Assessment of global megatrends — an update

# Global megatrend 1: Diverging global population trends

European Environment Agency

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Europe is bound to the rest of the world through an enormous number of systems — environmental, economic, social, political and others. Such networks enable complex flows of materials and ideas across the globe, producing uncertain feedbacks and knock-on effects over time. Greenhouse gas emissions in Europe today can affect the climate in distant locations and far into the future. Land management choices on the other side of the world can influence food and energy prices in Europe. Global communication and trade networks fuel innovation — sometimes boosting efficiency, sometimes creating new environmental pressures.

Most of these interactions are intimately linked and set to unfold over decades. All are likely to have important implications for living standards and well-being.

The European environment's status, trends and prospects have always depended in part on events outside its borders. Yet the growing importance of global networks and flows has augmented this interdependence, creating complex challenges for traditional governance systems framed within national or regional territories. To design effective ways to manage the environmental changes ahead, societies and governments need to understand the global drivers at work and their potential implications.

With this challenge in mind, the European Environment Agency in 2010 produced its first assessment of emerging global trends as part of its five-yearly flagship report on the European environment's state and outlook (SOER 2010). The exploratory analysis summarised 11 global megatrends grouped into five clusters — social, technological, economic, environmental and governance. Introducing the issues succinctly, it sought to trigger a discussion about how Europe should monitor and assess future changes in order to better inform environmental policymaking.

In preparation for its next report on the European environment's state and outlook (SOER 2015), the EEA has initiated an update of the assessment of global megatrends, analysing each of these drivers in a little more detail than previously in terms of their impacts on the European environment and well-being. During the second half of 2013 and early-2014, the EEA is reassessing the 11 megatrends and publishing the updates separately on its website. In 2014 the chapters will be consolidated into a single EEA technical report and will provide the basis for the analysis of megatrends included in SOER 2015. The present chapter addresses megatrend 1: 'Diverging global population trends'.

Again, it needs to be emphasised that the complexity of highly interconnected human and natural systems introduces considerable uncertainty into projections and forecasts. As much as anything, the assessment of megatrends aims to encourage readers to acknowledge this interdependence and uncertainty. In so doing, it may help point the way towards systems of planning and governance better adapted to meeting the challenges ahead.

# Global megatrend 1
# Diverging global population trends

Across the world, the basic determinants of population size and structure — fertility, mortality and migration — have been fundamentally altered by the processes of social and economic development. As a result, the global population doubled to 7 billion in the last half century and will continue growing fast in coming decades, although regional trends differ markedly. In advanced economies, populations are ageing and in some cases reducing in size. At the other extreme, populations in the least developed countries ([1]) are expanding rapidly. Migration is also affecting the distribution and structure of populations, as people move in search of higher earnings or to escape conflict or environmental degradation.

An expanding workforce relative can create a 'demographic dividend' of greatly increased economic output. But it can also create the risk of social unrest if there are insufficient employment opportunities. Furthermore, some of the returns from the demographic dividend must be invested in areas such as health and education, and in savings for retirement, if living standards are to be sustained as the population ages.

If the world remains on its current development path, population growth and investments in human capital will continue to provide a boost to global economic output, potentially increasing the burdens on natural capital stocks. But the challenges facing regions will vary. Developing countries will need to identify ways to exploit the opportunities presented by a large economically active population and few dependents. Advanced economies will need to maintain living standards as the elderly population expands and the workforces contracts.

The world population has more than doubled since the 1960s and is projected to continue growing in coming decades. Trends in population size and structure are likely to vary greatly between countries and regions, influenced by a range of factors such as economic growth, improving public health, education and migration. This chapter will review these drivers, the resulting population trends and their implications for societies in Europe and elsewhere.

## 1.1 Key drivers of global population trends

### *Fertility and mortality rates*

Among the factors that most directly shape the size and structure of populations are fertility and mortality rates ([2]), and the related issue of life expectancy. Small changes in assumptions about fertility can produce big variations in projections of population size over time. They are therefore an important source of uncertainty regarding future population trends.

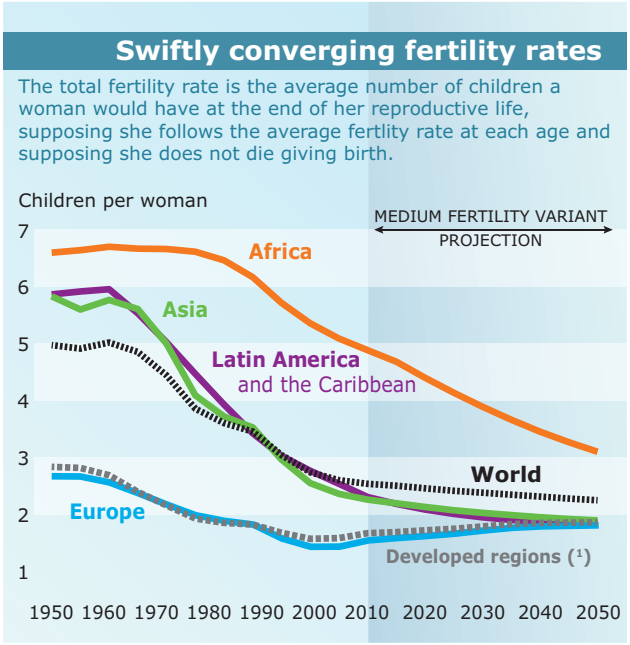
Globally, fertility rates have converged since 1950, with the average rate in most regions falling below 3.0 by 2010 (Figure 1.1). In 2004, the total fertility rate in Asia and Latin America was 2.6, which was half the level in 1970. Africa remains a significant outlier but the fertility rate there is also projected to decline to below 3.0 around 2050.

Mortality rates have recorded similar decreases in recent decades. As a result, global average life expectancy has undergone the most significant increase in history, rising from 48 years in 1950–1955 to 69 years in 2005–2010 (UN, 2013b), although significant regional variations persist (Figure 1.2).

(1) This chapter employs the United Nations categorisation of countries and regions according to their level of economic development (UN, 2013a). As of 2013, the UN defines 49 countries as 'least developed countries', and identifies seven 'developing regions' and four 'developed regions'. As such, references in this chapter to 'developing countries' and 'developed countries' thus relate to countries in those regions. 'Developed countries' are also referred to as 'advanced economies'.

(2) The fertility rate refers to the number of children born to a woman during her lifetime. The mortality rate is the number of deaths in a population or a segment of a population (e.g. infant mortality).

**Figure 1.1 Total fertility rate by selected world regions, 1950–2050**




**Note:** (1) Europe, Northern America, Australia, New Zealand and Japan.

**Source:** UN Population Division, World Population Prospects (2012 revision).

Childhood mortality (i.e. death under the age of five) fell from 203 per 1 000 live births to 60 during that period. According to United Nations projections, global life expectancy will continue rising in coming decades, reaching 75 years by 2045–2050 (UN, 2013b).

In combination, these trends in fertility and mortality rates have important implications for population growth and structure. The immediate effect of fewer births and increasing life expectancy is an increase in the average age of a population.

The interaction of fertility and mortality rates also influences population size. In particular, childhood mortality rates play a central role in determining the replacement fertility rate ([3]), which ranges from less than 2.1 in advanced economies to almost 3.4 in the least developed countries (Engelman and Leahy, 2006). If the fertility rate remains below the replacement rate for a sustained period then the population will decline unless net migration inflows offset the reduction.

The global total fertility rate stood at a little over 2.5 in the period 2005–2010, which was slightly higher than the global replacement rate of approximately 2.3. Both rates are projected to decline in coming decades, with global fertility falling below the replacement level in the second half of the current century (UN, 2014b).

### *Economic development and education*

The trends in fertility and mortality rates are themselves shaped by interrelated drivers, such as economic development; advances in health care, science and governance; and related cultural and lifestyle changes.

Economic development impacts both fertility and mortality. As illustrated in Figure 1.3, fertility rates typically start to drop when a country achieves a per capita income level of USD 1 000–2 000 (2010 PPP) and declines to replacement level when the country reaches a per capita GDP of USD 4 000–10 000. After this income level, fertility continues at or below the replacement level but may increase again in some cases.

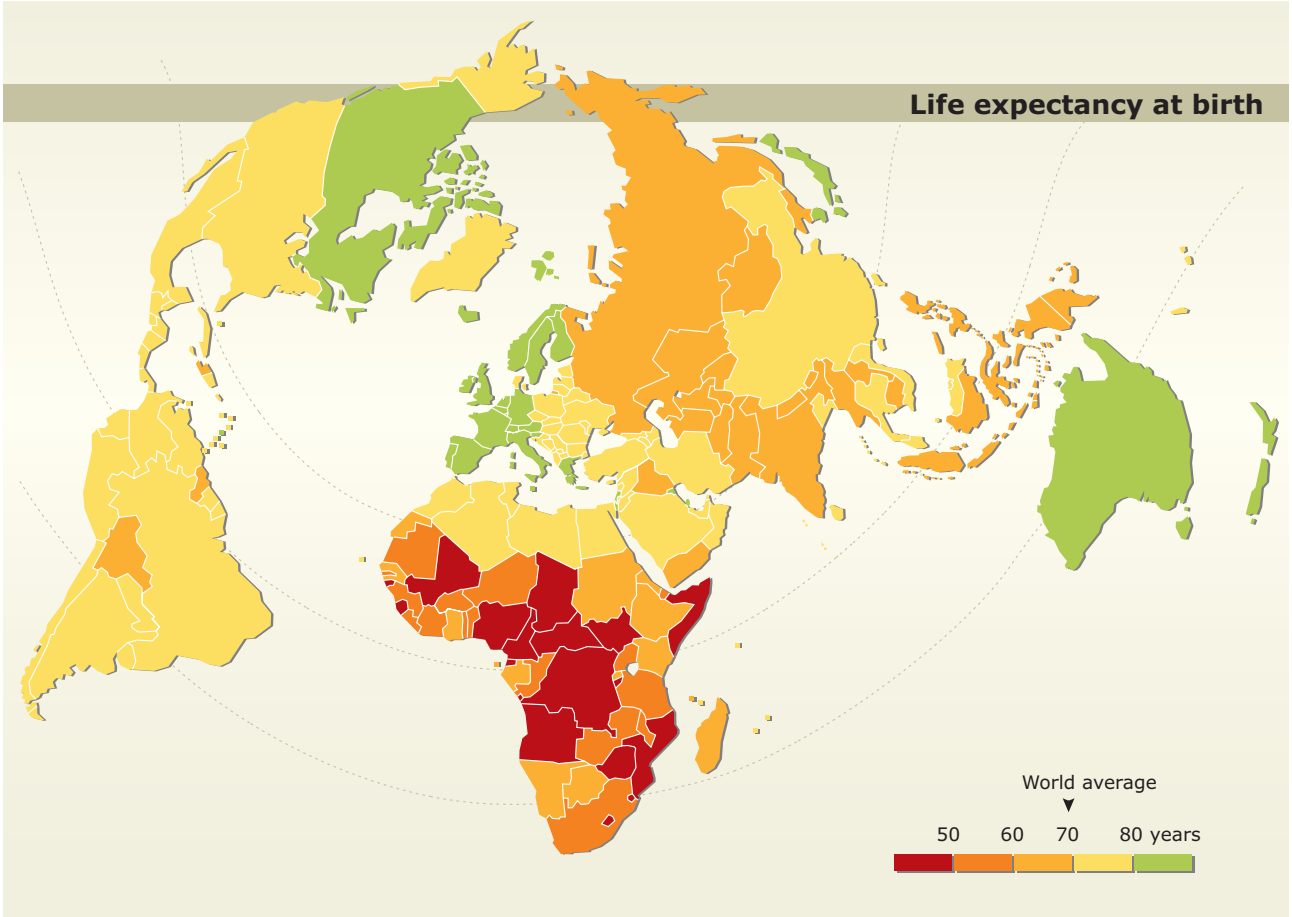
Economic growth is both a cause and a consequence of numerous other societal changes that influence fertility and mortality. For example, increased incomes and savings, as well as the emergence of well financed social security and health systems, can reduce reliance on family assistance during old age, shifting the incentives that inform choices about family size. Economic development can also influence access to reproductive planning and to contraception (UNFPA, 2014).

As national income increases, investments in human capital — in terms of both health and education — emerge as a particularly important determinant of population trends. Improved health services can greatly reduce infant and maternal mortality, as well as influencing life expectancy for the broader population (Claeson and Waldman, 2000). Higher earnings also provide access to better nutrition. And beyond certain levels of economic development, countries tend to reduce some types of pollution (Van Alstine and Neumayer, 2010).

Education is recognised as having a particularly marked impact on fertility rates (Figure 1.4). For

([3]) 'Replacement fertility rate' refers to the average number of children that the women in a population must have during their lifetime in order to sustain a constant population size. Variations in the rate between countries reflect differences in the likelihood that female children will survive to child-bearing age, as well as differences in the ratio of female to male children born.

**Figure 1.2 Global life expectancy at birth, 2011**




**Note:** Data for 2011 (or most recent data available).

**Source:** World Health Organization, 2014.

example, a study addressing 24 sub-Saharan countries found that birth rates were four times as high among uneducated girls aged 15–19 than among those with at least secondary schooling (UNFPA, 2012). The importance of education is also reflected in population growth projections. One study addressing the implications of different education levels for population growth projects a global population of 8.9 billion in 2050 based on its 'highest education' scenario and a population of 10.0 billion in its 'lowest education' scenario (Lutz and Samir, 2011).

### *Key drivers of migration*

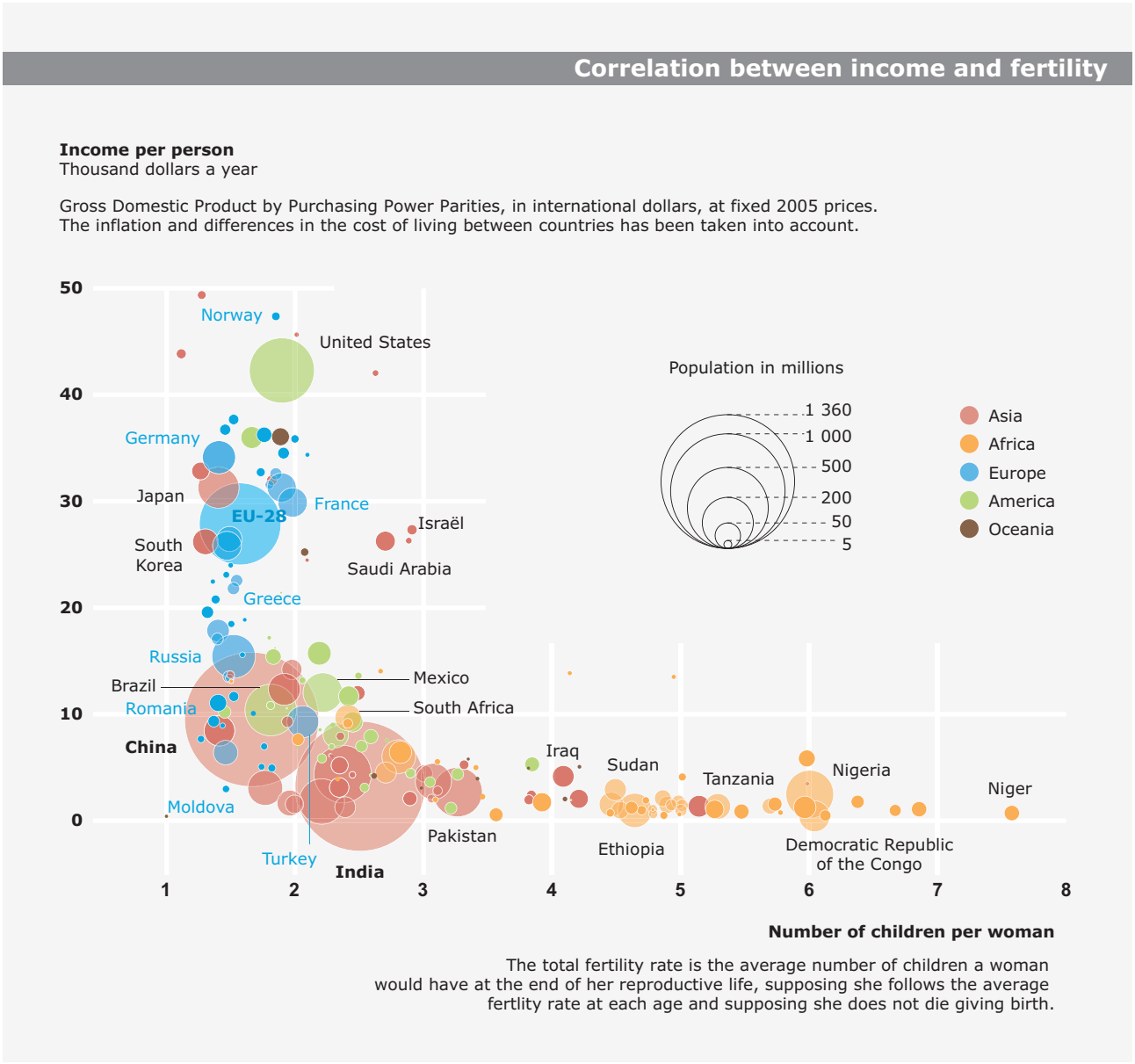
Another key determinant of the size and structure of national or local populations is migration, which is itself a manifestation of complex economic, social and environmental drivers.

Differentials between the earnings available in different locations are a powerful incentive for migration — both within countries (see GMT 2 on urbanisation) and between countries (IOM, 2013). Such movements can have implications for the population size and age structure at the source and destination locations, exacerbating or counteracting demographic trends at the national level.

Similarly, conflict, natural disasters and environmental degradation have long been recognised as catalysts for forced migration (IOM, 2013). In recent years, climate change has emerged as additional driver, potentially exacerbating existing migration pressures by threatening livelihoods and increasing exposure to natural hazards (ICMPD, 2011; Foresight, 2011).

The links between environmental change and migration are complex, however, linking to many

**Figure 1.3 Correlation of fertility rates and per capita GDP, 2010**



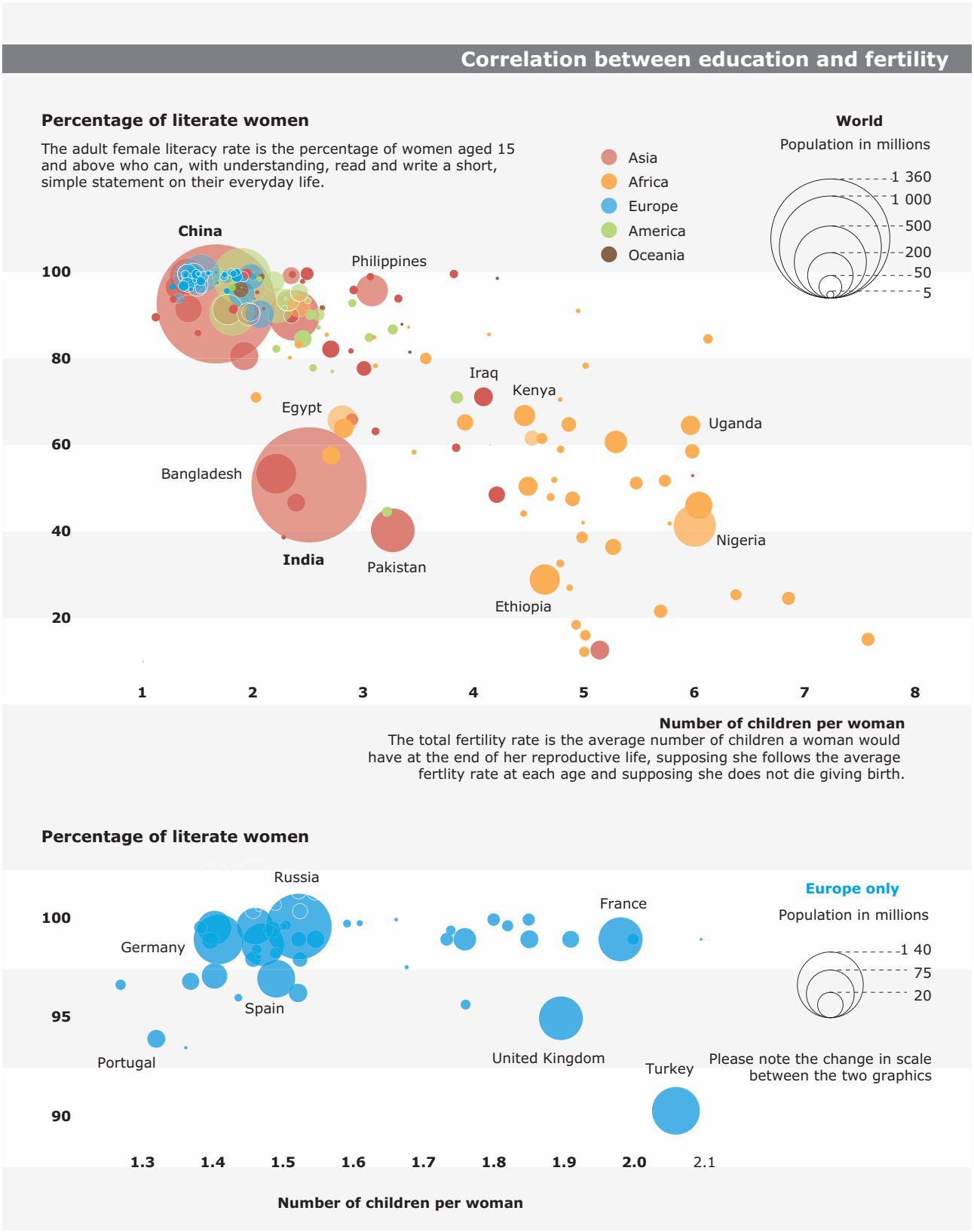

**Note:** European Union countries are represented both individually and collectively (EU-28). Data for 2012–2013.

**Source:** World Bank, UN Population Division, Gapminder.org.

other social and political drivers of migration. Economic migration, for example, can often be partially or wholly rooted in environmental degradation. This makes it very difficult to generate precise estimates of environmentally induced migration (IOM, 2009; Foresight, 2011).

The precise effects of climate change and environmental degradation are rendered even more complicated by the fact that in some instances they can actually deter migration. This could occur, for example, if environmental change means that communities lack the resources to meet the costs of relocating (Foresight, 2011).

**Figure 1.4 Correlation between fertility and adult female literacy rate, 2000–2009**




**Note:** Data for 2012 (or most recent value).

**Sources:** UNESCO; Gapminder.org; CIA World Factbook; 2013.

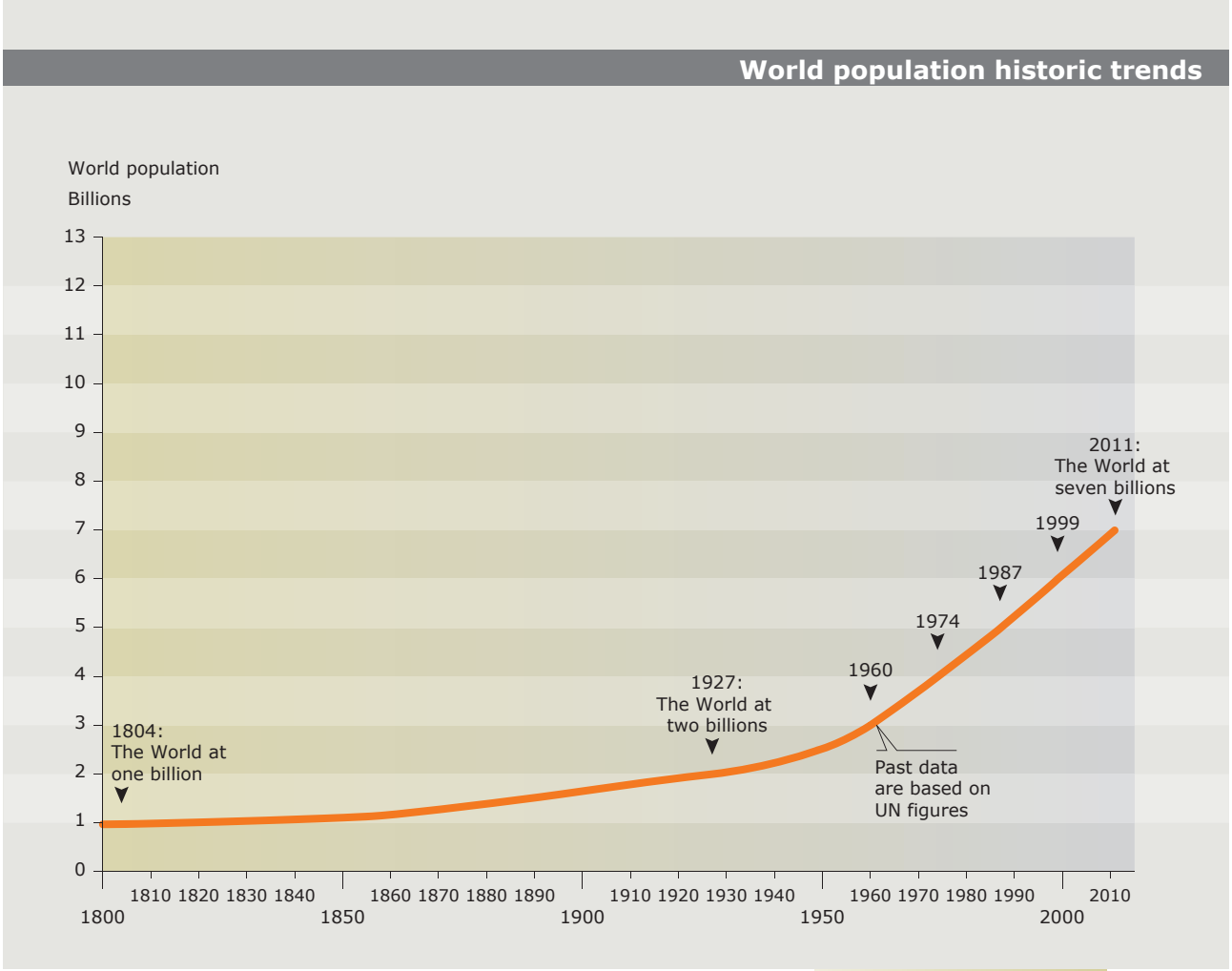
## 1.2 Trends in population size and structure

*Global population growth*

Driven in part by the economic and social forces described above, the world population has more than doubled since the 1960s. Today, it exceeds seven billion people (UNFPA, 2011) and continues to grow by approximately 1.1 % annually (UN, 2013b). In the decades ahead the rate of global population growth appears likely to slow, although the interaction of the different drivers creates many uncertainties — a fact reflected in large differences between projections.

As illustrated in Figure 1.5, according to UN estimates (UN, 2013b) the world population will be between 8.3 billion and 10.9 billion in 2050, with a medium variant of 9.6 billion ([4]). Thereafter the population is expected to keep rising, exceeding 10 billion at the end of the century.

**Figure 1.5 IIASA and UN world population projections**




**Sources:** UN Department of Economic and Social Affairs, The World at Six Billion, 1999.

([4]) The medium variant is defined by certain assumptions about future fertility trends in developed and developing countries. It is not a 'mean' growth estimate.

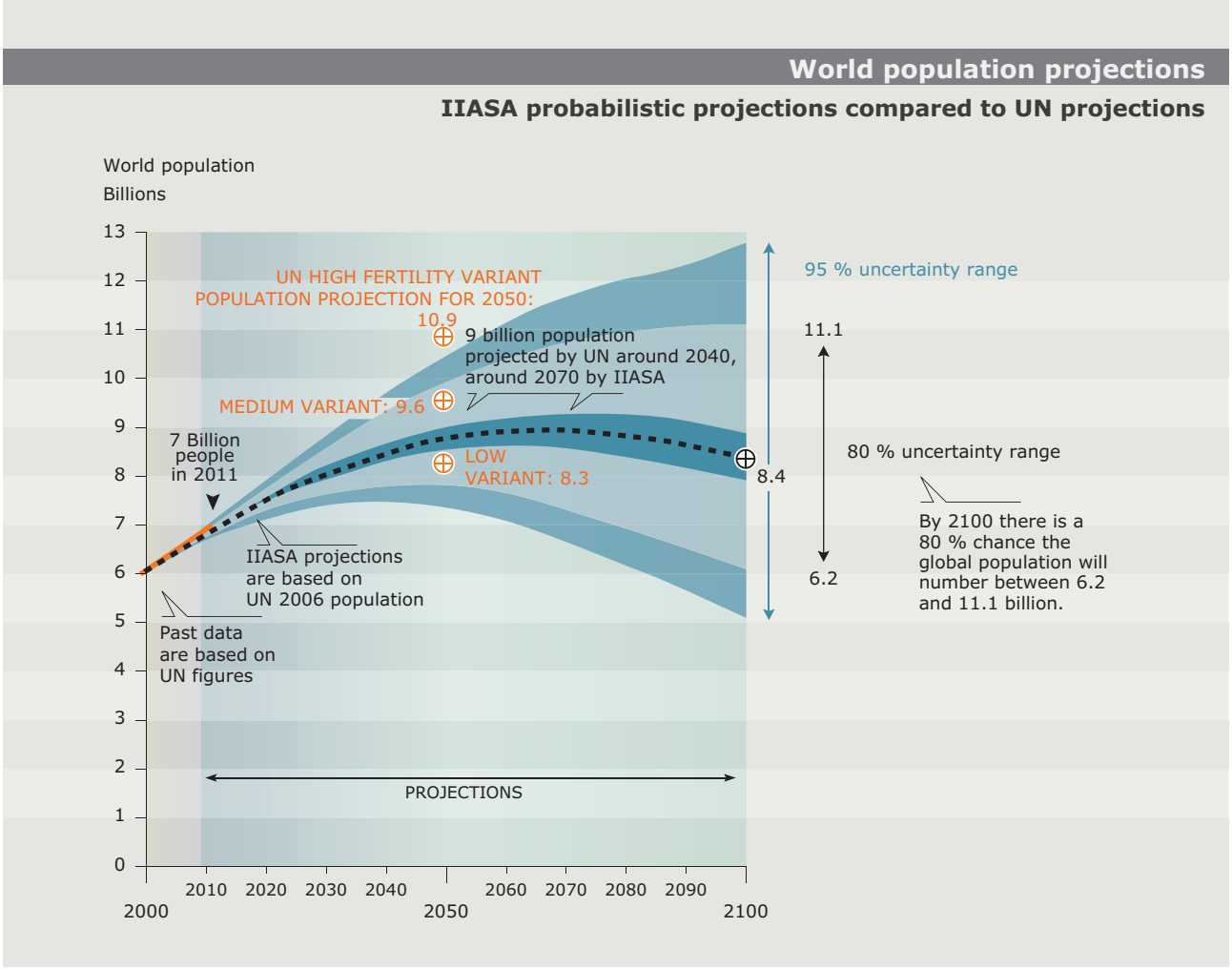
In contrast, IIASA (2007) projects a medium-variant population of 8.75 billion in 2050, with a range from 7.8 to 9.9 billion. It foresees the global population peaking at 9.45 billion around 2070 and then starting to decline.

The projected global trends mask significant variance in the population growth in different areas of the world. The UN estimates that the population of today's developed regions will grow marginally from 1.25 billion in 2013 to 1.3 billion by 2050.

This increase is due to a projected annual inflow of 2.4 million immigrants in the period 2013–2050. After 2050 inward migration is projected to decrease, resulting in a slight reduction in the population in these regions. Europe's population is expected to begin its decline sooner, falling from 739 million in 2011 to 709 million in 2050 in the medium variant scenario.

With the population in more developed regions growing only very slightly, almost all of the

**Figure 1.5 IIASA and UN world population projections (cont.)**




**Note:** The UN Population Division studies fertility-evolution scenarios to produce high, medium and low variant figures, whereas the IIASA bases its calculations on assumptions for fertility, mortality and migration (the latter only affecting regional projections).

**Sources:** Lutz W., Sanderson W. and Scherbov S., 2007 Probabilistic World Population Projections, International Institute for Applied Systems Analysis (IIASA); UN Population Division, World Population Prospects (2012 Revision).

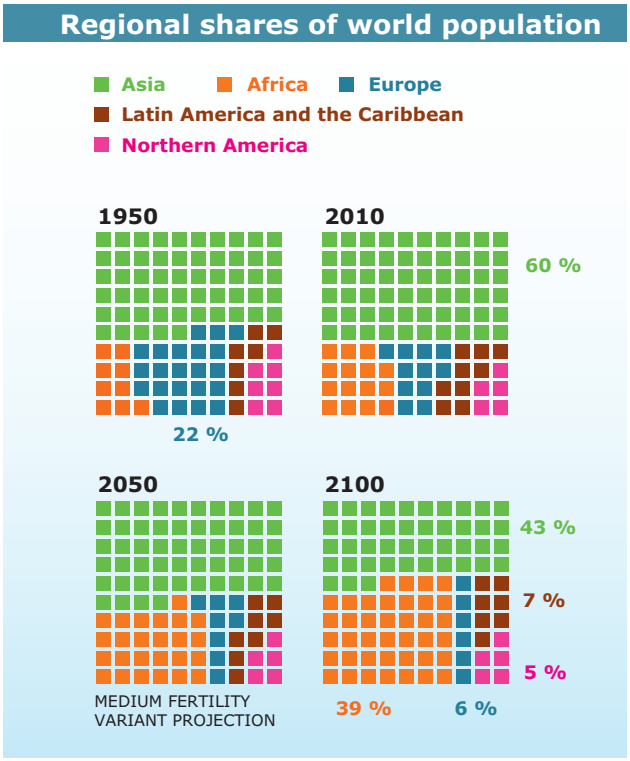
projected increase in the global population in coming decades is concentrated in countries currently categorised as less developed. The UN foresees the population of these countries rising from 5.9 billion in 2013 to 8.2 billion in 2050. As illustrated in Figure 1.6, this implies that today's developed regions will account for just 12 % of the world population in 2050, down from 16 % in 2010 and 27 % in 1950 ( UN, 2013b).

Among the less developed regions, Asia and Africa are projected to dominate population growth in coming decades, with particularly robust increases expected in the 49 'least developed countries' (LDCs). The UN estimates that the population of the LDCs will double from 898 in 2013 to 1.8 billion in 2050, which would represent almost a fifth of the global population (UN, 2013b).

In today's developing regions, population trends are expected to shift towards the stagnation and decline that have already commenced in developed regions. Despite continuing population growth in much of the developing world, in the future, some developing nations will begin to experience population ageing, stagnation and decline in coming years. For example, the populations of Russia, Ukraine and several Caribbean countries will decline in the period 2010–2030. Indeed, Russia's population is projected to decline by 10 million over that period, and a further 10 million by 2050 (UN, 2013b).

One effect of these uneven growth trends will be a significant adjustment in the geographical distribution of the world population (Figure 1.6). The contribution of Asia, Europe and South America to the global total is expected to decline during the remainder of the century. In contrast, Africa's contribution is expected to expand significantly, from less than 15 % of the world total in 2010 to more than 35 % in 2100.

**Figure 1.6 Distribution of the world population by major area, medium variant, 1950, 2010, 2050 and 2100**




**Source:** UN Population Division, World Population Prospects (2012 revision).

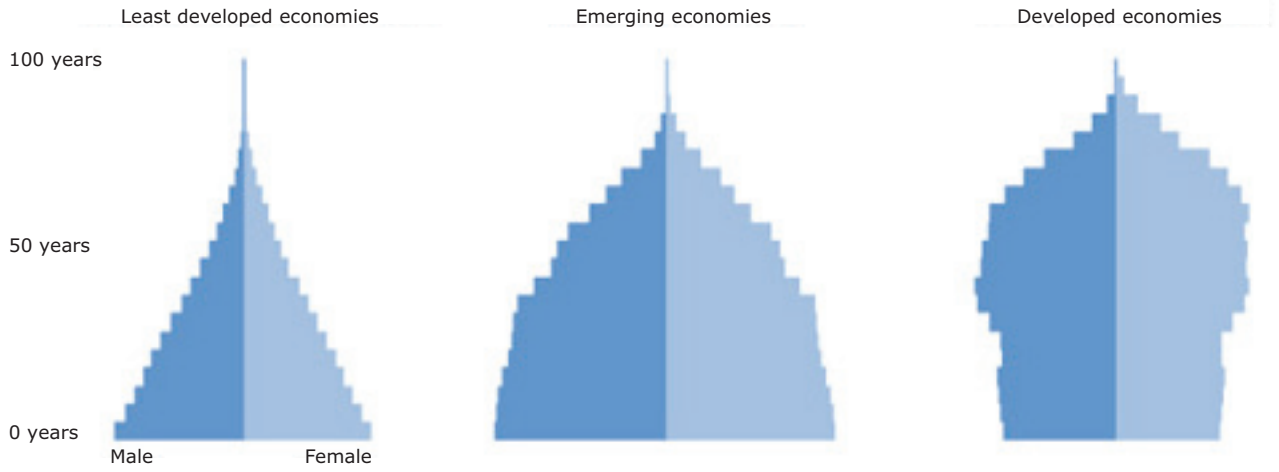
*Changes in population age structure*

Changes in population age structure are an inevitable consequence of the adjustments in fertility and mortality rates associated with socio-economic development. As socio-economic conditions improve, structural changes in the population tend to occur in three phases (NTA, 2011a; Figure 1.7):

- In the least developed economies, high fertility rates are balanced by high infant and child morality rates. As infant and child mortality rates decline, the proportion of children in the total population increases.
- Fertility rates decline and the many young people born during the era of high fertility enter adulthood. As a result, the working-age population expands relative to the populations of young and old dependents.
- The large workforce enters retirement and the smaller generations that follow imply a reduced working age population. At the same time, increased life expectancy means a further increase in the population of elderly dependents relative to workers.

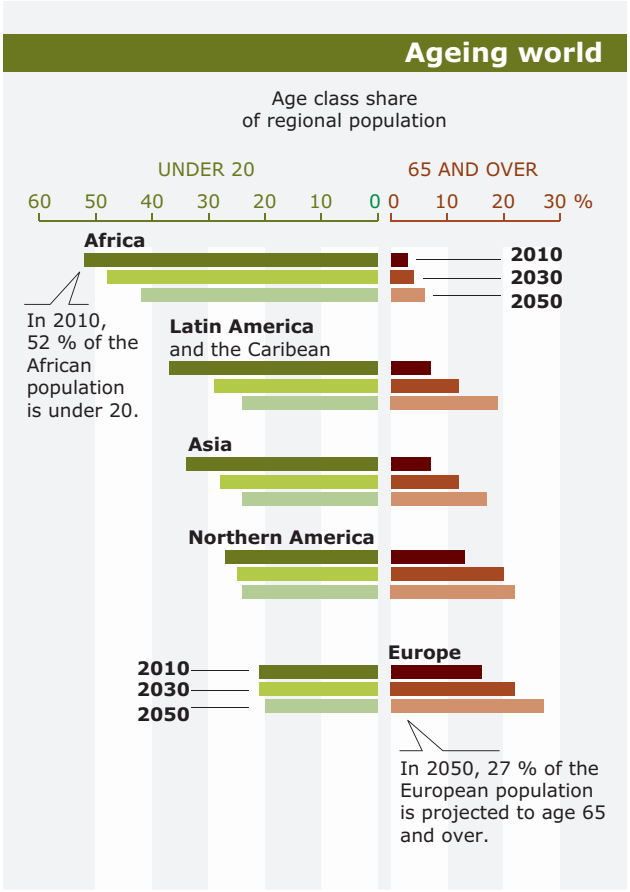
While this sequence of structural changes appears to occur globally, populations vary greatly in how far they have progressed through the transition. As illustrated in Figure 1.8, in 2010 just 4 % of Africa's population was aged 65 or more, while 51 % were under 20 years old. In Europe, the figures were 16 % and 21 % respectively. Looking ahead, it is projected that children will still account for more than 40 % of the population in Africa in 2050.

**Figure 1.7 Population pyramids for the least developed economies, developing economies and developed economies**




**Source:** NTA, 2011a.

**Figure 1.8 Percentage of total population under age 20 versus age 65 and above in major regions of the world, 2010 and projected for 2030 and 2050**



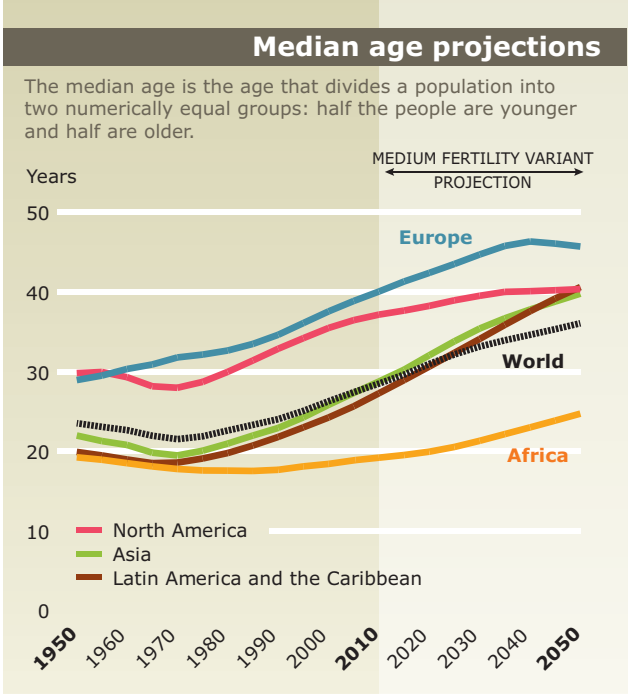

**Source:** UN Population Division, World Population Prospects (2012 revision).

Notwithstanding the variance in global population change, population ageing is an increasingly important trend in both developed and developing nations. The median age declined in most world regions in the first two decades after 1950 as child populations expanded but has since increased markedly (Figure 1.9). Again, the trends vary between regions. In Africa, the increase did not commence until the 1990s. In Europe, the process of demographic transition is more advanced, resulting in a steady rise in the median age since 1950.

Globally, the population aged 60 or over is expected to rise from 841 million people in 2013 to two billion in 2050. In developing regions, the population aged 60 or over is expected to grow at an annual rate of over 3 % in the next three decades, rising from just 9 % of the population today to 20 % in 2050 (UN, 2013b). In developed regions, the percentage aged 60 or over is projected to increase from 22 % to 32 % in the same period (UN, 2013b).

Alongside these changes in the size and structure of populations, coming decades are expected to see substantial shifts in the distribution of populations. Half of the world's population today inhabits cities and this figure is likely to reach 67 % by 2050 (UN, 2012). This would imply an increase in the global urban population from 2.6 billion in 2010 to 5.2 billion, meaning that cities would account for all of the population growth up to 2050.

**Figure 1.9 Median age projections, 1950–2050**




**Source:** UN Population Division, World Population Prospects (2012 revision).

### *Shifting migration trends*

Since the 1960s, migration patterns have been marked by an increase in the share of migrants from developing countries, with developed countries receiving the majority of international migrants. Between 1960–1970 and 2000–2010, the average annual net number of migrants to Europe grew from 95 000 to nearly 1.9 million (UN, 2013b), steadily increasing in significance as a component of the European population (Figure 1.10). Indeed, 20 of the 30 countries that experienced population growth in 2000–2010 primarily due to net migration (rather than natural increase) are European (UN, 2011a).

By 2010, nearly 70 % of international migrants were from developing regions, with half of these migrating to developed regions (OECD, 2012). Overall, 59 % of global international migrants in 2013 were living in developed regions and accounted for 11 % of the population there (Table 1.1).

At present, the trend of migration from developing to developed regions appears to be continuing. The UN (2011b) estimates that 32 of 45 developed countries were net receivers of migrants over the period 2000–2010. And although migration into the OECD countries and Russia saw a modest slowdown in 2008–2010, largely due to the global economic crisis, it began to increase again in most of these countries in 2011 (OECD, 2012).

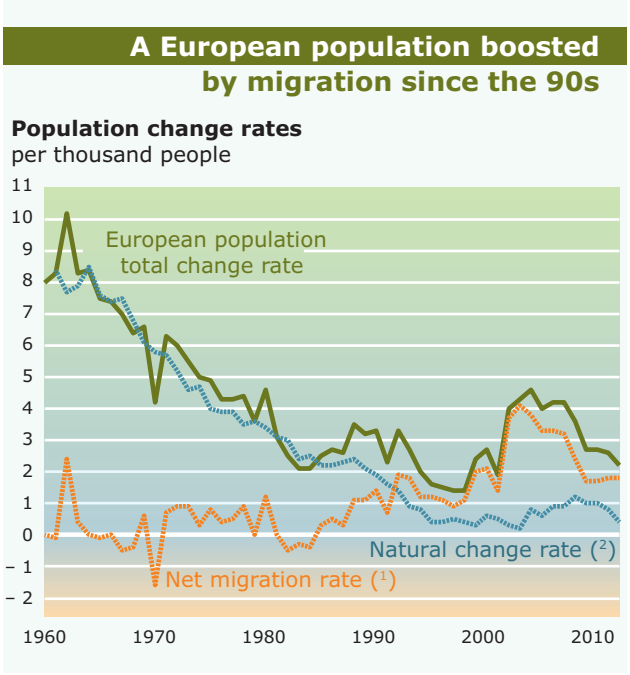
Looking further ahead, however, the direction of migration flows is likely to evolve as the economic incentives shift. Already, several countries in developing regions (e.g. Kuwait, South Africa and Thailand) have been attracting significant numbers of migrants, including refugees from neighbouring countries (UN, 2011b). China and India, for example, could attract more labour migrants as their working-age population slows whereas wages rise. Equally, labour migration into the United States is projected to decrease as certain areas of South America are expected to attract labour migrants that would traditionally have gone to the United States (NIC, 2008).

**Table 1.1 Estimated number of international migrants and their percentage distribution by major area, 2013**

| Geographic region | Number of migrants (million) | As a % of total migrants in the world | As % of regional population |
|---|---|---|---|
| World | 231.5 | 100 | 3.2 |
| Developed regions | 135.6 | 58.6 | 10.8 |
| Developing regions | 95.9 | 41.4 | 1.6 |
| Africa | 18.6 | 8.1 | 1.7 |
| Asia | 70.8 | 30.6 | 1.6 |
| Europe | 72.4 | 31.3 | 9.8 |
| Latin America and the Caribbean | 8.5 | 3.7 | 1.4 |
| Northern America | 53.1 | 22.9 | 14.8 |
| Oceania | 7.9 | 3.4 | 20.7 |

**Source:** UN, 2014a.

**Figure 1.10 European population change by component, 1960–2009 (per 1 000 population)**




**Note:** EU-28: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia Slovenia, Spain, Sweden and the United Kingdom.

(1) Including statistical adjustment.

(2) Number of births minus number of deaths per thousand people.

**Source:** Eurostat, 2014.

Climate change will exacerbate existing pressures on migration, and could lead to changes in migration patterns (ICMD, 2011). However, the complexity and uncertainty of the associated drivers is reflected in widely diverging projections for climate change-induced migration. ESPON (2013), for example, conclude that climate change-induced migration may be slight compared to migration for other reasons. In assessing the current state of knowledge on the subject, the International Organization for Migration found that 200 million people are expected to migrate by 2050 but projections vary from 25 million to one billion (IOM, 2009).

UN analysis (taking into account the migration policy stance of developed countries) predicts that international migration flows to developed regions will decline smoothly in the coming decades. The average number of annual migrants is projected to ease from 3.4 million people in the period 2000–2010 to about 2.3 million per year in 2040–2050 (UN, 2011b).

## 1.3 Implications

The changing size and structure of populations across the world has wide-ranging implications, driving other global trends such as economic growth and increasing environmental burdens. At each phase of the demographic transition, the shifting population structure and related migration flows bring opportunities and difficulties.

### *Economic and environmental impacts of expanding workforces*

Population trends directly influence economic production by shaping the size and age structure of the workforce. In many countries, strong growth in the working age population, alongside improvements in human capital (e.g. health and education) and investments in infrastructure and technology, have contributed to rapid economic growth in recent years (WEF, 2012).

The expansion in workforces and skills is likely to vary globally, however. Samir et al. (2010) project that Africa's population will grow significantly up to 2050 (Figure 1.11), with a substantial youth cohort persisting throughout, in parallel with a growing older population. Asia will experience marked population growth and significant ageing. In contrast, Europe's population is projected to contract and age. In all regions the share of the population with secondary and tertiary education is projected to increase but the expansion is very substantial in Africa and Asia. Age structure of human capital (education levels) influences future societal economic growth and democracy processes, longevity and disabilities of population, as well resilience of individuals along many dimensions of well-being (Figure 1.11).

This rebalancing of productive potential is already apparent in economic output data. While the advanced economies dominated growth during the 20th century, emerging economies are rapidly gaining prominence. The BRIICS countries accounted for 21 % of global output (in PPP terms) in 2000 but by 2010 that had already risen to 32 % (OECD, 2013). The OECD projects that their economic production will exceed the GDP of OECD members by around 2030, and will account for 56 % of global GDP by 2050 (OECD, 2013; GMT 6).

As illustrated in Figure 1.12, rapid economic growth in developing regions is projected to translate into marked reductions in the proportion of populations living in extreme poverty.

Population growth and related economic development can boost humanity's competition for non-renewable resources (GMT 7). They can also increase the burden on the environment through increased consumption of biotic resources (GMT 8) and via the production of harmful emissions and waste (GMT 10). Environmental damage may be particularly significant in regions such as sub-Saharan Africa and parts of south-east Asia, where high population growth rates coincide with a high and direct dependency on natural capital for economic development (OECD, 2012).

### *Employment opportunities and threats to social cohesion*

While the surge in workforce numbers offers the potential of rapid economic expansion, it also generates challenges. One important issue is the need to create sufficient employment opportunities for the young and fast-growing workforce. Failing to create such opportunities is a waste of valuable human resources and potentially a source of conflict.

While the world as a whole reached a peak in its share of young people (aged 15–24) around 1985 (Figure 1.13), in the least developed countries this peak occurred in 2005 and is projected to remain high in the coming decades. By 2025, three quarters of the countries with youth bulges (particularly large cohorts in the 15–24 age bracket) will be located in sub-Saharan Africa, with the rest located in the Middle East and a few across Asia and the Pacific Islands (Ortiz and Cummins, 2012). The largest youth bulges are found in some of the world's most fragile countries, which are likely to be particularly vulnerable to civil unrest and ill-equipped to respond.

The challenges facing those countries currently experience youth bulges have been exacerbated in recent years by the global economic crisis, which has disproportionately impacted young people. Since employment itself provides an important means of developing skills and experience, the jobs crisis has serious implications for the future employability and earnings potential of a substantial group of young workers (Ortiz et al., 2012).

### *Increasing burdens of ageing populations*

In other countries further advanced in the process of demographic transition, threats to social cohesion are more likely to arise from population ageing and decline. While these trends may alleviate some of the growth in demands on ecosystems, they can threaten the social security and public health systems established in the context of growing working-age populations. As old-age dependency ratios increase, the social contract may come under strain. Public finances could worsen as a smaller economically active population is relied upon to provide for the pensions, health care and other needs of the elderly.

Preserving living standards as populations age and avoiding a breakdown in social cohesion will require that countries use the period when they benefit from a disproportionately large workforce to prepare for subsequent population ageing and decline. This could involve two sets of measures: first, investing some of the economic returns into education, skills, health and infrastructure that can enable a relatively smaller workforce to maintain or enhance economic output (Figure 1.11); second, building up savings to finance pensions, thereby reducing the need reliance of the elderly on transfers from current workers.

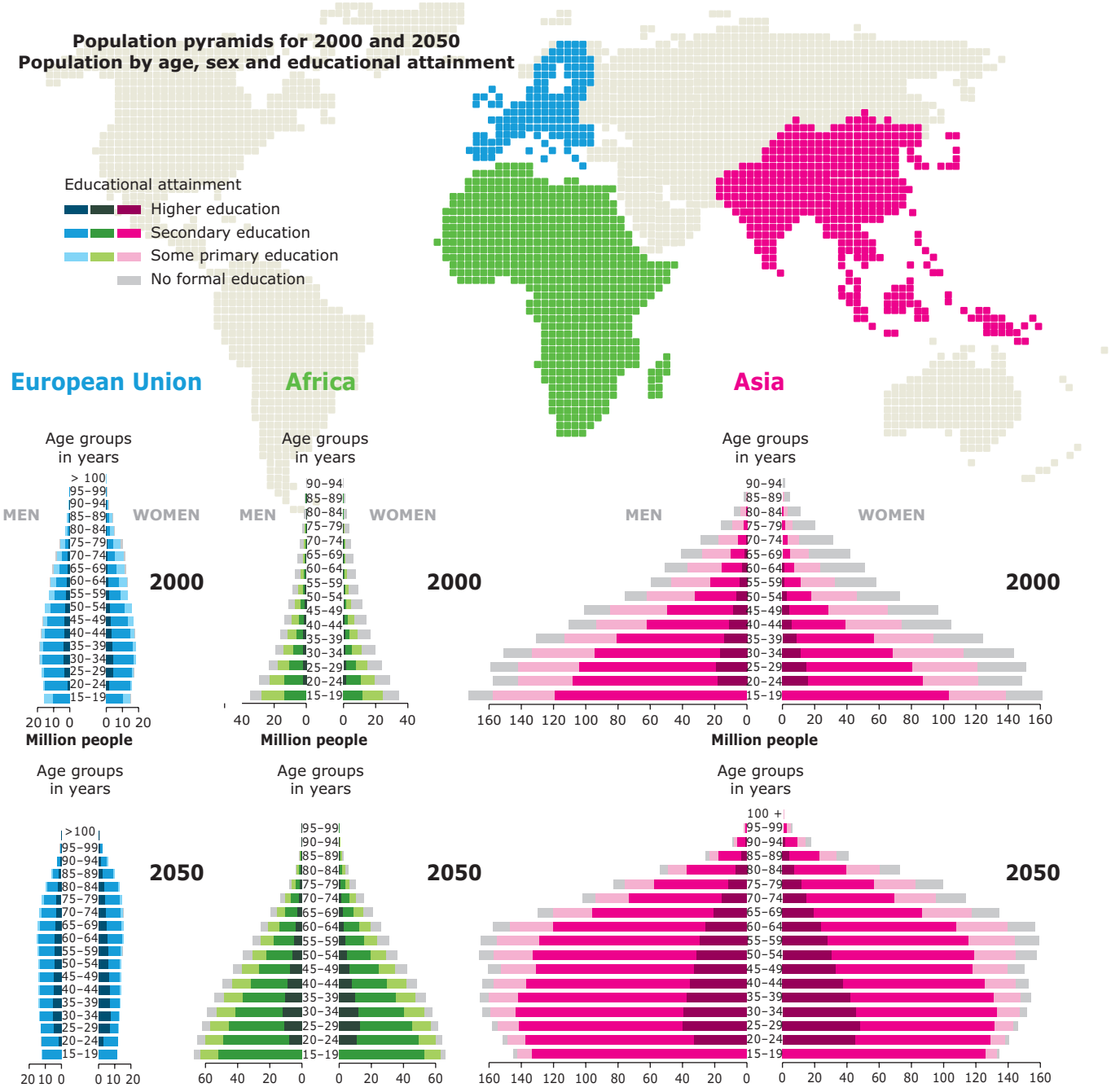
China has made very significant progress in improving educational enrolment. By 2030 it is expected to have more educated people of working age than Europe and Northern America together (Lutz and Goujon, 2001). Whether the large populations of young people concentrated in the world's poorest countries will benefit from such investments is unclear.

### *Migration and workforces in developed regions*

In past decades, migration from developing regions has often delivered economic benefits to the advanced economies. In addition to mitigating population ageing (in part by affecting fertility rates), immigration can increase the working-age population and offering valuable skills to the labour market. It is estimated, for example, that 30 % of migrants in the OECD have tertiary education (OECD and UNDESA, 2013). Migration flows have also brought changes in the ethnic and cultural complexion in the recipient countries.

For developing regions, past migration flows have brought significant costs but also some benefits. The loss of highly skilled persons is one major concern, potentially undermining the productive capacity and

**Figure 1.11 Population pyramids for Europe (left), Africa (centre) and Asia (right) in 2000 and 2050**




**Note:** Please note that children under 15 are not represented on the age pyramids.

2050 education attainment calculated according to the Global Education Trend (GET) scenario.

The GET scenario is not derived from a simple assumption. It is based on the country's educational expansion historical trend.

**Source:** Samir et al., 2010.

development prospects of poor nations. According to OECD and UNDESA (2013), one in nine tertiary educated persons born in Africa resides in OECD countries. The situation is especially worrying in small countries and island states. For example, in 2010 almost 90 % of highly skilled persons born in Guyana lived in OECD countries. In contrast, large countries in developing regions, such as Brazil, China, India and the Russian Federation, had low emigration rates of the highly skilled (below 3.5 %).

**Figure 1.12 Reductions in population living in extreme poverty**


**Source:** World Bank PovcalNet, 2013; Uri Dadush and Bennett Stancil, The World Order in 2050, Carnegie Endowment for International Peace, Policy outlook, April 2010.

At the same time, however, migrant workers provide a major source of revenues for the populations that they leave behind. The World Bank estimates that remittance flows to developing countries reached USD 414 billion in 2013 — nearly three times the size of official development assistance. By 2016, they are projected to increase to USD 540 billion. Transfers on this scale represent a crucial source of income to support livelihoods and finance development.

The projected changes in migration flows in coming decades are likely to bring some redistribution of the benefits and costs of migration. In developed regions, reduced immigration to some countries may imply that populations age more rapidly, increasing the ratio of dependents to workers. In relatively prosperous parts of the developing world, increasing inflows of migrants may produce the opposite effects.

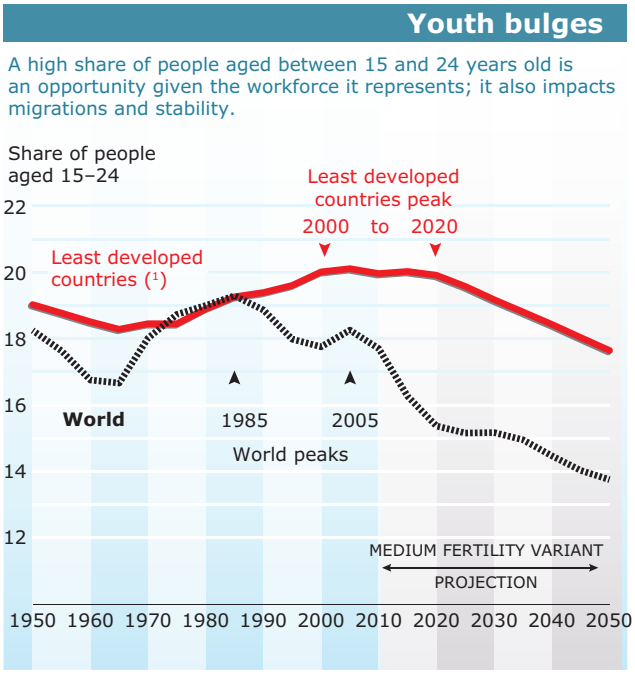
## 1.4 Challenges for Europe

Global environmental policy today seeks to address and mitigate the environmental effects of anticipated population growth, particularly in the most vulnerable areas (typically developing regions).

Costs related to ageing, health and education (pensions, expanded education spending, labour shortages) will increase fiscal pressures, and a drying up of migration could make things worse. Both, population age structure and the specific features of economic life-cycle in each society (including consumption and production patterns) have important economic and policy implications. The legacy of the crisis — with often large increases in public debt — unfavourable demographics, and rising spending pressures in areas like health and education all contribute to substantial fiscal pressures. In several cases, structural reforms can mitigate fiscal pressures without harming growth and equity, thus providing a way to avoid difficult trade-offs (OECD, 2014).

In Europe as a whole, population decline later in the current century may help ease environmental

**Figure 1.13 Share of youth in world population and in least developed countries, 1950–2050**




**Note:** (1) Afghanistan, Angola, Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, Central African Republic, Chad, Comoros, D.R. Congo, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Haiti, Kiribati, Lao, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Myanmar, Nepal, Niger, Rwanda, Samoa, São Tomé and Príncipe, Senegal, Sierra Leone, Solomon Islands, Somalia, South Sudan, Sudan, Timor-Leste, Togo, Tuvalu, Uganda, Tanzania, Vanuatu, Yemen and Zambia.

**Source:** UN Population Division, World Population Prospects: (2012 revision).

pressures, although it will need to be coupled with sound environmental policy in order to achieve substantial reductions in resource use and pollution. Moreover, demographic trends create some difficult challenges for European policymakers. The expanded workforce during recent decades has underpinned substantial improvements in living standards and the development of the welfare state. Sustaining these systems will present significant challenges in the light of population dynamics.

It is important to stress, however, that projected demographic trends vary markedly across Europe. According to Eurostat (Eurostat, 2011a), the EU-27 population will remain fairly static in the period 2010–2060, increasing by 5 % between 2010 and 2040 and then declining slightly. Some Member States are projected to grow substantially, however, for example Ireland (46 %), Luxembourg (45 %), Cyprus (41 %), the United Kingdom (27 %) and Belgium (24 %). Others are expected to contract significantly, such as Bulgaria (27 %), Latvia (26 %), Lithuania (20 %), Romania and Germany (19 %).

These trends would have important implications for the distribution of Europe's population, and for the related distribution of economic output, resource use and environmental pressures. For example, according to the Eurostat projections, Germany's population would decline from 82 million to 66 million, whereas the United Kingdom would become the EU-27's largest population, growing from 62 million to 79 million.

The contrasting population dynamics would also result in variance in the burden of ageing populations. Although the proportion of the population aged over 65 is expected to increase in all European countries up to 2060, the projected rates range from 22 % in Ireland and 25 % in the United Kingdom, Belgium and Denmark to 36 % in Latvia, 35 % in Romania and Poland and 33 % in Bulgaria, Germany and Slovakia (2011c).

Understanding and anticipating Europe's demographic trends will allow the EU to reach out to its population, to promote awareness, and to invest in its human capital, in order to help manage risks and drive a more sustainable economy. EU Member States may be able to pre-empt certain associated challenges, for example via smart urban design or effective support structures for older populations. Such measures could help tackle some of Europe's environmental and sustainability issues more quickly and effectively.

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