

## World population: seven billion today, how many tomorrow?

Gilles Pison\*

The number of people in the world is increasing rapidly, raising concerns about overpopulation. Demographers are projecting that growth will continue for several more decades, but at a steadily slower pace. As Gilles Pison explains here, the world population is set to rise by a further one to four billion over the next century, but should level off thereafter.

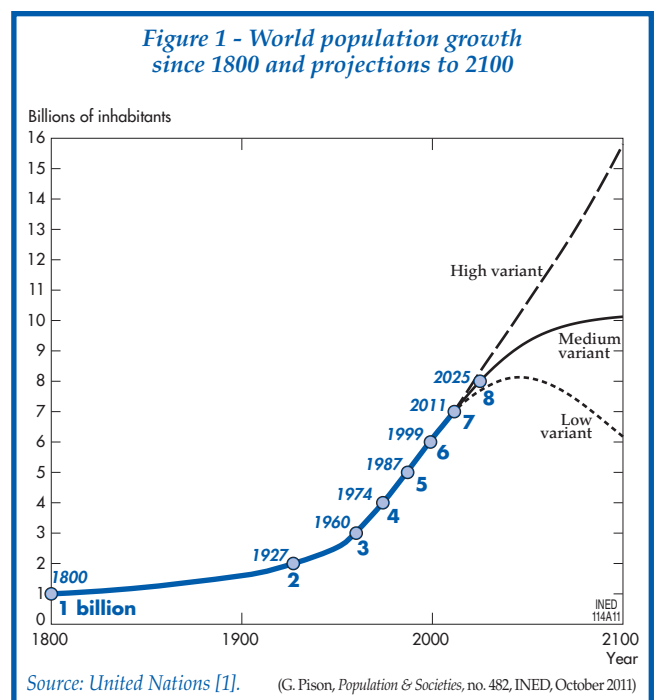
According to the United Nations, the world population will reach 7 billion at the end of October 2011 [1] (Box). From a total of just one billion in 1800, it has risen seven-fold over the last two centuries, and will continue to increase. Under the United Nations medium variant projections (Figure 1) the planet will be home to 10 billion people by the end of the twenty-first century. The high and low variants, representing the extremes, give figures of 16 and 6 billion, respectively, in 2100. Why can we expect the growth trend to continue? Will the population level off over the long term?

### ◆ Growth is linked to the demographic transition

Until two centuries ago, the population was stable or increased very slowly because birth rates and death rates were almost equal. Severe mortality crises, caused by epidemics and famine, maintained life expectancy at levels of between 20 and 25 years, due notably to very high infant mortality. To offset these high levels of mortality, mean fertility was also high, at around 6 children per woman. In the western world, this status quo was disrupted two centuries ago. With economic

progress, early advances in hygiene and medicine, and the emergence of modern government, epidemics and famine were gradually eradicated in Europe and North America. Mortality also fell – infant mortality in particular. But as families were still very large, births

Figure 1 - World population growth since 1800 and projections to 2100



\* Institut national d'études démographiques (Ined)

started to outnumber deaths and the population began to increase. After one or more generations, adults started to realize that most children were now surviving beyond infancy, and that the cost of sending them to school was becoming a heavy burden. With the spread of the Enlightenment, which advocated individualism and freedom from religious constraints, the notion of voluntary birth control took hold across Europe and North America, and family size decreased. But as mortality was still declining, births continued to outnumber deaths and the population continued to grow. It is not until later generations that this growth started to slow down, as the number of births decreased to a level matching the increasingly stable number of deaths. This marked the end of the so-called “demographic transition”. In the modern theoretical equilibrium, which has never actually been reached, but towards which the developed countries are tending, fertility would be close to two children per woman and the mean length of life equal to or above 70 years. Births and deaths would practically even out.

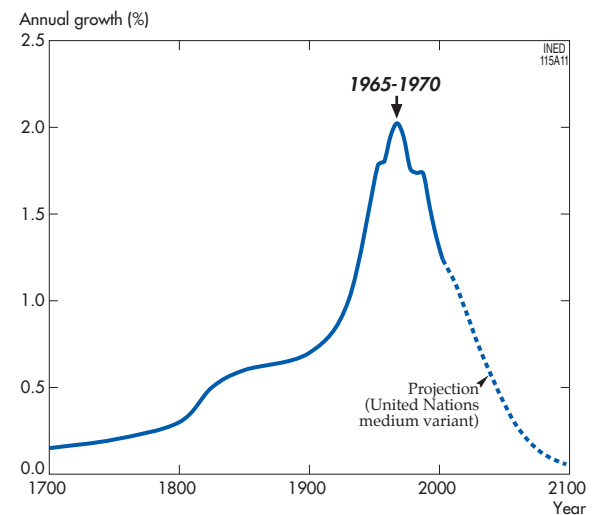
This process, which has already taken place in the developed world, is now under way in other countries. It explains why their populations are now increasing rapidly and fuelling global demographic growth.

### ◆ Population growth will continue, but at an ever slower pace

The world population is still increasing, but more and more slowly (Figure 2). After peaking at more than 2% fifty years ago, annual growth has fallen by almost half (1.1 % in 2011) and, under the United Nations medium scenario (Figure 1), should continue to slow down until the population levels off at around 10 billion one century from now.

The acceleration of growth over the last two centuries reflects the successive entry of different regions of the world into the demographic transition. The growth peak 50 years ago corresponds to a period when fertility was still high in all Southern countries, at between 5 and 7 children per woman. Mortality in these countries, while still much higher than in the North, had been falling for several years or decades by that time, thanks to progress in hygiene and medicine and to socioeconomic development. This produced a surplus of births over deaths which led to steady population increase. The phenomenon had already been identified by demographers, but it was not for some years that the general public became aware of the so-called “population explosion”. More precisely, it signalled the entry of the Southern countries into the demographic transition, at a faster pace than observed in the North some decades or a century earlier. Growth rates of around 3% per year (a doubling of the population in 23 years) were not rare, by contrast with Europe where, from 1880 to 1914, at an

Figure 2 - World population growth rates, 1700 to 2100



Source: United Nations [1]. (G. Pison, *Population & Societies*, no. 482, INED, October 2011)

equivalent stage in the transition, countries with sustained annual growth of 1.5 % were the exception.

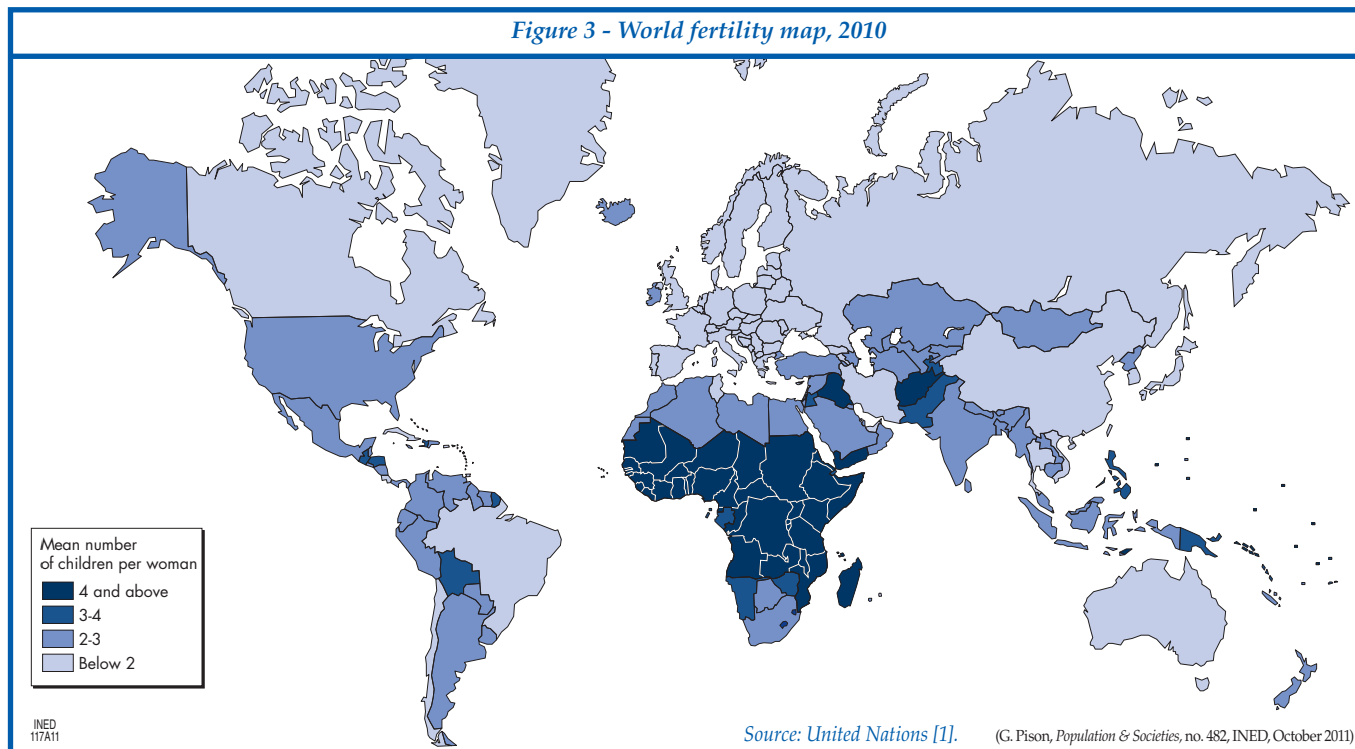
Demographers presumed that the mortality decline in the South would be followed sooner or later by a fertility decline, as had been the case in the developed world. The spread of voluntary birth control had been a slow process in the West – after emerging in the late eighteenth century in certain countries, well before modern contraception, it did not become universal until the second half of the twentieth century – and demographers believed that the South would follow a similar pattern, even if birth control programmes were in place. They were supported in this belief by ethnologists who described the societies in these regions as strongly family-centred and totally opposed to the idea of limiting births.

### ◆ A fast and unexpected fertility decline in Asia and Latin America

Demographers were taken by surprise when surveys revealed the onset of a sharp fertility decline in many countries of Asia and Latin America in the 1960s and 1970s, and demographic projections for these regions of the world were revised strongly downward. This fertility decline did not produce an immediate slowdown in growth, however, because of demographic inertia – so long as the population is young and has a large proportion of young adults, the number of births remains high even if each couple has few children.

As a result of this new trend, world fertility in 2010 was only 2.5 children per woman on average, half the level of 1950 (5 children). But the current global average of 2.5 children conceals a wide range of situations. Fertility is lowest in Taiwan (0.9 children per woman) and highest in Niger (7 children). More than half the world population now lives in countries or regions – including many

Figure 3 - World fertility map, 2010



Southern countries – where fertility is below the replacement level of 2.1 children per woman. This is the case in Tunisia (2.0 children per woman), in Brazil (1.8), in Iran (1.7), in China and in Thailand (1.6). Even in India, where the average is 2.6 children per woman, certain states totalling several hundred million inhabitants (including Andhra Pradesh, West Bengal, Karnataka, Kerala, Maharashtra, Punjab and Tamil Nadu) have also fallen below the replacement level of 2.1.

The high-fertility regions where levels are (still) above 4 children per woman include practically the whole of sub-Saharan Africa and a zone extending across Afghanistan, northern India and Pakistan (Figure 3). In most cases, these are the least developed countries of the planet. It is in these regions that population growth will be strongest in the twenty-first century, although, as elsewhere across the globe, voluntary birth control should become widespread in years to come.

### ◆ Rapid growth in Africa, despite the AIDS epidemic

One of the major demographic changes in future decades will be the exceptional population growth in Africa. Under the United Nations medium projection, the continent's population, including North Africa, could quadruple over the next century, rising from 800 million inhabitants in 2000 to 3.6 billion in 2100. While one person in seven currently lives in Africa, the proportion will probably be one in four in 2050 and perhaps one in three in 2100. Growth should be especially rapid in sub-Saharan Africa, where the UN scenario forecasts a rise from just over 700 million in 2000 to almost 3.4 billion in 2100.

#### Box

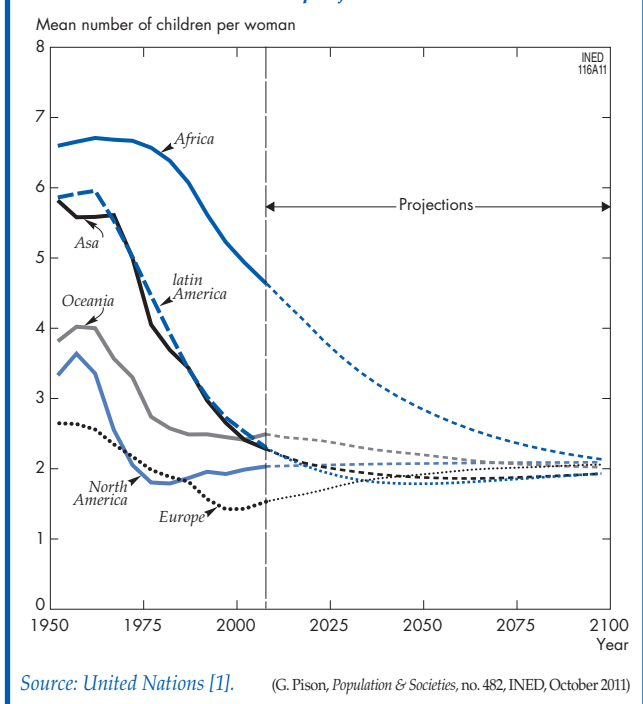
##### 7 billion on 31 October 2011: Can we be sure?

According to the United Nations, the world population will reach 7 billion on 31 October 2011. But how can we be sure? National censuses provide us with information of population numbers for all countries of the world, although their quality varies from one country to the next. They can be used to estimate the total number of human beings to within a few percentage points. The 7 billion mark may have been reached one or two years before 2011, or one or two years later. Global demographic trends are well understood, however, and we already know that the world population will total 8 to 10 billion by 2050.

How is this possible in a region ravaged by the AIDS epidemic? It is true that mortality has increased temporarily in sub-Saharan Africa, and that life expectancy has fallen, but fertility remains high and births still outnumber deaths. Demographic projections take account of the mortality increase in this region while predicting a gradual return to a more favourable situation thanks to progress in the fight against AIDS. The heavy tribute to AIDS paid by the countries of Africa has not dampened their demographic vitality, and even though growth has slowed, the population is expected to grow rapidly over the next century, as mentioned above.

The fertility decline initiated in the 1980s in a few countries of southern and eastern Africa is gradually taking hold elsewhere, but mainly in the cities rather than in the rural areas where most of the population lives. Kenya was one of the first African countries to see a substantial fertility decline – from 8 children per woman on average in 1970 to slightly more than 5 in the 1990s – but the downtrend appears to have stopped or slowed

Figure 4 - Fertility trends by world region, 1950-2010 and projections to 2100



considerably over the last decade for reasons that are unclear. Change may finally be slower in Africa than in Asia and Latin America. The United Nations took this factor into account in their recent upward revision of demographic projections for Africa. While its fertility decline is still slower than that observed some decades ago in Asia and Latin America (Figure 4), the reason does not lie in a refusal to use contraception. Many African women, even in rural areas, wish to limit or space their births, but often they have no access to family planning services. National birth control programmes are ineffective because they lack resources and, above all, because their organizers and the field personnel responsible for implementing them are not convinced of their necessity. Many people, including at top government level, see no reason to limit the number of births. This is one of the differences with respect to Asia and Latin America in the 1960s and 1970s, and one of the obstacles to faster fertility decline in sub-Saharan Africa.

\* \* \*

The short-term future of the world population is largely predictable. Demographic projections are quite reliable for forecasting population size over the next ten, twenty or thirty years. Most of the people who will be alive over the next few decades have already been born, their number is known and we can estimate quite accurately the annual proportion who will die. Likewise, the women who will bear children over the next twenty years are already alive today, and can be counted. By estimating their potential fertility we can determine the number of future births. Beyond the next fifty years, however, the

future is much more uncertain and there is no established forecasting model. The demographic transition, which has served well to predict changes over the last two centuries, will be of little use for this distant future.

While humankind can, as of now, start working towards long-term equilibrium, the most pressing issues concern the short term, i.e. the next fifty years. Little can be done to alter the course of population growth over this short period. However, while the population is still increasing, the pace of growth is slowing down naturally, since humans have chosen to have fewer children and to focus on the quality and length of life. The world population will inevitably increase by 1 to 3 billion over the next half-century because of demographic inertia that no-one can prevent. We nonetheless have the power to change our way of living – and there is an urgent need to do so – by ensuring greater respect for the environment and more efficient use of natural resources. All in all, the long-term survival of humankind depends more on its choice of lifestyle than on its population size.

## REFERENCES

- [1] United Nations, 2011 – Population Division, World Population Prospects: the 2010 Revision (<http://esa.un.org/unpd/wpp/>)

To find out more about world population visit the INED website: [www.ined.fr/en](http://www.ined.fr/en)

The “All about population” and “Population in figures” pages provide a wide range of information about the world population,

- with “The world population and me” find out where you stand in the world population,
- with “Population in figures”, view the United Nations population statistics, travel from one country to another, track changes over time, rank and compare countries,
- with “Population maps” view the world maps of some thirty demographic indicators and track changes since 1950,
- with the “Population simulator”, choose your own assumptions to simulate future population trends.

The INED website offers a broad range of animations, videos, factsheets and publications on world population.

## ABSTRACT

The world population will top 7 billion this year (2011) and should reach 8 billion by around 2025. Population growth is slowing down, however: after peaking at 2% fifty years ago, annual growth has fallen by almost half (1.1% in 2011) and should continue to decrease until the population levels off at around 10 billion one century from now. One of the major changes in future decades will be the exceptional population growth in Africa. The continent’s population, including North Africa, could quadruple over the next century, rising from 800 million inhabitants in 2000 to 3.6 billion in 2100.