children turning 5 in 2015-2030 to estimated number of children turning 5 in 2000-2015 by the proportion of primary school aged children enrolled in school (most recent estimate since 2003), 167 countries or areas



Children of primary school age enrolled in school (per cent)

*Included countries or areas met the following criteria: 1) population greater than 90,000 in 2015; and 2) estimate of primary school enrolment available for the year 2003 or later.

Figure 11. Ratio of projected number of children turning 5 in 2015-2030 to estimated number of children turning 5 in 2000-2015 by the percentage of 15-24 year-olds literate (most recent estimate since 2000), 143 countries or areas.



Percentage literate among 15-24 year-olds

*Included countries or areas met the following criteria: 1) population greater than 90,000 in 2015; and 2) estimate of literacy rates among 15-24-year-olds available for the year 2000 or later.

Data sources: United Nations (2015). World Population Prospects: The 2015 Revision and the 2015 Millennium Development Goals Indicators database.

Some low-literacy countries, owing to a comparatively stable population of primary school-aged children, are confronted with an opportunity to improve access to and quality of education without having to simultaneously serve growing numbers of children. In Afghanistan, for example, where just 47 per cent of the population aged 15-24 was literate in 2011, the number of children turning five in 2015-2030 is projected to be just 11 per cent greater than the number who turned five in 2000-2015. In Haiti, the number of children turning five over the next 15 years is projected to be less than one per cent greater than over the previous 15 years, offering the country an opportunity to improve its literacy rate, which was 72.3 per cent among the population aged 15-24 in 2006. In Bhutan, the number of 5-year-olds over 2015-2030 is projected to be 11 per cent smaller than in 2000-2015, a trend which could help the country to improve its literacy rate from 74.4 per cent in 2005.

V. Preparing for the next two billion adolescents and youth

Between 2015 and 2030 1.9 billion children will enter their youth, i.e. turn 15 years old. The projected number of new youth over the next 15 years globally is two per cent smaller than the number who turned 15 years of age during the previous 15 years. However, there are substantial differences across regions in the trends in the numbers of adolescents and youth. The number of youth turning 15 years old during 2015-2030 is projected to be greater relative to 2000-2015 in Africa and in Oceania, and smaller in the remaining regions (table 3). In Africa, a projected 474 million youth will turn 15 years old during 2015-2030, which represents a 31 per cent increase over the 361 million youth that turned 15 during 2000-2015. A smaller increase in the number of new youth is projected for Oceania, at 9 per cent. Europe is the region with the largest projected decline in the number of people entering their youth; the 117 million projected new 15-year-olds during 2015-2030 is 14 per cent less than the 137 million who turned 15 during 2000-2015. Asia, Latin America and the Caribbean, and Northern America are anticipated to see declines in the numbers turning 15 of 10 per cent, 8 per cent, and 6 per cent, respectively. More than half (56 per cent) of youth turning 15 years old over the period 2015-2030 will reside in Asia, while one-quarter will reside in Africa.

Table 3. Youth turning 15 years old by region, 2000-2015 and 2015-2030

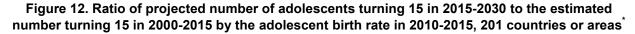
	Youth turning 15 over the	Youth turning 15 over the	Ratio of	Distribution of 15-year-	Distribution of 15-year-
	period 2000-2015 (millions)	period 2015-2030 (millions)	2015- 2030/2000- 2015	olds in 2000-2015 (per cent)	olds in 2015-2030 (per cent)
World	1945.7	1898.9	0.98	100.0	100.0
Africa	360.7	474.2	1.31	18.5	25.0
Asia	1188.3	1066.0	0.90	61.1	56.1
Europe	136.7	117.2	0.86	7.0	6.2
Latin America and the Caribbean	176.9	161.9	0.92	9.1	8.5
Northern America	74.3	70.0	0.94	3.8	3.7
Oceania	8.8	9.6	1.09	0.5	0.5

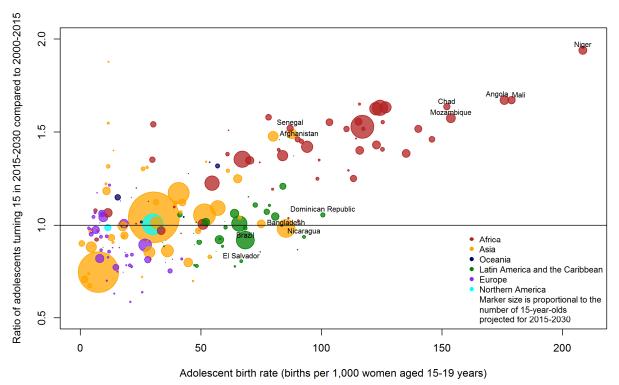
Data source: United Nations (2015). World Population Prospects: The 2015 Revision.

Adolescence and youth is a period of growth and change, during which young people begin to explore their identities and assert their independence. Although adolescents and youth usually have low mortality rates compared to other age groups, they face particular health and mortality risks, most of which are preventable. For example, many young people engage in behaviours that pose substantial risks to their health and well-being. Some adolescents and youth become sexually active, exposing themselves to the risks of early pregnancy and sexually transmitted infections (STIs), including HIV (WHO, 2014). Others begin to experiment with tobacco, alcohol, or harmful drugs, with potential consequences not only for their present wellbeing, but also for their health later on in adulthood. Many youth begin to operate vehicles and their inexperience and risk tolerance contributes to higher rates of road-traffic fatalities, especially for young men (WHO, 2013; Patton, 2011). The dietary and physical activity habits established during adolescence and youth are known to extend into adulthood, with powerful implications for the risks of developing non-communicable diseases (NCDs) later on in life (Sawyer et al., 2012). Thus in addition to high-quality secondary education, adolescents and youth are in need of health education, including sexuality education, so that they can obtain the knowledge and tools they need to protect their present and future health and well-being.

Many of the countries that will see the largest increases in the number of adolescents and youth between 2015 and 2030 are already struggling to address their health needs, particularly with respect to reproductive health. Figure 12 shows the ratio of the projected number of adolescents turning 15 in 2015-2030 to the number turning 15 in 2000-2015 against the birth rate among adolescent girls aged 15-19 years (the "adolescent birth rate" or ABR) in 2010-2015. In 83 countries the adolescent birth rate in 2010-2015 exceeded 50 per 1,000. A majority (60 per cent) of these high-ABR countries will see a more than 20 per cent increase in the number of adolescents during the coming 15 years and more than one-third of high-ABR countries will see a more than 40 per cent increase in the number of youth entering the reproductive ages. Of the 25 countries with very high adolescent birth rates in 2010-2015, with more than 100 births per 1,000 women aged 15-19 years, a large majority (84 per cent) will need to serve at least 40 per cent more adolescents during 2015-2030 than during 2000-2015.

Niger, Mali, Angola, Mozambique and Chad stand out both for their very high adolescent birth rates – greater than 150 births per 1,000 women aged 15-19 years – and for their substantial growth in the number entering adolescence over the next 15 years, with projected increases of more than 50 per cent. Afghanistan and Senegal also have high rates of fertility among adolescents, at 88 and 87 births per 1,000 women aged 15-19, respectively, and both countries are projected to see a 50 per cent increase in the number of adolescents. Adolescent mothers face a number of challenges - they tend to be poorer, have lower levels of education and their children are more likely to suffer ill health (WHO, 2012) – underscoring the urgency for those countries that are facing rapid growth in the population of adolescents to prepare to provide family planning information and services and reproductive health care to growing numbers of young people. Several countries with relatively high adolescent fertility rates—such as Bangladesh, El Salvador, Brazil, the Dominican Republic and Nicaragua—are projected to experience little to no increase, or even a decline, in the number entering adolescence over the coming 15 years. These countries are well-positioned from a demographic perspective to meet the needs of their adolescents by scaling up programmes without having to plan for a growing population in need of services.





*Countries or areas with population greater than 90,000 in 2015.

Data source: United Nations (2015). World Population Prospects: The 2015 Revision.

Rapid growth in the numbers of adolescents and youth is likely to challenge progress in combatting HIV/AIDS, particularly in countries with generalized HIV epidemics. Indeed, a significant number of the countries presently struggling to reverse generalized HIV epidemics are experiencing rapid growth in the numbers of adolescents and youth, meaning that an increasing amount of resources are needed in order to maintain and expand coverage of HIV prevention and treatment services to young people. This is especially true for the countries with medium-level generalized epidemics, with between 5 and 15 per cent of the adult population living with HIV. Figure 13 shows the ratio of the projected population aged 15-24 years in 2030 to the estimated population aged 15-24 in 2015 against the HIV prevalence among the population aged 15-49 years in 2013. Of the seven countries where adult HIV prevalence was between 5 and 15 per cent in 2013, all but one will be challenged to provide services to at least 30 per cent more adolescents and youth in 2030 than they needed to serve in 2015, and four are anticipated to see the numbers of adolescents and youth grow by more than 50 per cent. However, in the countries with the highest HIV prevalence – Botswana, Lesotho, South Africa and Swazilandthe number of adolescents and youth in 2030 is projected to grow only modestly compared to 2015. Thus, while these countries will certainly face many challenges as they strive to treat those living with HIV and prevent the spread of the disease, they will not be additionally challenged by increasing demand from rapidly growing numbers of adolescents and youth.

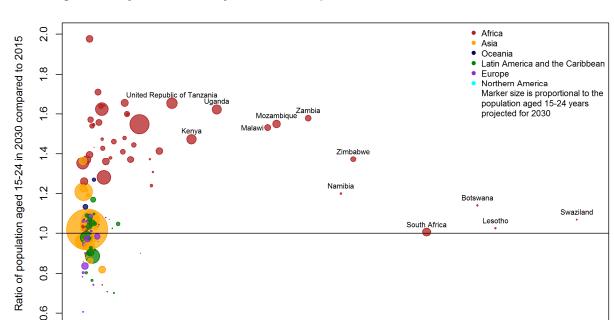


Figure 13. Ratio of the projected population aged 15-24 years in 2030 to the estimated population aged 15-24 years in 2015 by the adult HIV prevalence in 2013, 117 countries or areas*

*Included countries or areas met the following criteria: 1) population greater than 90,000 in 2015; and 2) estimate of adult HIV prevalence available for 2013.

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Data sources: United Nations (2015). World Population Prospects: The 2015 Revision and the 2015 Millennium Development Goals Indicators database.

15

Adult HIV prevalence in 2013 (per cent)

20

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Adolescents and youth can be a positive force for development when they are provided the knowledge and opportunities they need to thrive. In particular, young people need the education and skills required to contribute to the productive economy, and they need access to a jobs market that is able to absorb them into its labour force. One of the greatest challenges facing many countries today, including some in the developed regions as well as some in the less developed regions, is extremely high unemployment rates among youth. Youth unemployment hinders social and economic development today, and also in the future since youth who get a delayed start into the labour force tend to continue to lag behind in terms of earnings and income growth once they do become employed (Gregg and Tominey, 2005). When countries already facing high levels of youth unemployment are also anticipating large growth in the numbers of youth entering the labour force, they are doubly challenged to ensure progress towards full and productive employment and decent work for all, which was one of the targets under MDG1 and is highlighted in the eighth SDG.

Globally, the number of youth aged 15-24 years is projected to increase by 8 per cent over the next 15 years, from nearly 1.2 billion in 2015 to close to 1.3 billion in 2030 (table 4). Africa is the region with the largest projected relative growth in the number of youth, with the number aged 15-24 years expected to increase by 44 per cent between 2015 and 2030. Africa is followed by Oceania, with a 15 per cent projected increase in the number of youth over the next

15 years. The number of youth is projected to decline somewhat between 2015 and 2030 in Asia, in Latin America and the Caribbean, and in Northern America, while in Europe it is projected to remain relatively unchanged. In 2030, one in four youth aged 15-24 worldwide will reside in Africa, up from around one in five youth in 2015, and Africa is the only region that will house a growing share of the world's youth. The global share of youth residing in each of the five other regions will decline. While Asia is expected to continue to be home to a majority (55.5 per cent) of those aged 15-24 years in 2030, that share represents a reduction from the 60 per cent of the world's youth who resided in Asia in 2015.

Table 4. Youth aged 15-24 years by region, 2015 and 2030

	Youth aged 15-24 in 2015	Youth aged 15-24 in 2030	Ratio of	Distribution of youth in 2015	Distribution of youth in 2030
	(millions)	(millions)	2030/2015	(per cent)	Per
World	1193.6	1286.3	1.08	100.0	100.0
Africa	229.6	331.4	1.44	19.2	25.8
Asia	718.5	713.4	0.99	60.2	55.5
Europe	81.1	81.0	1.00	6.8	6.3
Latin America and the Caribbean	109.9	105.3	0.96	9.2	8.2
Northern America	48.6	48.4	0.99	4.1	3.8
Oceania	5.9	6.8	1.15	0.5	0.5

Data source: United Nations (2015). World Population Prospects: The 2015 Revision.

Some countries that are anticipating rapid growth in the numbers of youth are among those that already have very high youth unemployment rates. Figure 14 shows the ratio of the projected number of youth aged 15-24 years in 2030 to the estimated number of youth in 2015 against the unemployment rate among 15-24-year-olds in 2015 based on International Labor Organization (ILO) projections. Notably, there is great heterogeneity in both the youth population ratio and the youth unemployment rate within and across regions and countries, underscoring the need for countries to incorporate demographic projections along with their own specific economic and social contexts into development planning. In several countries where the youth unemployment rate is very high, above 30 per cent, the youth population is expected to grow by more than 20 per cent over the coming 15 years. Selected examples include Saudi Arabia, Iraq and Egypt. In contrast, a number of countries—such as South Africa, Spain and Greece—face extremely high youth unemployment, with rates above 50 per cent, but are projected to see less or even negative growth among the youth population.

Even in countries where youth unemployment rates are comparatively low, growth in the numbers of youth over the coming years could stress labour markets and challenge sustainable development if those markets are unable to absorb rapidly increasing numbers of young workers. In Mali, for example, though the youth unemployment rate in 2015, at just under 11 per cent, is substantially lower than in many other countries, the number of youth aged 15-24 is projected to increase by 71 per cent between 2015 and 2030. Thus Mali's economy will need to grow to accommodate a substantially larger young labour force. Nigeria and Zambia, with youth unemployment rates of 14 per cent and 24 per cent respectively in 2015, are each projected to see their youth populations grow by nearly 60 per cent over the next 15 years. If those youth are

provided with sufficient education, training and jobs, then the growth in their numbers could be highly beneficial for development, but if they are instead absorbed into the numbers of unemployed, the growth in the numbers of youth will pose a great challenge to efforts to achieve economic growth and reduce poverty, and could prove socially or politically destabilizing as well (Urdal, 2012).

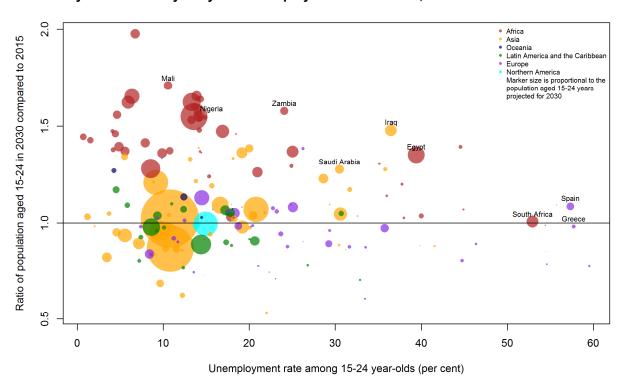


Figure 14. Ratio of projected number of youth aged 15-24 in 2030 to the estimated number of youth in 2015 by the youth unemployment rate in 2015, 178 countries or areas

Data sources: United Nations (2015). World Population Prospects: The 2015 Revision and ILO (2015). World Employment and Social Outlook – Trends 2015.

When a population experiences sustained reductions in fertility rates, there is a window of time during which the share of the population that are children declines and the share in the working ages grows. Demographers and economists have long heralded the potential of the so-called "demographic dividend", an opportunity that arises during this window, wherein a growing proportion of working-aged people, traditionally defined as ages 15-64 years, can spur economic growth (Mason, 2005). When the growth of the number of youth, discussed above, accompanies fertility decline, it can signal the beginning of a demographic dividend opportunity. Most of the countries anticipated to see rapid growth in the numbers of youth between 2015 and 2030 are located in Africa, and this is the only major region projected to see increases in the working-aged share of the total population over the next 15 years.

^{*}Included countries or areas met the following criteria: 1) population greater than 90,000 in 2015; and 2) estimate of youth unemployment rate available for 2015.

Figure 15 shows the percentage of the population aged 15 to 64 years in each of the six regions from 1970 and projected to 2030. In Europe, in Northern America and in Oceania regions where fertility decline began during the 19th and early 20th centuries – more than 60 per cent of the population in 1970 was in the working ages 15-64 years. The working-aged share in those regions increased only moderately to 2010 and it has begun to decline since, as sustained low fertility has led to population ageing. In contrast, in Asia, in Latin America and the Caribbean, and in Africa, the proportion in the working ages in 1970 was smaller, ranging between 52 and 56 per cent. Fertility reductions over the latter half of the 20th century both in Asia and in Latin America and the Caribbean then produced rapid increases in the proportion in the working ages, to more than 66 per cent in 2015. Countries like the Republic of Korea and Singapore were enormously successful at leveraging the economic growth potential offered by that demographic shift, in part by accelerating the accumulation of human capital and rapidly expanding their industrial sectors (Mason and Kinugasa, 2008). Other countries, such as Thailand and Brazil have also experienced a boost to economic growth fueled by the jump in the population of working ages (Gribble and Bremmer, 2012), but in many parts of Latin America inadequate investment in education and a lack of employment prospects have limited countries' ability to leverage the economic growth potential offered by favourable demographic shifts (Lee and Mason, 2011).

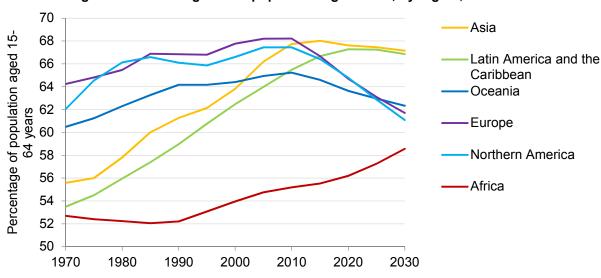


Figure 15. Percentage of the population aged 15-64, by region, 1970-2030

Data source: United Nations (2015). World Population Prospects: The 2015 Revision.

The share of the population in working ages both in Asia and in Latin America and the Caribbean is close to its peak (although the situation in some individual countries within those regions may differ somewhat), and is projected to remain fairly stable or begin to decline by 2030 as population ageing accelerates in those regions. In stark contrast, more recent fertility declines in Africa mean that the region's demographic window of opportunity has only recently begun. The share in the working ages in Africa fell slightly from 52.4 per cent in 1970 to 52.2

per cent in 1990 and has since risen to 55.5 per cent in 2015. Africa is the only region where the share of the working-aged population is projected to continue to rise over the next 15 years: it could reach close to 59 per cent by 2030 according to the latest projections for the region. In order to take advantage of the economic growth opportunity offered by the demographic dividend, however, countries in Africa must act urgently to improve their labour markets by increasing human capital through education and training, as well as by aggressively promoting job creation (World Bank, 2015b).

VII. Preparing for the next billion women of reproductive age

We have already seen that a projected 1.9 billion young people will enter the reproductive ages between 2015 and 2030. Roughly half of them are women, most of whom will become pregnant or give birth at some point during their lifetimes. Ensuring their access to reproductive health care and services is critical to continued progress towards numerous development goals, among them achieving gender equality and empowering women, improving maternal health, and reducing child mortality.

In 2015, there were close to 1.9 billion women aged 15-49 years worldwide, and by 2030 their number is projected to grow to 2.0 billion, an increase of 9 per cent (table 5). Again, Africa is the region that will see the most growth in the population of reproductive age, with 47 per cent more women aged 15-49 years in 2030 compared to 2015. In 2030, one in five women of reproductive age worldwide will reside in Africa.

Table 5. Women aged 15-49 years by region, 2015 and 2030

	Women	Women		Distribution	Distribution
	aged 15-49	aged 15-49		of women	of women
	years in	years in		aged 15-49	aged 15-49
	2015	2030	Ratio of	in 2015 (per	in 2030 (per
	(millions)	(millions)	2030/2015	cent)	cent)
World	1858.6	2031.4	1.09	100.0	100.0
Africa	284.3	417.9	1.47	15.3	20.6
Asia	1144.4	1183.3	1.03	61.6	58.3
Europe	168.9	151.0	0.89	9.1	7.4
Latin America and the Caribbean	169.7	181.6	1.07	9.1	8.9
Northern America	81.7	86.6	1.06	4.4	4.3
Oceania	9.5	11.0	1.16	0.5	0.5

Data source: United Nations (2015). World Population Prospects: The 2015 Revision.

Most other regions are projected to experience growth in the numbers of women of reproductive age over the next 15 years. The population of women aged 15-49 years is expected to grow by 16 per cent in Oceania, by 7 per cent in Latin America and the Caribbean, by 6 per cent in Northern America and by 3 per cent in Asia. Only Europe is projected to see a reduction in the numbers of women of reproductive age: there were 169 million women aged 15-49 in 2015, but only 151 million projected for 2030, a decline of 11 per cent.

A majority of the countries that are projected to have large increases in the population of reproductive age over the next 15 years tend also to have relatively high levels of fertility. Figure 16 shows the ratio of the projected female population aged 15-49 years in 2030 to the estimated number of women aged 15-49 in 2015 against the total fertility rate in 2010-2015. In 72 countries the number of women of reproductive age is projected to grow more than 20 per cent between 2015 and 2030. Two-thirds of these countries had total fertility rates greater than 4 children per woman in 2010-2015, and in one-quarter of the countries, total fertility was greater than 5 children per woman. All but six of the 47 countries with total fertility greater than 4 children per woman in 2010-2015 and at least a 20 per cent increase in the number of women of reproductive age are located in Africa; five are in Asia and one is in Oceania.

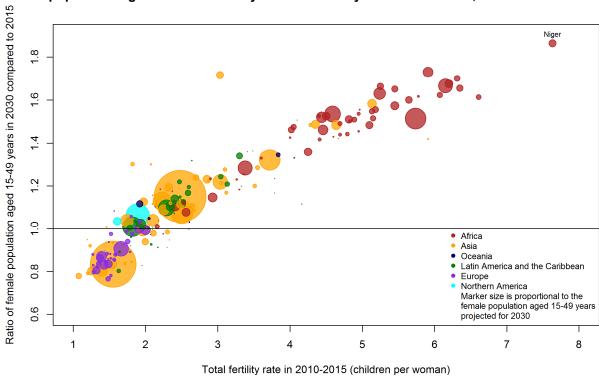


Figure 16. Ratio of the projected female population aged 15-49 years in 2030 to the estimated female population aged 15-49 in 2015 by the total fertility rate in 2010-2015, 201 countries or areas

*Countries or areas with population greater than 90,000 in 2015.

Data source: United Nations (2015). World Population Prospects: The 2015 Revision.

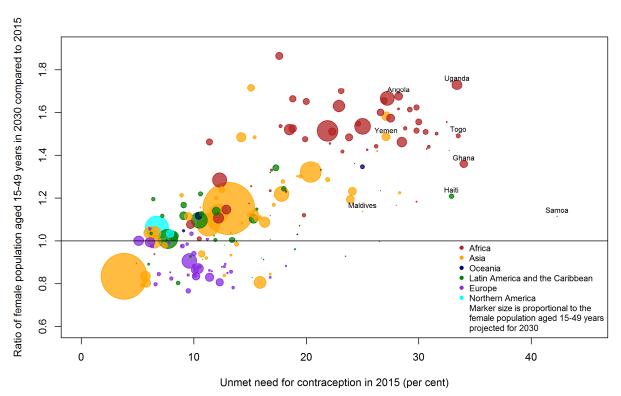
Rapid growth in the population of reproductive age combined with high levels of fertility produces the rapid growth in the number of births discussed earlier in this report. In Niger, for example, the projected 86 per cent increase in the female population of reproductive age combined with total fertility of 7.6 children per woman yields the projected 66 per cent increase in the number of births projected in the country, shown previously in figure 4.

Enabling women to have the number of children they wish and to choose the timing of their pregnancies entails ensuring that all women have access to family planning information and tools, including a broad range of contraceptive options. When women who are exposed to the risk of pregnancy but do not wish to become pregnant are not using any method to prevent

pregnancy, they are said to have an unmet need for contraception (United Nations, 2013). Many of the countries that are projected to see the largest growth in the population of women of reproductive age over the next 15 years are the same countries where unmet need is high. These countries will be especially challenged to increase access to family planning in the coming years since the numbers of women in need of family planning will continue to grow.

Figure 17 shows the ratio of the projected female population aged 15-49 years in 2030 to the estimated female population aged 15-49 in 2015 against the level of unmet need for contraception projected for 2015. In Uganda, 33.4 per cent of women had unmet need for contraception and the country is projected to experience a 73 per cent increase in the number of women of reproductive age between 2015 and 2030. Uganda thus must expand its family planning programmes in the coming years in order to even just maintain the current level of unmet need. For Uganda to reduce the level of unmet need, family planning efforts must be scaled up even more. Angola, Yemen, Togo, Ghana and Haiti are among those countries facing a similar situation of high levels of unmet need for contraception within a context of substantial growth of the population of reproductive age. According to United Nations estimates, unmet need for contraception exceeds 20 per cent in 52 countries in 2015. In a majority of these countries (67 per cent) the female population of reproductive age is projected to grow by more than 40 per cent between 2015 and 2030.

Figure 17. Ratio of the projected female population aged 15-49 years in 2030 to the estimated female population aged 15-49 in 2015 by the unmet need for contraception in 2015, 185 countries or areas.*



*Included countries or areas met the following criteria: 1) population greater than 90,000 in 2015; and 2) estimate of the unmet need for contraception available for 2015.

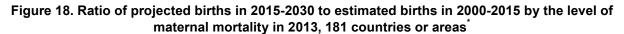
Data sources: United Nations (2015). World Population Prospects: The 2015 Revision and United Nations (2015). Model-based Estimates and Projections of Family Planning Indicators 2015.

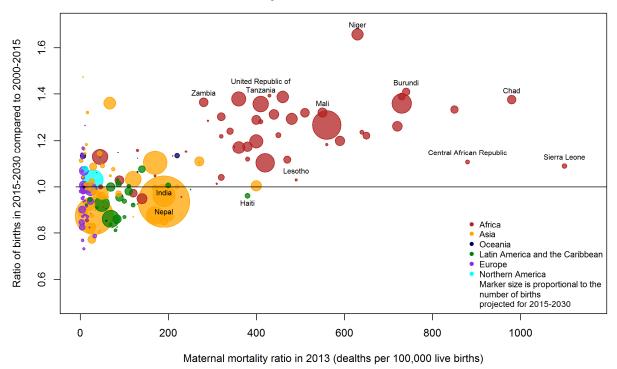
In a few countries with high levels of unmet need for contraception the projected growth of the population of reproductive age is modest, thus offering an opportunity to substantially reduce the levels of unmet need with strategic investments in family planning. In Samoa, 43 per cent of women had unmet need for contraception in 2014 and the number of women of reproductive age is expected to grow by just 12 per cent between 2015 and 2030. Unmet need is also relatively high in the Maldives, where 26 per cent of women's need for contraception was unmet in 2014, and the country is expected to see 14 per cent growth in the number of women of reproductive age over the next 15 years.

MDG5 aimed to improve maternal health and set specific targets for the reduction of maternal mortality and the expansion of maternity care. Safeguarding maternal health is also a key component of the third SDG, which aims to ensure healthy lives and promote well-being for all at all ages. While most countries have achieved progress in reducing the maternal mortality ratio (MMR), defined as the number of maternal deaths per 100,000 live births, maternal risks remain high in many countries, particularly in sub-Saharan Africa. With each pregnancy and delivery, a woman is exposed to the risks of maternity-related complications, some of which can be fatal. Lives can be saved, however, when the necessary interventions are available, including family planning, antenatal care, skilled birth attendance, emergency obstetric services, and by eliminating unsafe abortion.

Countries that continue to experience high rates of maternal mortality must scale up their maternal care and services in order to reach larger numbers of women at risk. This task is made more difficult in the context of a rapidly increasing number of births, which corresponds to an increase in demand for maternal health care. Figure 18 shows the ratio of the projected number of births in 2015-2030 to the estimated number of births in 2000-2015 against the MMR in 2013. In 52 countries there were more than 200 maternal deaths per 100,000 live births in 2013. A large majority (83 per cent) of these countries with high maternal mortality risks are located in Africa; five are in Asia; three in Latin America and the Caribbean; and one in Oceania. Half of the countries with MMR greater than 200 in 2013 are projected to see the number of births in 2015-2015 increase by more than 20 per cent relative to 2000-2015. Examples of countries with both high MMR and rapid growth in the number of births include Mali, Zambia, Burundi, Niger and the United Republic of Tanzania. Chad is yet another example, where there were 980 maternal deaths per 100,000 live births in 2013 and the number of births projected for 2015-2030 is 37 per cent greater than the number in 2000-2015.

In some countries where the growth in the number of births over the next 15 years relative to the previous 15 years is projected to be modest, there may be an opportunity to achieve substantial reductions in maternal mortality in the coming years. Sierra Leone had the highest MMR in the world in 2013, with 1,100 maternal deaths per 100,000 live births, but the country is expected to see relatively little growth in the number of births – a 9 per cent increase in 2015-2030 compared to 2000-2015. The Central African Republic faces a similar situation, with 880 maternal deaths per 100,000 live births and a projected 11 per cent increase in the number of births over the next 15 years compared to the past. Numerous other countries with high, but less extreme, levels of maternal mortality in 2013 may also have a demographic opportunity to accelerate reductions in MMR, such as India, Nepal, Haiti and Lesotho.





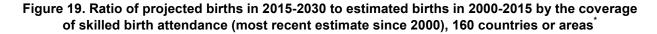
*Included countries or areas met the following criteria: 1) population greater than 90,000 in 2015; and 2) estimate of the maternal mortality ratio available for 2013.

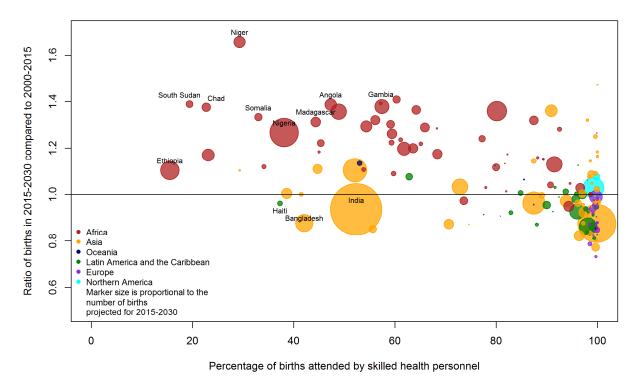
Data sources: United Nations (2015). World Population Prospects: The 2015 Revision and the 2015 Millennium Development Goals Indicators database.

The presence of a skilled health worker during the birth of a child is a critical piece of the maternity care needed to reduce the health and mortality risks to both mother and child. Moreover, the proportion of births that are attended by a skilled health worker is an important indicator not only of the coverage of this vital service, but it has also been suggested as a proxy indicator for women's overall access to and utilization of delivery services. Many of the countries where only a minority of births is attended by skilled health personnel are projected to see substantial increases in the number of births over the coming years, which will place additional stress on already inadequate maternal health systems. Figure 19 shows the ratio of the projected number of births in 2015-2030 to the number of births during 2000-2015 against the proportion of births attended by skilled health personnel in a recent year. In 32 countries less than 60 per cent of births were attended by skilled health workers and in half of these, the number of births projected over the next 15 years is more than 20 per cent greater than the number of births over the previous 15 years.

29

⁵ Skilled birth attendance estimates refer to the most recent year available since 2000. For half of the countries, the estimate refers to the year 2012 or later.





*Included countries or areas met the following criteria: 1) population greater than 90,000 in 2015; and 2) estimate of skilled birth attendance available for the year 2000 or later.

Data sources: United Nations (2015). World Population Prospects: The 2015 Revision and the 2015 Millennium Development Goals Indicators database.

Countries like Angola, Chad, Gambia, Madagascar, Niger, Nigeria, Somalia and South Sudan must seek to rapidly expand the availability of skilled health personnel to attend a growing number of deliveries and protect the health of mothers and their children, making up for existing gaps and preparing for the projected increases in demand. In other countries where skilled birth attendance coverage is low, but the number of births will stay flat or decline—such as Bangladesh, Haiti and India—skilled birth attendance programmes can be scaled up to make up for existing shortfalls without having simultaneously to address increases in demand over the coming years. Ethiopia is projected to see a 10 per cent increase in the number of births in 2015-2030 compared to 2000-2015, and while this growth is modest compared to many other countries, it could pose significant challenges to Ethiopia's efforts to expand access to skilled birth attendance and delivery care over the coming years, given that just 16 per cent of births were attended by skilled health personnel in 2014.

VIII. Preparing for the next billion older persons

Between 2015 and 2030 1.1 billion people will celebrate their 60th birthdays. By 2030 the total number of people aged 60 or over globally is projected have risen to 1.4 billion, from 901 million in 2015 (table 6). Older persons constitute the only major age category for which all of the world's regions will see substantial increases in the population over the coming 15 years (United Nations, forthcoming). In Latin America and the Caribbean, the number of people aged 60 years or older in 2030 is projected to be 71 per cent greater than in 2015. Asia's population of older persons is projected to grow by 66 per cent, Africa's by 64 per cent, Oceania's by 47 per cent, Northern America's by 41 per cent and Europe's by 23 per cent. Regional differences in the growth of the population of older persons mean that a growing proportion of older persons resides in the developing regions, especially in Asia. In 2015, 56 per cent of the world's population aged 60 years or over were in Asia, and that proportion is projected to rise to 60 per cent by 2030.

Table 6. Persons aged 60 years or over by region, 2015 and 2030

	Persons aged				
	60 years or older in	Persons aged 60 years or		Distribution of older	Distribution of older
	2015	over in 2030	Ratio of	persons in	persons in
	(millions)	(millions)	2030/2015	2015	2030
World	900.9	1402.4	1.56	100.0	100.0
Africa	64.4	105.4	1.64	7.2	7.5
Asia	508.0	844.5	1.66	56.4	60.2
Europe	176.5	217.2	1.23	19.6	15.5
Latin America and the Caribbean	70.9	121.0	1.71	7.9	8.6
Northern America	74.6	104.8	1.41	8.3	7.5
Oceania	6.5	9.6	1.47	0.7	0.7

Data source: United Nations (2015). World Population Prospects: The 2015 Revision.

Not only are the numbers of older persons growing in all regions of the world, but so too is their share of the overall population. This phenomenon is driven by both declining fertility and improvements in survival to older ages (United Nations, forthcoming). In Europe, the world's most aged region, the share aged 60 years or over has grown from around 20 per cent in 2000 to close to 24 per cent in 2015 and it is projected to rise further to nearly 30 per cent by 2030 (figure 20). Similarly, in Northern America, more than one in four people will be aged 60 years or over in 2030, as will one in five people in Oceania. In Asia and in Latin America and the Caribbean, the share of the population aged 60 years or over has grown from 8 per cent in 2000 to 11 per cent in 2015 and it is expected to increase further, reaching nearly 17 per cent by 2030. Although Africa is home to the world's youngest population, the proportion of older persons is growing there as well: it is expected to increase gradually from 5 per cent in 2015 to 6 per cent in 2030.

An increasing proportion of older persons in a population—a trend referred to as population ageing—holds important implications for production and consumption patterns and for the demand for services, such as health care and pensions to support people through

retirement and old age. Many older persons are healthy, remain active in the labour force, live independently, and provide financial or caregiving support to their relatives, including their adult children and their grandchildren (United Nations, 2013b). But old age is also often associated with the onset of chronic, non-communicable diseases, and the associated disabilities they cause, as well as a withdrawal from the labour force and a growing reliance on non-labour sources of income.

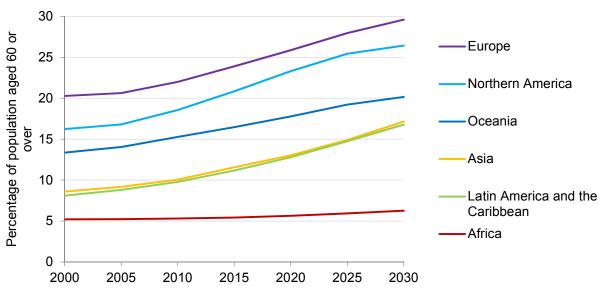


Figure 20. Percentage of population aged 60 or over, by region, 2000-2030

Data source: United Nations (2015). World Population Prospects: The 2015 Revision.

Ensuring that adequate and appropriate health care is available to growing numbers of older persons is a challenge shared by countries throughout the world. In many high-income countries, health systems have grown equipped to care for patients afflicted with conditions associated with old age – many of which require frequent visits to clinicians, ongoing medication management and expensive procedures, such as surgeries or dialysis. These countries are confronting rising health care demands as the population of older persons grows (WHO, 2015). In contrast to high-income countries, many low-income and middle-income countries continue to rely upon health systems that were designed primarily to diagnose and treat acute infections, rather than the NCDs associated with old age and, as a result, are finding it difficult to satisfy the health care demands of growing numbers of older persons.

The link between the size and growth of the population of older persons and the burden of disability caused by NCDs is shown in figure 21. It depicts the ratio of the population aged 60 years or over in 2012 compared to 2000 against the ratio of NCD-related disability in 2012 compared to 2000 as estimated in the World Health Organization's 2014 update of Global Health Estimates⁶ (WHO, 2014b). Some of the countries that saw the largest increases in NCD-related

32

⁶ The burden of NCD-related disability is represented by the total years of life lost due to disability (YLDs) in a population as a result of the group of causes classified by the WHO as non-communicable diseases.

disability between 2000 and 2012 are those that experienced the greatest proportional growth in the population of older persons. In Lebanon, for example, the number of people aged 60 years or over grew by 71 per cent between 2000 and 2012, while the burden of NCD-related disability increased by 54 per cent. In China, the population aged 60 or over grew by 46 per cent at the same time the burden of NCD-related disability rose by 17 per cent.

The numbers of older persons declined between 2000 and 2012 in only a few countries, likely due to a combination of declining fertility some 60 years earlier and the past emigration of working-aged people (Bussolo et al., 2015). One of the largest declines was in Ukraine, where the population aged 60 years or over in 2012 was 5 per cent smaller than in 2000. Ukraine experienced a concomitant reduction in the burden of NCD-related disability of approximately 7 per cent.

Ratio of population aged 60 years or over in 2012 compared to 2000 Africa Asia Oceania Latin America and the Caribbean Europe Northern America Marker size is proportional to the population aged 60 or over in 2012 Kuwait 5. 0.1 8.0 1.2 1.0 1.4 1.6

Figure 21. Ratio of population aged 60 or over in 2012 to that in 2000 by the ratio of NCD-related disability in 2012 to that in 2000, 172 countries or areas.

Ratio of NCD-related disability in 2012 compared to 2000

*Included countries or areas met the following criteria: 1) population greater than 90,000 in 2015; and 2) estimates of NCD-related disability available for both 2000 and 2012.

Data sources: United Nations (2015). World Population Prospects: The 2015 Revision and WHO (2014). Global Health Estimates.

Looking towards the future, virtually every country in the world should anticipate significant growth in the numbers of older persons (United Nations, forthcoming). In countries where health systems are already well-equipped to diagnose and treat conditions associated with old age, preparations are needed to deal with the increases in the national health care budgets necessitated by the demand for care for growing numbers of older persons. Countries where existing health systems are weak or ill-equipped to address the needs of an ageing population must work to expand and evolve in preparation for a growing burden of NCDs, at a cost that can be accommodated by national budgets.

In addition to the pressures on health systems, many countries are experiencing the strain of a growing aged population on the pension systems that aim to offer social protection to older persons. In some countries, large majorities of older persons are covered by existing pensions, but those programmes may struggle in the future to provide adequate income support while absorbing increasing numbers of beneficiaries. In other countries, existing pension systems cover only a minority of older persons. There, Governments must work to make up for existing coverage gaps while also preparing to absorb substantial future increases in the numbers of pensioners.

Figure 22 shows the ratio of the projected population aged 60 years or over in 2030 to the population aged 60 or over in 2015 against the proportion of men and women of statutory age receiving a pension in 2010. There is a great deal of heterogeneity in the projected increases in the size of the older population at all levels of pension coverage. For example, the projected increase in the number of older persons in Brazil, at 76 per cent, is nearly three times that in Italy, at 26 per cent, both countries where more than 80 per cent of persons of statutory age were covered by pensions.

Ratio of population aged 60 years or over in 2030 compared to 2015 Africa Asia Oceania Latin America and the Caribbean Europe Northern America 2.5 Marker size is proportional to the population aged 60 years and over projected for 2030 2.0 (Islamic Republic of) 5. 0. 0 20 40 60 80 100

Figure 22. Ratio of the projected population aged 60 or over in 2030 to the estimated population aged 60 or over in 2015 by the level of pension coverage in 2010, 169 countries or areas.

*Included countries or areas met the following criteria: 1) population greater than 90,000 in 2015; and 2) estimate of pension coverage available for 2010.

Data sources: United Nations (2015). World Population Prospects: The 2015 Revision and World Bank (2015). World Development Indicators database.

At middle levels of pension coverage, between 40 and 50 per cent, growth rates of the older population are similarly diverse. In Serbia, for example, the population aged 60 or over is

Proportion of men and women of statutory age receiving a pension in 2010

projected to increase by 4 per cent over the next 15 years, compared to a near doubling of the numbers of older persons in Jordan and in Libya. Despite the heterogeneity observed across countries, an overwhelming majority (78 per cent) of the countries with pension coverage of less than 80 per cent are anticipating substantial growth of the older population, with increases of more than 50 per cent projected between 2015 and 2030. Examples include Mexico and Colombia, where 25 and 23 per cent, respectively, of those of statutory age received a pension in 2010. The numbers of older persons in both countries is projected to grow by more than 80 per cent by 2030. In both Papua New Guinea and Pakistan, less than 5 per cent received a pension in 2010 and the population aged 60 years or over is projected to grow by 73 per cent and 66 per cent, respectively.

In many countries, the pension programmes are based on "pay-as-you-go" models in which the payments to current pensioners draw on monies paid into the system by the present day workforce (United Nations, 2003). Such programmes are easiest to fund when there is a large pool of workers relative to the numbers of pensioners. One measure of the stress placed on ageing societies as they strive to sustain pension and other social protection mechanisms for older persons is the old-age dependency ratio, which describes the number of older persons aged 65 years or over per 100 people in the "working ages" 20-64 years. Figure 23 shows the old-age dependency ratio in 2015 against the proportion of older men and women that were receiving a pension in 2010. Old-age dependency ratios in 2015 ranged from less than 15 older persons aged 65 years or over per 100 people aged 20 to 64 in most African countries and in many parts of Asia and of Latin America and the Caribbean, to more than 40 older persons per 100 people aged 20-64 in Japan, and more than 30 in many European countries.

50 Africa Asia Oceania Latin America and the Caribbear Old age dependency ratio (65+/20-64) in 2015 Northern America 4 Marker size is proportional to the population aged 60 years and over rojected for 2030 Croatia 30 Serbia 20 9 0

Figure 23. Old-age dependency ratio in 2015 by the level of pension coverage in 2010, 169 countries or areas

Proportion of men and women of statutory age receiving a pension in 2010 *Included countries or areas met the following criteria: 1) population greater than 90,000 in 2015; and 2) estimate of pension coverage available for 2010.

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Data sources: United Nations (2015). World Population Prospects: The 2015 Revision and World Bank (2015). World Development Indicators database.

60

80

100

A majority of the countries with high old-age dependency ratios also had high levels of pension coverage in 2010. In 63 per cent of the countries with high old-age dependency ratios (above 20 per 100 in 2015), pension programmes covered at least 90 per cent of the pensionable-age population in 2010. Conversely, in most of those countries with the lowest old-age dependency ratios, pension programmes covered less than half of those in the eligible age group, despite the relatively low number of older persons per worker. Several countries with already relatively high old-age dependency ratios in 2015 were covering only a fraction of older persons in existing pension programmes in 2010, and these countries may find it especially challenging to expand pension coverage as their populations continue to age. Countries in Southern Europe, including Greece, Spain and Italy, and several Balkan countries, such as Bosnia and Herzegovina, Croatia and Serbia, have both high old-age dependency ratios and substantial proportions of their older populations not receiving pensions.

Old-age dependency ratios are anticipated to rise in all regions as the number of older persons grows relative to the size of the working-age population (figure 24). Across the six regions in 2015, the old-age dependency ratio is highest in Europe, with 29 persons aged 65 or over for every 100 aged 20-64, and it is expected to rise to 41 in 2030. The old-age dependency ratio in Northern America will be nearly as high, with 38 older persons per 100 in the working ages in 2030, up from 25 in 2015. The increase is projected to be somewhat less steep in Oceania, rising from 21 in 2015 to 28 in 2030. Both in Asia and in Latin America and the Caribbean, the old-age dependency ratio is projected to grow from around 13 in 2015 to close to 20 in 2030. Africa, owing to its young population stemming from higher fertility levels, is projected to see only a gradual rise in old-age dependency over the next 15 years, with the ratio rising from 8 to 9 between 2015 and 2030.

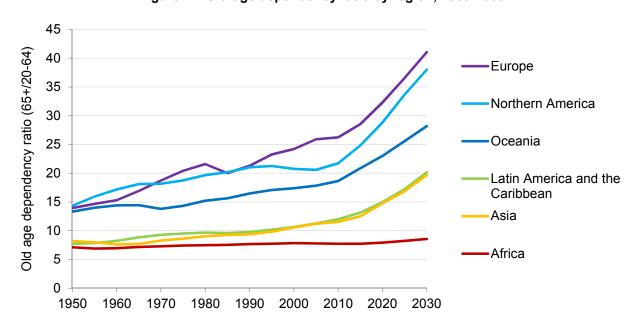


Figure 24. Old-age dependency ratio by region, 1950-2030

Data source: United Nations (2015). World Population Prospects: The 2015 Revision.

Countries with rapidly growing populations of older persons must prepare to include larger numbers in their social protection programmes, including old-age pensions. Those countries that are additionally facing steep increases in the old-age dependency ratio will be doubly challenged to find solutions in the context of a shrinking share of adults in the working ages. However, given that population ageing is driven by fertility decline, growing old-age dependency ratios occur concomitantly with reductions in child dependency, thus some of the fiscal pressures associated with population ageing may be at least partially offset by an easing of the demand for services targeted to children (Lee and Mason, 2014).

IX. Preparing for the next one billion city dwellers

Between 2015 and 2030 the world will add 1.1 billion new city dwellers, growing the global urban population by 28 per cent, from 4.0 billion to 5.1 billion (table 7). Virtually all of the future growth of the world's population will be concentrated in cities (United Nations, 2014). Africa is projected to experience the most rapid growth of its urban population with the addition of 300 million new city dwellers, for an increase of 63 per cent between 2015 and 2030. Asia will see substantial growth to its cities by 2030 as well, when the urban population is projected to be 30 per cent larger than in 2015, accounting for nearly 60 per cent of the increase in the global urban population. While projected urban growth is slower in the other regions, all will see population growth in their cities: the urban population of Oceania is projected to grow by 21 per cent between 2015 and 2030; that of Latin America and the Caribbean by 18 per cent; Northern America by 15 per cent; and Europe by 4 per cent. Asia is expected to continue to be home to just over half of the world's urban dwellers in 2030, while the proportion of urban residents living in Africa is projected to increase from 12 per cent to 15 per cent.

Table 7. Urban population by region, 2015 and 2030

	Urban population in 2015 (millions)	Urban population in 2030 (millions)	Ratio of 2030/2015	Distribution of urban population in 2015 (per cent)	Distribution of urban population in 2030 (per cent)
World	3957.3	5058.2	1.28	100.0	100.0
Africa	471.6	770.1	1.63	11.9	15.2
Asia	2113.1	2752.5	1.30	53.4	54.4
Europe	547.1	567.0	1.04	13.8	11.2
Latin America and the Caribbean	502.8	595.1	1.18	12.7	11.8
Northern America	294.8	339.8	1.15	7.5	6.7
Oceania	27.9	33.7	1.21	0.7	0.7

Data source: United Nations (2014). World Urbanization Prospects: The 2014 Revision.

In all regions the urban population is growing faster than the rural population, thus the proportion of the population residing in urban areas is increasing over time⁷. Figure 25 shows the share of the total population residing in urban areas for the six regions from 1950 and projected to 2030. The populations of Northern America and of Latin America and the Caribbean are the most urbanized in 2015, with more than 80 per cent of people concentrated in urban settings. By 2030, the two regions are projected to become 84 per cent and 83 per cent urban, respectively. Europe and Oceania are also highly urbanized, with 74 per cent and 71 per cent of their populations residing in urban areas in 2015. While the level of urbanization in Oceania is projected to remain largely unchanged to 2030, in Europe it is projected to rise to 77 per cent. While Asia and Africa are the worlds least urbanized regions, both are urbanizing rapidly. The proportion of people in Asia residing in urban areas is projected to increase from 48 per cent in 2015 to 56 per cent in 2030, while Africa is anticipating a similar rise, from 40 per cent urban in 2015 to 47 per cent urban in 2030.

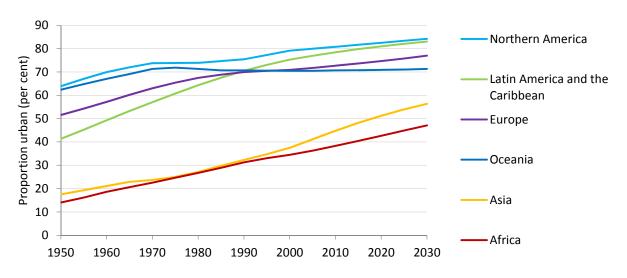


Figure 25. Proportion urban by region, 1950-2030

Data source: United Nations (2014). World Urbanization Prospects: The 2014 Revision.

The urban populations are growing fastest in the least urbanized countries and slowest in the most urbanized countries. This inverse association arises from two key demographic processes: 1) the more urbanized countries have relatively smaller rural populations from which to draw rural-to-urban migrants; and 2) the more urbanized countries also tend to have lower fertility rates, and thus lower rates of natural increase among their urban populations (United Nations, 2014). Figure 26 displays the ratio of the projected urban population in 2030 to that in 2015 against the proportion of the population residing in urban areas in 2015 for 201 countries or areas with at least 90,000 inhabitants in 2015. Despite significant international variability, an

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⁷ There exists no common global definition of what constitutes an urban settlement. As a result, the urban definition employed by national statistical offices varies widely across countries, and in some cases has even changed over time within a country. For information about the specific urban definition used for each country, see United Nations. 2014. *World Urbanization Prospects: the 2014 Revision*.

inverse association between urban growth and the level of urbanization is apparent, with the fastest urban population growth projected for the mostly rural countries of Africa and the slowest urban population growth projected for the highly urbanized countries of Europe, of Northern America, of Latin America and the Caribbean, of Oceania and of Asia.

Ratio of urban population in 2030 compared to 2015 Oceania Latin America and the Caribbean Furone Northern America Marker size is proportional to the total urban population 2.0 projected for 2030 1.5 0. 20 40 60 80 100

Figure 26. Ratio of projected urban population in 2030 to the estimated urban population in 2015 by the proportion of the population residing in urban areas, 201 countries or areas*

Proportion of total population residing in urban settlements in 2015 (per cent)

*Countries or areas with population greater than 90,000 in 2015.

Data source: United Nations (2014). World Urbanization Prospects: The 2014 Revision.

Urbanization can contribute to development and poverty reduction in both urban and rural areas, since cities concentrate much of the national economic activity, government, commerce and transportation, and provide crucial links with rural areas, between cities, and across international borders. With sufficient planning and institutional capacity, Governments are able to take advantage of the economies of scale that cities provide to supply infrastructure like roads, piped water and electricity, as well as basic services like education and health care, to a large population at much lower costs than would be required to reach the same number of people dispersed over rural areas. These advantages of city life, combined with the higher incomes available in urban areas compared to rural areas, afford numerous advantages to city dwellers: urban living is often associated with higher levels of literacy and education, women's status and labour force participation, as well as better health, greater access to social services, and enhanced opportunities for cultural and political participation (Cohen, 2006).

Nevertheless, rapid and unplanned urban growth threatens sustainable development when the necessary infrastructure is not developed or when policies are not implemented to ensure that the benefits of city life are equitably shared. Perhaps nowhere are the challenges posed by urban growth to sustainable development more acutely apparent than in slums, where the poorest urban residents are concentrated in informal settlements, characterized by housing that is non-durable or overcrowded, or that lacks access to improved water and sanitation or security against eviction (United Nations, 2015b).

One of the most pressing challenges facing many developing countries is the rapid growth of urban populations in the context of urban poverty. Figure 27 displays the ratio of the projected urban population in 2030 to the estimated urban population in 2015 against the proportion of the urban population that was living in slums. In 41 countries in 2014, more than half of urban dwellers lived in slum conditions. Of these, 83 per cent are projected to see the urban population grow by at least 50 per cent over the next 15 years. In 7 of the countries where a majority of urban residents live in slums—all located in sub-Saharan Africa—the urban populations are expected to double by 2030.

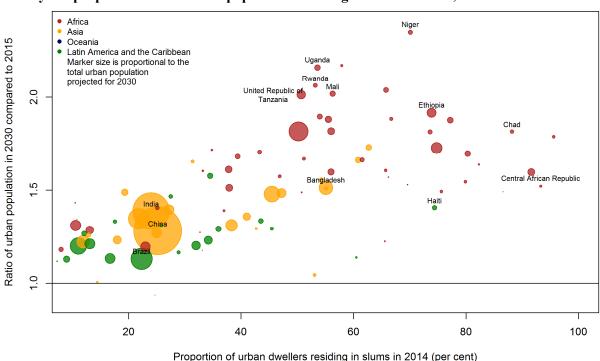


Figure 27. Ratio of projected urban population in 2030 to the estimated urban population in 2015 by the proportion of the urban population residing in slums in 2014, 96 countries or areas*

In the Central African Republic, the overwhelming majority of urban dwellers lived in slum conditions and the urban population is projected to grow by 52 per cent between 2015 and

^{*}Included countries or areas met the following criteria: 1) population greater than 90,000 in 2015; and 2) estimate of the proportion of slum dwellers available for 2014.

Data source: United Nations (2014). World Urbanization Prospects: The 2014 Revision and Millennium Development Goals Indicators database.

2030. Similarly, 74 per cent of Ethiopia's 19 million urban dwellers lived in slums and, by 2015, the number of urban residents will have nearly doubled to 37 million. The link between urban growth and urban poverty is a matter of concern in countries with a smaller share of slum dwellers as well. In India, for example, the proportion of slum dwellers, at 24 per cent, is much lower than in many African countries, but the number of urban dwellers is projected to increase substantially between 2015 and 2030, from 420 million to 583 million, requiring a significant expansion of city infrastructure and services in order to ensure adequate living conditions for all of them. Brazil, too, is expected to add 23 million new residents to its cities between 2015 and 2030, posing a challenge to the country as it strives to improve the lives of the urban poor. In 2014, 22 per cent of urban dwellers in Brazil lived in slums.

The growth of urban populations in countries where slums are prevalent points directly to the challenges posed by demographic trends to the achievement of the development goals. MDG target 7.d aimed to improve the lives of at least 100 million slum dwellers. While progress was made and the global proportion of urban residents in developing countries living in slums fell from 39 to 30 per cent over the past 15 years, the total number of people living in slums actually increased over that period, from 792 million in 2000 to 880 million in 2014 (United Nations, 2015b). Because the urban populations have grown faster than the expansion of improved housing and infrastructure programmes, the number of slum dwellers has continued to rise. Looking to the future, it is clear that such programmes must be accelerated dramatically in developing countries experiencing rapid urban growth if progress is to be made towards the eleventh SDG, which aims to make cities and human settlements inclusive, safe, resilient and sustainable.

X. Preparing for an additional one billion consumers and producers

To this point this report has been concerned with the challenges and opportunities posed by projected changes in the absolute and relative size of selected population groups, and their potential implications for different facets of economic and social development. But sustainable development rests on not two, but three pillars: economic and social development, as well as environmental sustainability. This section considers the associations between population size and growth and two selected indicators of production and consumption — carbon dioxide emissions and energy use — that play a significant role in humans' impact on the natural environment and hold important implications for global climate change into the future.

While it may seem intuitive that more people on the planet (and thus more producers and consumers) equates to greater carbon emissions, in reality the association between population growth and CO₂ emission growth is less straightforward (O'Neill et al., 2010). This is because changes in production and consumption depend on a large number of factors, of which population size is only one. Figure 28 shows the per capita CO₂ emissions in 2010 against the total population (logarithmic scale) in 2010, where the marker size for each country is proportional to the total CO₂ emissions in 2010 (equivalent to per capita CO₂ emissions multiplied by total population). The world's most populous countries, those towards the right-hand side of the chart, are among the biggest CO₂ emitters, indicated by the large marker sizes: China, with 1.3 billion people in 2010, lead the world in CO₂ emissions, outputting more than 8

million kilotons,⁸ and India, with 1.2 billion people in 2010, was the third leading CO₂ emitter, outputting 2 billion kilotons. But across the world's countries or areas overall, population size is correlated only loosely with total CO₂ emissions. The population of the United States was roughly one quarter the size of India's, but the U.S. emitted more than twice as much CO₂ in 2010. The Russian Federation and Nigeria were fairly similar in terms of population size in 2010, yet Russia's CO₂ emissions were more than twenty times Nigeria's in that year.

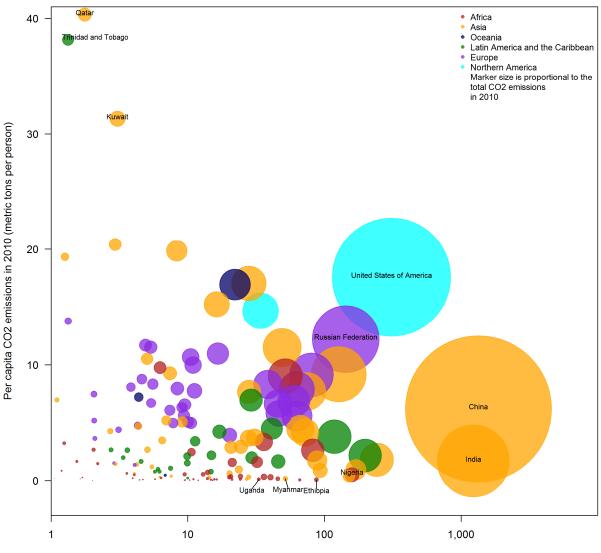


Figure 28. Population and per capita and total CO₂ emissions, 2010, 155 countries or areas

Total population in 2010 in millions (log scale)

Data sources: United Nations (2015). World Population Prospects: The 2015 Revision and World Bank (2015). World Development Indicators database.

^{*}Included countries or areas met the following criteria: 1) population greater than one million in 2010; and 2) estimate of CO₂ emissions available for 2010.

⁸ New evidence indicates that official estimates of coal usage in China were underestimated by as much as 17 per cent dating back to 2000. In light of the new coal usage information, estimates of China's total CO₂ emissions could be significantly understated. One report has suggested that in 2012 China's total CO₂ emissions were higher than reported by 600 million tons (http://www.nytimes.com/2015/11/04/world/asia/china-burns-much-more-coal-than-reported-complicating-climate-talks.html).

Many countries in the less developed regions contribute only negligibly to global carbon emissions despite being home to more than 40 million people each, such as Uganda, Myanmar, and Ethiopia. By comparison, some countries or areas that are relatively small in terms of population are making substantial contributions to global carbon output, largely due to the prominence of oil and gas or concrete industries that increase the per capita level of CO₂ emissions. In three countries – Kuwait, Qatar and Trinidad and Tobago – per capita CO₂ emissions in 2010 exceeded 30 metric tons per person and thus, despite small populations of 3.9 million, 2.2 million and 1.4 million, respectively, Kuwait contributed 94 thousand kilotons, Qatar 71 thousand kilotons and Trinidad and Tobago 51 thousand kilotons to global CO₂ emissions.

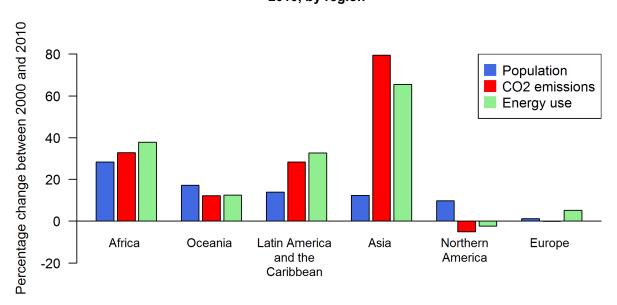


Figure 29. Change in population, total CO₂ emissions and total energy use between 2000 and 2010, by region^{8,9}

Data sources: United Nations (2015). World Population Prospects: The 2015 Revision and World Bank (2015). World Development Indicators database.

At the regional level, the association between population growth, growth of energy use, and growth of CO₂ emissions has clearly been mediated by factors related to the level of development (figure 29). In Africa, in Asia, in Latin America and the Caribbean, and in Oceania, increases in population size between 2000 and 2010 were accompanied by increases in both energy use and CO₂ emissions. In Northern America, however, population growth over 2000-2010 was accompanied by reductions in both total energy use and total CO₂ emissions, while in Europe, slight population growth was accompanied by growth in total energy use, but essentially no change in total CO₂ emissions. In Africa, in Latin America and the Caribbean and in Asia, growth in energy use and CO₂ emissions outpaced population growth. While in Africa growth in

43

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 $^{^{9}}$ Estimates of the regional changes in CO_2 emissions and energy use, respectively, include only those countries for which data were available for both 2000 and 2010. The estimates represent more than 90 per cent of the populations of each region, with the exceptions of the changes in energy use in Africa and Oceania, which represent 74 per cent and 73 per cent, respectively, of their populations.

CO₂ emissions and energy use was only moderately faster than population growth, in Latin America and the Caribbean, CO₂ emissions and energy use grew more than twice as fast as the population between 2000 and 2010. In Asia, growth in energy use and CO₂ emissions outpaced population growth by a factor of four between 2000 and 2010, a period of extremely rapid economic growth in the region.

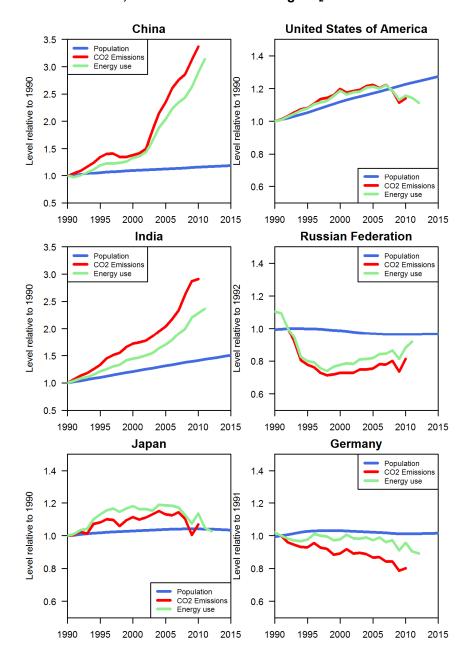
Heterogeneity in the association between population change and changes in energy use and carbon emissions is clear at the country level, as well. Figure 30 shows the trends in the three indicators since 1990 for the world's six largest carbon emitters: China, the United States, India, the Russian Federation, Japan and Germany. Both in China and in India, energy use and CO₂ emissions have grown much faster than population. China's population in 2010 was 16 per cent larger than in 1990, while energy use was 289 per cent higher and CO₂ emissions were 337 per cent higher.⁸ In India, the population in 2010 was 41 per cent larger than in 1990, while energy use had grown by 228 per cent and CO₂ emissions by 291 per cent. In the United States, energy use and CO₂ emissions tracked population growth fairly closely – in 2007 all three indicators were about 20 per cent greater than their levels in 1990 – but in the wake of the 2008 financial crisis, energy use and CO₂ emissions began to fall, even as the population continued to grow. In 2012, the most recent year for which data are available, the level of total energy use in the U.S. was just 11 per cent higher than in 1990, even as the population had grown by 25 per cent. The trends in Japan are similar to those in the United States: the total population of Japan grew by just 4 per cent between 1990 and 2010, and increases in energy use and CO₂ emissions were similarly modest, at 14 per cent and 7 per cent, respectively.

The patterns observed in the Russian Federation and Germany are strikingly different from the other four big CO₂ emitters shown in figure 30. In Russia, energy use and CO₂ emissions fell precipitously along with the economic contractions of the 1990's, while the population size remained largely unchanged. By 1998, the levels of energy use and CO₂ emissions had fallen to around 70 per cent of their 1992 levels (the earliest year for which CO₂ emissions estimates are available for Russia), while the population had declined by around 1 per cent. More recently, energy use and CO₂ emissions have begun to rebound: in 2010 energy use in Russia was 88 per cent of its 1992 level; CO₂ emissions were 81 per cent of the 1992 level; and population was 97 per cent of its size in 1992.

In China and in India, levels of total CO₂ emissions increased faster than total energy use between 1990 and 2010, while in the United States, in the Russian Federation and in Japan, trends in total energy use and total CO₂ emissions tracked each other fairly closely. In Germany, however, total CO₂ emissions are observed to have declined faster than the decline in total energy use since 1990. These downward trends occurred at the same time population size remained stable. In 2010, Germany's population was 1 per cent larger than it had been in 1990, while energy use had fallen to 96 per cent of its 1990 level and total CO₂ emissions had fallen to 80 per cent of their 1990 level. Taken together, these trends in Germany offer evidence of a shift towards cleaner sources of energy, such as wind or solar power, which allow the country to pollute less while maintaining the same level of energy consumption. Recent estimates indicate that more than 30 per cent of Germany's gross energy supply comes from renewable sources.¹⁰

¹⁰ https://energy-charts.de/index.htm, last accessed 26 October 2015

Figure 30. Trends in population, total CO₂ emissions and total energy use between since 1990, for the world's six leading CO₂ emitters⁸



Data sources: United Nations (2015). World Population Prospects: The 2015 Revision and World Bank (2015). World Development Indicators database.

This report began with a discussion of the degree of uncertainty associated with population projections over the 15-year horizon targeted by the SDGs outlined in the 2030 Agenda for Sustainable Development. It noted that, in contrast to highly uncertain forecasts of economic growth or technological advancements, the near future of world population is relatively certain, because it is determined largely by fertility and mortality patterns that unfolded

over the past several decades. Recent debate has centred on the role of population growth in contributing to unsustainable consumption patterns, pollution and, ultimately, global climate change (e.g., Bradshaw and Brook, 2015; O'Neill et al. 2015; O'Sullivan, 2015). While a growing population no doubt contribute to increasing demand for resources, numerous other economic and social factors also play a role in shaping the production and consumption patterns that drive harmful emissions. A comparison of the range of outcomes associated with the IPCC's alternative scenarios of global CO₂ emissions to the degree of uncertainty associated with United Nations' population projections to 2050 is instructive in this regard (figure 31).

Global CO2 emissions from fossil fuels

- IPCC CO2 projection scenarios

- World population
- Median population projection with 80% and 95% uncertainty bounds

6 - 80% and 95% uncertainty bounds

Figure 31. Trends in global CO₂ emissions and IPCC CO₂ emissions projection scenarios and trends in world population and associated uncertainty intervals, 1960-2050.

Data sources: Population estimates and projections are from United Nations (2015). *World Population Prospects: The 2015 Revision.* CO₂ estimates are from Carbon Dioxide Information Analysis Center, Environmental Sciences Division, Oak Ridge National Laboratory, Tennessee, United States, as catalogued in World Bank (2015). *World Development Indicators* database. CO₂ projections are from IPCC (2000). *Special Report on Emissions Scenarios. Appendix VII: Data Tables.* Cambridge University Press: United Kingdom. Available at: http://www.ipcc.ch/ipccreports/sres/emission/index.php?idp=164.

Between 1960 and 2000 the world's population doubled, having increased from 3.0 billion to 6.1 billion, but global CO₂ emissions grew even faster over this period, increasing by a factor of 2.6 since 1960, from 9.4 gigatons to 24.8 gigatons. In 2000, experts collaborating with the IPCC produced numerous CO₂ projection scenarios, reflecting various assumptions about population change, economic growth, and the adoption of clean energy standards and technologies, among other factors. These scenarios produced wide ranging predictions of future CO₂ emissions: in the most optimistic scenario from a pollution perspective, global CO₂ emissions in 2050 would be just over triple their 1960 levels, while in the least optimistic they would soar to 10 times their 1960 levels in less than 100 years. By comparison, the 95 per cent prediction intervals associated with population projections indicate that world population will be between 308 per cent and 337 per cent of its 1960 level, a quite narrow range relative to the CO₂ projection scenarios.

Since 2000 both the world's population and global CO₂ emissions have continued to grow. By 2010, the world's population had grown to 229 per cent of its size in 1960, while CO₂ emissions had increased to 357 per cent of their 1960 level, following the paths of the least optimistic IPCC projection scenarios. These trends suggest that while population size and growth is certainly a matter of concern for environmental sustainability, a host of other factors influence the volume of CO₂ emissions. Of course, some of these other factors are integrally connected to demographic trends. Integrated models of the human impact on the environment consider the interlinkages between population growth and economic growth, as well as between demographic shifts—like ageing, smaller household sizes and urbanization—and economic growth and consumption patterns (Jiang, 2015). A 2010 study simulated that slowing population growth could reduce global CO₂ emissions in 2050 by between 1.4 and 2.5 gigatons annually, which is equivalent to 16-29 per cent of the estimated emission reductions needed to avoid dangerous climate change (O'Neill et al., 2010). The authors further found that urbanization was a powerful driver of CO₂ emissions in developing countries, while population ageing in developed countries was contributing to reductions in emissions. Such assessments make clear that a complete understanding of the implications of demographic trends for environmental sustainability must go beyond population size and consider the effects of changes in the age structure and spatial distribution on production and consumption patterns.

XI. Conclusions

In September 2015 the United Nations General Assembly marked the end of the Millennium Development Goals monitoring framework and ushered in a new era. With the adoption of the 2030 Agenda for Sustainable Development, and the 17 sustainable development goals therein, the international community renewed its commitment to complete the unfinished agenda of the MDGs and set new priorities towards equitable and inclusive social and economic development that strives for environmental sustainability.

Population trends undeniably had an impact on countries' progress towards the achievement of the MDGs. In some countries, population growth since 1990 outpaced efforts to provide adequate nutrition, so that the proportion undernourished actually increased over time. Important strides were made towards improving the lives of hundreds of millions of slum dwellers, yet rapid growth of urban populations has meant that the number of slum dwellers globally continues to increase. Demographic trends that unfold over the next 15 years, the

implementation period for the 2030 Agenda, will almost certainly hold significant implications for progress towards the achievement of the SDGs as well. In some countries, growing populations will challenge efforts to provide basic services and eradicate poverty. In others, slowing population growth affords an opportunity to expand programmes to reach a greater proportion of the population without having simultaneously to cover growing numbers of people. In many countries, shifting age structures and spatial distributions of the population could present opportunities to leverage favourable demographic conditions to accelerate development. This report concludes with a summary of its key recommendations:

Prepare to care for the next two billion babies.

In nineteen countries the number of babies born in 2015-2030 will be more than 30 per cent greater than the number born in 2000-2015. In Niger, the number of births projected over the next 15 years is 66 per cent greater than over the past 15 years. Numerous countries – particularly low-income countries located in sub-Saharan Africa – should anticipate substantial increases in the number of babies born in the coming years. Many high-fertility countries are struggling to provide adequate nutrition to children, who suffer high infant and child mortality rates. Moreover, these countries lack the necessary resources to scale up infant and child health programmes to match the growing demand posed by rapidly increasing numbers of births. Sadly, Africa already contributes more than half of child deaths globally, and this share is expected to increase to 60 per cent by 2030, despite the projected reductions in child mortality risks. On the other hand, many of the middle-income countries of Asia and of Latin America and the Caribbean have benefitted from reduced fertility in past decades, which offers them an opportunity to expand or improve infant and child health programmes without having simultaneously to reach a growing population of children.

Prepare to educate the next two billion school-aged children.

Two billion children globally will celebrate their fifth birthdays between 2015 and 2030 and will need to enter primary school. In Africa the number of children turning five over the next 15 years will be 25 per cent greater than the number who turned five over the previous 15 years, portending massive increased demand on school systems in the region, many of which are already struggling to provide quality schools to substantial proportions of children. Countries such as South Sudan and Liberia will be especially challenged in this regard since less than half of primary school-aged children are enrolled in school and, owing to high fertility, both countries are seeing rapid growth in the number of children entering school age. Conversely, recent reductions in fertility in some countries means that they will see no change, or even declines, in the number of school-aged children, offering a demographic opportunity to improve access to and quality of education without having to serve growing numbers of children. Such an opportunity could be leveraged to accelerate gains in literacy in Afghanistan, Bhutan and Haiti, for example.

Prepare to meet the needs of growing numbers of youth in developing regions.

Between 2015 and 2030, 1.9 billion children are expected to enter their youth, that is to say, they will turn 15 years of age. The needs for continued education, access to health services, including for sexual and reproductive health, and for productive youth employment will grow in tandem over the next 15 years. Most countries in Africa and many in Asia and developing Oceania are projected to see extremely rapid growth in the numbers of youth: in 31 countries the

number aged 15-24 is expected to increase by more than 40 per cent by 2030. Many of the countries with the most rapid projected growth in the number of youth are those where adolescent birth rates are high, including most of Africa, parts of Southern and Western Asia, as well as in several Latin American and Caribbean countries, despite lower fertility overall there. Rapidly increasing numbers of youth in countries struggling to prevent and treat HIV/AIDS or to absorb young people into the labour force also will challenge progress on the SDGs. All countries, but especially those with growing youth populations, must intensify efforts to ensure that youth are able to access the necessary services, acquire the requisite skills and form the relationships that lead to healthy and successful transitions to adulthood.

Leverage the opportunity for a demographic dividend, particularly in Africa.

When growth in the number of youth accompanies fertility decline, it can signal the beginning of a demographic dividend opportunity, wherein economic growth can be accelerated as the share of working-age (15-64 years) people in the population increases. Africa is the only region with a projected increase in the share of working-age people between 2015 and 2030. The proportion aged 15-64 has reached its peak both in Asia and in Latin America and the Caribbean, and it is declining in Europe, in Northern America and in Oceania. In order to take advantage of the economic growth opportunity offered by the coming shifts in age structure, countries in Africa must act urgently to improve labour markets by increasing human capital through education and training, as well as by aggressively promoting job creation.

Prioritize gender equality and the empowerment of women.

One of the main principles of the Programme of Action of the 1994 International Conference on Population and Development (ICPD) centred on advancing gender equality and empowering women by, *inter alia*, ensuring women's access to education and that women have a say in the political process; by eliminating all forms of violence against women; and, critically, by making sure that women have the ability to control their own fertility. The centrality of women's roles in society, and in population and development processes, was reinforced in the MDGs and again in the 2030 Agenda for Sustainable Development.

Expand access to and improve the quality of reproductive health care.

As with the other goals, population trends pose challenges and present opportunities to efforts to advance progress for women. All regions except Europe are expected to see an increase in the number of women of reproductive age (15-49 years) over the next 15 years, but it will be fastest in Africa, with an increase of 47 per cent between 2015 and 2030, when one in five of the world's women of reproductive age will live in Africa. A large majority of African countries are faced with rapidly growing numbers of women at the same time they are confronting major shortfalls in women's access to health and education. Women's access to reproductive health gives an illustration: many of the countries with the fastest projected growth in the number of women of reproductive age are those where large proportions of women have an unmet need for contraception, where maternal mortality risks are high, and where maternity care is insufficient. Angola, Chad and Niger are a few of the countries that stand out in this regard. These countries must scale up efforts to counter existing deficiencies in women's access to reproductive health care while also expanding programmes to reach growing numbers of women. Other countries characterized by slower growth both in the number of reproductive-age women and in the number of births, such as Bangladesh, Haiti, and India, are presented a demographic opportunity

to improve the coverage and quality of reproductive health care in a context of much milder population pressures.

Prepare for rapid increases in the numbers of older persons.

The number of older persons aged 60 years or over globally is projected to increase by 56 per cent over just the next 15 years, from 901 million in 2015 to 1.4 billion in 2030. Older persons constitute the only major age category for which all of the world's regions will see substantial increases in the population over the coming 15 years, and the share of older persons among the total population is increasing everywhere as well, making population ageing a matter of global concern. The older populations are growing faster in the developing regions than in the developed regions and, as a result, the world's older population is increasingly concentrated in Asia, in Latin American and the Caribbean, and in Africa. These three regions are expected to be home to three-quarters of the world's population aged 60 or over by 2030.

Promote health and well-being for all at all ages.

Ensuring that adequate and appropriate health care is available to persons at all ages, and to growing numbers of older persons, in particular, is a challenge shared by countries throughout the world. In many developed countries that challenge is presented in the upward pressure on national health budgets associated with an increase in demand for the expensive medications and procedures to treat the chronic conditions associated with old age. In many developing countries the challenge surrounds adapting health systems that were built primarily to diagnose and treat acute infections to now address the prevention and treatment of NCDs as well.

Ensure older persons' access to adequate social protection.

In addition to health care, ensuring older persons' access to social protection is a matter of concern throughout the world. A number of countries in South America have relatively aged populations but also fairly high pension system coverage. Old-age pension coverage is generally lower in the majority of Asian countries, and it is very low in most African countries, with some exceptions where universal pensions are meant to provide subsistence-level support in old-age, rather than as replacement of past labour income. Since in parts of Asia and in most of Africa older persons still represent a small fraction of the total population, and, consequently, old-age dependency ratios remain low, there is a demographic opportunity to institute and expand sustainable social security systems to provide social protection to an increasing number of older persons. This should be a priority over the next 15 years since delaying action could squander the opportunities offered by present demographic shifts. Many developed countries faced with ageing populations and increasing old-age dependency ratios are exploring a variety of policy options to preserve the fiscal sustainability of pensions for older persons. Fertility rates have fallen so low in a number of countries in Europe and some in Eastern Asia that some Governments have considered policies to encourage family formation and childbearing. Encouraging women's workforce participation, raising statutory ages at retirement to prolong older persons' labour force participation, and promoting immigration of workers are additional policy options that have been considered by many Governments to bolster the size of the labour force in response to population ageing.

Foster sustainable cities in an urbanizing world.

Essentially all of the future growth of the world's population is expected to take place in cities, and thus preparing for the additional one billion of city dwellers projected between 2015 and 2030 will be essential for the implementation of the sustainable development agenda. Eradicating urban poverty will pose a particular challenge, especially because the urban populations are growing fastest in developing countries, and in most of those countries projected to see extremely rapid city population growth over the next 15 years, a majority of urban dwellers live in slums. At the same time, the increasing concentration of the population in cities could facilitate development progress by improving people's access to basic services, housing, infrastructure, health care, education and higher productivity employment. Trends in urbanization are associated with both challenges to and opportunities for environmental sustainability as well. On the one hand, urban life is associated with higher levels of production and consumption and the associated emissions of pollutants, including greenhouse gases. On the other hand, cities foster technological innovation and efficiency solutions that will be necessary to ensure that economic growth is not antithetical to environmental protection going forward.

Recognize the role of demographic trends as drivers of increasing consumption and production, with implications for environmental sustainability.

Population growth, per se, is not the main driver of increasing greenhouse gas emissions. Between 2000 and 2010, increases in CO₂ emissions and energy use outpaced population growth by a factor of four in Asia, by a factor of two in Latin America and the Caribbean, and by a smaller, but still notable factor in Africa. Yet demographic trends other than changes in population size—particularly those related to urbanization, household size and shifting population age structures—can influence emissions because they are related to the consumption and production patterns that drive energy use. The future of global carbon emissions, which is highly uncertain compared to the relative certainty of population projections over the next several decades, will depend in part on how well societies are able to improve efficiency in the context of demographic changes and economic growth. The recent experience of Germany offers proof that it is possible to achieve reductions in CO₂ emissions that exceed reductions in energy use, all while promoting robust economic growth. The world's other major carbon emitters and those with high per capita levels of emissions must also strive to achieve improvements in efficiency in order to stem the massive growth of carbon emissions, which have increased more than three-fold since 1960 on the global scale. Both in China and in India, CO₂ emissions have approximately tripled since 1990.

Anticipate demographic shifts as part of development planning.

Changes in population size, as well as shifts in the age structure and spatial distribution of a population, are largely foreseeable, having been shaped by demographic processes that already occurred in the past. Efforts towards sustainable development to be undertaken as a part of the 2030 Agenda must take into account the demographic shifts projected to unfold over the next 15 years. Policymakers should incorporate the present and future demographic dynamics particular to each country to inform development planning, identifying areas where programmes must be scaled up to reach growing numbers of people in need, as well as areas where the shifting demographic profile offers opportunities to accelerate progress towards sustainable development.

References

- Bradshaw, C.J.A., and B.W. Brook (2015). Human population reduction is not a quick fix for environmental problems. *Proceedings of the National Academy of Sciences*, vol. 111, no. 46, pp. 16610-16615.
- Bussolo, Maurizio, Johannes Koettl, and Emily Sinnott (2015). *Golden Aging: Prospects for Healthy, Active, and Prosperous Aging in Europe and Central Asia.* Washington, DC: World Bank.
- Cohen, B. (2006). Urbanization in developing countries: Current trends, future projections, and key challenges for sustainability. *Technology in Science*, vol. 28, pp. 63-80.
- Commoner, B., M. Corr, and P.J. Stamler (1971). The causes of pollution. *Environment*, vol. 13, no. 3, pp. 2–19.
- Ehrlich, P. (1968). *The Population Bomb*. Sierra Club/Balantine Books.
- Ehrlich, P., and P. Holdren (1971). Impact of population growth. *Science*, vol, 171, pp. 1212–1217.
- Gregg, P., and E. Tominey (2005). The wage scar from male youth unemployment. *Labour Economics*, vol. 12, no. 4, pp. 487-509.
- Gribble, James N. and Jason Bremner (2012). Achieving a Demographic Dividend. *Population Bulletin* vol. 67, no. 2. Population Reference Bureau.
- International Labour Organization (ILO) (2015). *World Employment and Social Outlook Trends 2015*. Geneva: International Labour Office.
- International Monetary Fund (IMF) (2015). World Economic Outlook (WEO) Uneven Growth: Short- and Long-Term Factors. Washington, D.C.: International Monetary Fund.
- Jiang, Lewin (2015). Population dynamics and their impacts on sustainable development. Expert paper prepared for the United Nations Expert Panel on Integrating Population Issues into Sustainable Development, Including in the post-2015 Development Agenda, New York, 22 January 2015.
- Intergovernmental Panel on Climate Change (IPCC) (2014). *Climate Change 2014: Synthesis Report*. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, R.K. Pachauri and L.A. Meyer, eds. Geneva:IPCC.
- Lam, D. (2011). How the world survived the population bomb: lessons from fifty years of extraordinary demographic history, *Demography*, vol. 48, no. 4, pp. 1231-1262.
- Lee, R. and A. Mason (2011). *Population Ageing and the Generational Economy: A Global Perspective*. Cheltenham, UK: Edward Elgar.

- Lee, R., A. Mason and members of the National Transfer Accounts Network (2014). Is low fertility really a problem? Science, vol. 346, no. 6206, pp. 229-234.
- Mason, A. (2005). Demographic dividends: the past, the present, and the future. Joint International Conference of the 21st Century COE (Center of Excellence) Program of Kobe University and the Japan Economic Policy Association (JEPA), Awaji Yumebutai International Conference Center near Kobe, Japan, 17 18 December.
- Mason, A. and T. Kinugasa (2008). East Asian economic development: two demographic dividends. *Journal of Asian Economics*, vol. 19, nos.5-6, pp. 389-399.
- O'Neill, B.C., M. Dalton, R. Fuchs, L. Jiang, S. Pachauri, and K. Zigova (2010). Global demographic trends and future carbon emissions. *Proceedings of the National Academy of Sciences*, vol. 107, no. 41, pp. 17521-17526.
- O'Neill, B.C., L. Jiang, and P. Gerland (2015). Plausible reductions in future population growth and implications for the environment. *Proceedings of the National Academy of Sciences*, vol. 112, no.6, pp. E506.
- O'Sullivan, J.N. (2015). Population stabilization potential and its benefits underestimated. *Proceedings of the National Academy of Sciences*, vol. 112, no. 6, pp. E507
- Patton, George C. (2011). Global patterns of mortality in young people. Expert paper No. 2011/11 of the United Nations Department of Economic and Social Affairs, Population Division, New York.
- Raftery, A.E., N. Li, H. Ševčíková, P. Gerland, and G.K. Heilig (2012). Bayesian probabilistic population projections for all countries. *Proceedings of the National Academy of Sciences*, vol. 109, no. 35, pp. 13915-13921.
- Sawyer, S.M., R.A. Afifi, L.H. Bearinger, S-J Blakemore, B. Dick, A.C. Ezeh, and G.C. Patton, (2012). Adolescence: a foundation for future health. *The Lancet*, vol. 379, no. 9826, pp.1630-1640.
- UNFPA (2015). The Power of 1.8 Billion: Adolescents, Youth and the Transformation of the Future. State of World Population 2014 Report. UNFPA.
- UNFPA and HelpAge International. (2012). Ageing in the Twenty-First Century: A Celebration and A Challenge. UNFPA and HelpAge International.
- UNFPA Technical Division (2012). *Population Matters for Sustainable Development*. New York: UNFPA.
- United Nations (2003). *Report on the World Social Situation*. United Nations Department of Economic and Social Affairs, Social Policy and Development Division.

(2013a). Meeting demand for family planning. Population Facts No. 2013/6. Un Nations Department of Economic and Social Affairs, Population Division.	nited
(2013b). <i>World Population Ageing 2013</i> . United Nations Department of Econor Social Affairs, Population Division.	nic and
(2014). World Urbanization Prospects: The 2014 Revision. United Nations Dep of Economic and Social Affairs, Population Division.	artment
(2015a). World Population Prospects: The 2015 Revision. United Nations Depa Economic and Social Affairs, Population Division.	rtment of
(2015b). Millennium Development Goals Report 2015.	
(2015c). Millennium Development Goals Indicators database. Available at: http://mdgs.un.org/unsd/mdg/Default.aspx	
(forthcoming). <i>World Population Ageing 2015</i> . United Nations Department of Earn Social Affairs, Population Division.	economic
Urdal, H. (2012). A clash of generations? Youth bulges and political violence. Expert pa 2012/1 of the United Nations Department of Economic and Social Affairs, Popu Division, New York.	
World Bank (1984). World Development Report 1984. New York: Oxford University Pr	ess.
(2015a). World Development Indicators database. Available at: http://data.worldbank.org/data-catalog/world-development-indicators	
World Bank (2015b). <i>Global Monitoring Report 2015/2016: Development Goals in an Demographic Change</i> . Washington, D.C.: World Bank.	Era of
World Bank Group (2014). <i>Global Economic Prospects: Shifting Priorities, Building for Future</i> . Washington, D.C.: World Bank.	r the
World Health Organization (WHO) (2012). Early marriages, adolescent and young preg Report by the Secretariat to the sixty-fifth World Health Assembly.	nancies.
(2013). Road traffic injuries. Fact sheet N°358. Geneva: World Bank.	
(2014a). Health for the World's Adolescents: A Second Chance in the Second Decade. Geneva: World Health Organization.	
(2014b). Global Health Estimates 2014 update. Available at: http://www.who.int/healthinfo/global_burden_disease/en/	
(2015). World Report on Ageing and Health. Geneva: World Health Organization	on.