The Economist

Demography

A tale of three islands

The world's population will reach 7 billion at the end of October. Don't panic

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IN 1950 the whole population of the earth—2.5 billion—could have squeezed, shoulder to shoulder, onto the Isle of Wight, a 381-square-kilometre rock off southern England. By 1968 John Brunner, a British novelist, observed that the earth's people—by then 3.5 billion—would have required the Isle of Man, 572 square kilometres in the Irish Sea, for its standing room. Brunner forecast that by 2010 the world's population would have reached 7 billion, and would need a bigger island. Hence the title of his 1968 novel about over-population, "Stand on Zanzibar" (1,554 square kilometres off east Africa).

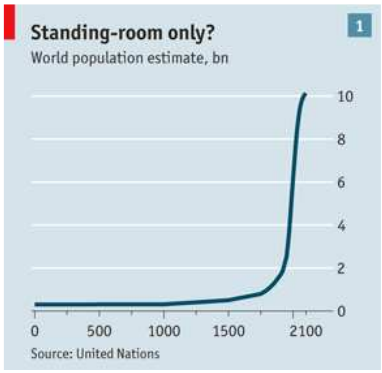
Brunner's prediction was only a year out. The United Nations' population division now says the world will reach 7 billion on October 31st 2011 (America's Census Bureau delays the date until March 2012). The UN will even identify someone born that day as the world's 7 billionth living person. The 6 billionth, Adnan Nevic, was born on October 12th 1999 in Sarajevo, in Bosnia. He will be just past his 12th birthday when the next billion clicks over.

That makes the world's population look as if it is rising as fast as ever. It took 250,000 years to reach 1 billion, around 1800; over a century more to reach 2 billion (in 1927); and 32 years more to reach 3 billion. But to rise from 5 billion (in 1987) to 6 billion took only 12 years; and now, another 12 years later, it is at 7 billion (see chart 1). By 2050, the UN thinks, there will be 9.3 billion people, requiring an island the size of Tenerife or Maui to stand on.

Odd though it seems, however, the growth in the world's population is actually slowing. The peak of population growth was in the late 1960s, when the total was rising by almost 2% a year. Now the rate is half that. The last time it was so low was in 1950, when the death rate was much higher. The result is that the next billion people, according to the UN, will take 14 years to arrive, the first time that a billion milestone has taken longer to reach than the one before. The billion after that will take 18 years.

Once upon a time, the passing of population milestones might have been cause for celebration. Now it gives rise to jeremiads. As Hillary Clinton's science adviser, Nina Fedoroff, told the BBC in 2009, "There are probably already too many people on the planet." But the notion of "too many" is more flexible than it seems. The earth could certainly not support 10 billion hunter-gatherers, who used much more land per head than modern farm-fed people do. But it does not have to. The earth might well not be able to support 10 billion people if they had exactly the same impact

per person as 7 billion do today. But that does not necessarily spell Malthusian doom, because the impact humans have on the earth and on each other can change.



For most people, the big questions about population are: can the world feed 9 billion mouths by 2050? Are so many people ruining the environment? And will those billions, living cheek-by-jowl, go to war more often? On all three counts, surprising as it seems, reducing population growth any more quickly than it is falling anyway may not make much difference.

Start with the link between population and violence. It seems plausible that the more young men there are, the more likely they will be to fight. This is especially true when groups are competing for scarce resources. Some argue that the genocidal conflict in Darfur, western Sudan, was caused partly by high population growth, which led to unsustainable farming and conflicts over land and water. Land pressure also influenced the Rwandan genocide of 1994, as migrants in search of a livelihood in one of the world's most densely populated countries moved into already settled areas, with catastrophic results.

But there is a difference between local conflicts and what is happening on a global scale. Although the number of sovereign states has increased almost as dramatically as the world's population over the past half-century, the number of wars between states fell fairly continuously during the period. The number of civil wars rose, then fell. The number of deaths in battle fell by roughly three-quarters. These patterns do not seem to be influenced either by the relentless upward pressure of population, or by the slackening of that pressure as growth decelerates. The difference seems to have been caused by fewer post-colonial wars, the ending of cold-war alliances (and proxy wars) and, possibly, the increase in international peacekeepers.

More people, more damage?

Human activity has caused profound changes to the climate, biodiversity, oceanic acidity and greenhouse-gas levels in the atmosphere. But it does not automatically follow that the more people there are, the worse the damage. In 2007 Americans and Australians emitted almost 20 tonnes of carbon dioxide each. In contrast, more than 60 countries—including the vast majority of African ones—emitted less than 1 tonne per person.

This implies that population growth in poorer countries (where it is concentrated) has had a smaller impact on the climate in recent years than the rise in the population of the United States (up by over 50% in 1970-2010). Most of the world's population growth in the next 20 years will occur in countries that make the smallest contribution to greenhouse gases. Global pollution will be more affected by the pattern of economic growth—and especially whether emerging nations become as energy-intensive as America, Australia and China.

Population growth does make a bigger difference to food. All things being equal, it is harder to feed 7 billion people than 6 billion. According to the World Bank, between 2005 and 2055 agricultural productivity will have to increase by two-thirds to keep pace with rising population and changing diets. Moreover, according to the bank, if the population stayed at 2005 levels, farm productivity would have to rise by only a quarter, so more future demand comes from a growing population than from consumption per person.

Increasing farm productivity by a quarter would obviously be easier than boosting it by two-thirds. But even a rise of two-thirds is not as much as it sounds. From 1970-2010 farm productivity rose far more than this, by over three-and-a-half times. The big problem for agriculture is not the number of people, but signs that farm productivity may be levelling out. The growth in agricultural yields seems to be slowing down. There is little new farmland available. Water shortages are chronic and fertilisers are over-used. All these—plus the yield-reductions that may come from climate change, and wastefulness in getting food to markets—mean that the big problems are to do with supply, not demand.

None of this means that population does not matter. But the main impact comes from relative changes—the growth of one part of the population compared with another, for example, or shifts in the average age of the population—rather than the absolute number of people. Of these relative changes, falling fertility is most important. The fertility rate is the number of children a woman can expect to have. At the moment, almost half the world's population—3.2 billion—lives in countries with a fertility rate of 2.1 or less. That number, the so-called replacement rate, is usually taken to be the level at which the population eventually stops growing.

The world's decline in fertility has been staggering (see chart 2). In 1970 the total fertility rate was 4.45 and the typical family in the world had four or five children. It is now 2.45 worldwide, and lower in some surprising places. Bangladesh's rate is 2.16, having halved in 20 years. Iran's fertility fell from 7 in 1984 to just 1.9 in 2006. Countries with below-replacement fertility include supposedly teeming Brazil, Tunisia and Thailand. Much of Europe and East Asia have fertility rates far below replacement levels.

The fertility fall is releasing wave upon wave of demographic change. It is the main influence behind the decline of population growth and, perhaps even more important, is shifting the balance of age groups within a population.

When gold turns to silver

A fall in fertility sends a sort of generational bulge surging through a society. The generation in question is the one before the fertility fall really begins to bite, which in Europe and America was the baby-boom generation that is just retiring, and in China and East Asia the generation now reaching adulthood. To begin with, the favoured generation is in its childhood; countries have lots of children and fewer surviving grandparents (who were born at a time when life expectancy was lower). That was the situation in Europe in the 1950s and in East Asia in the 1970s.

But as the select generation enters the labour force, a country starts to benefit from a so-called "demographic dividend". This happens when there are relatively few children (because of the fall in fertility), relatively few older people (because of higher mortality previously), and lots of economically active adults, including, often, many women, who enter the labour force in large numbers for the first time. It is a period of smaller families, rising income, rising life expectancy and big social change, including divorce, postponed marriage and single-person households. This was the situation in Europe between 1945 and 1975 ("*les trente glorieuses*") and in much of East Asia in 1980-2010.

But there is a third stage. At some point, the gilded generation turns silver and retires. Now the dividend becomes a liability. There are disproportionately more old people depending upon a smaller generation behind them. Population growth stops or goes into reverse, parts of a country are abandoned by the young and the social concerns of the aged grow in significance. This situation already exists in Japan. It is arriving fast in Europe and America, and soon after that will reach East Asia.

A demographic dividend tends to boost economic growth because a large number of working-age adults increases the labour force, keeps wages relatively low, boosts savings and increases demand for goods and services. Part of China's phenomenal growth has come from its unprecedentedly low dependency ratio—just 38 (this is the number of dependents, children and people over 65, per 100 working adults; it implies the working-age group is almost twice as large as the rest of the population put together). One study by Australia's central bank calculated that a third of East Asia's GDP growth in 1965-90 came from its favourable demography. About a third of America's GDP growth in 2000-10 also came from its increasing population.

The world as a whole reaped a demographic dividend in the 40 years to 2010. In 1970 there were 75 dependents for every 100 adults of working age. In 2010 the number of dependents dropped to just 52. Huge improvements were registered not only in China but also in South-East Asia and

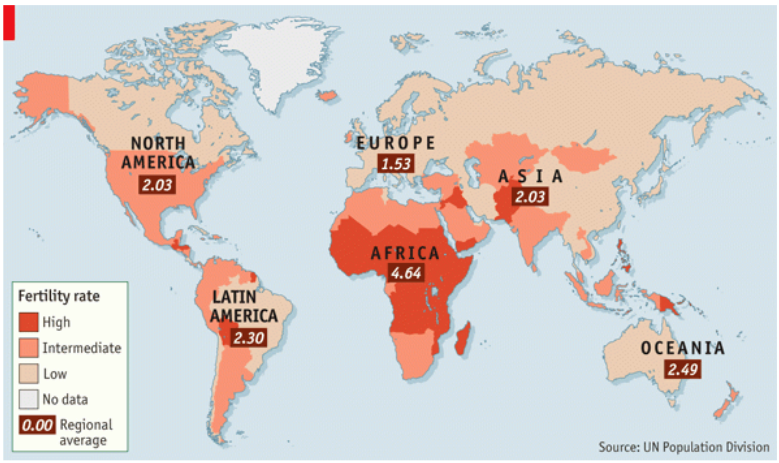
north Africa, where dependency ratios fell by 40 points. Even "ageing" Europe and America ended the period with fewer dependents than at the beginning.

A demographic dividend does not automatically generate growth. It depends on whether the country can put its growing labour force to productive use. In the 1980s Latin America and East Asia had similar demographic patterns. But while East Asia experienced a long boom, Latin America endured its "lost decade". One of the biggest questions for Arab countries, which are beginning to reap their own demographic dividends, is whether they will follow East Asia or Latin America.

But even if demography guarantees nothing, it can make growth harder or easier. National demographic inheritances therefore matter. And they differ a lot.

Where China loses

Hania Zlotnik, the head of the UN's Population Division, divides the world into three categories, according to levels of fertility (see map). About a fifth of the world lives in countries with high fertility—3 or more. Most are Africans. Sub-Saharan Africa, for example, is one of the fastest-growing parts of the world. In 1975 it had half the population of Europe. It overtook Europe in 2004, and by 2050 there will be just under 2 billion people there compared with 720m Europeans. About half of the 2.3 billion increase in the world's population over the next 40 years will be in Africa.



The rest of the world is more or less equally divided between countries with below-replacement fertility (less than 2.1) and those with intermediate fertility (between 2.1 and 3). The first group consists of Europe, China and the rest of East Asia. The second comprises South and South-East Asia, the Middle East and the Americas (including the United States).

The low-fertility countries face the biggest demographic problems. The elderly share of Japan's population is already the highest in the world. By 2050 the country will have almost as many dependents as working-age adults, and half the population will be over 52. This will make Japan the oldest society the world has ever known. Europe faces similar trends, less acutely. It has roughly half as many dependent children and retired people as working-age adults now. By 2050 it will have three dependents for every four adults, so will shoulder a large burden of ageing, which even sustained increases in fertility would fail to reverse for decades. This will cause disturbing policy implications in the provision of pensions and health care, which rely on continuing healthy tax revenues from the working population.

At least these countries are rich enough to make such provision. Not so China. With its fertility artificially suppressed by the one-child policy, it is ageing at an unprecedented rate. In 1980 China's median age (the point where half the population is older and half younger) was 22 years, a developing-country figure. China will be older than America as early as 2020 and older than Europe by 2030. This will bring an abrupt end to its cheap-labour manufacturing. Its dependency ratio will rise from 38 to 64 by 2050, the sharpest rise in the world. Add in the country's sexual imbalances—after a decade of sex-selective abortions, China will have 96.5m men in their 20s in 2025 but only 80.3m young women—and demography may become the gravest problem the Communist Party has to face.

Many countries with intermediate fertility—South-East Asia, Latin America, the United States—are better off. Their dependency ratios are not deteriorating so fast and their societies are ageing

more slowly. America's demographic profile is slowly tugging it away from Europe. Though its fertility rate may have fallen recently, it is still slightly higher than Europe's. In 2010 the two sides of the Atlantic had similar dependency rates. By 2050 America's could be nearly ten points lower.

But the biggest potential beneficiaries are the two other areas with intermediate fertility—India and the Middle East—and the high-fertility continent of Africa. These places have long been regarded as demographic time-bombs, with youth bulges, poverty and low levels of education and health. But that is because they are moving only slowly out of the early stage of high fertility into the one in which lower fertility begins to make an impact.

At the moment, Africa has larger families and more dependent children than India or Arab countries and is a few years younger (its median age is 20 compared with their 25). But all three areas will see their dependency ratios fall in the next 40 years, the only parts of the world to do so. And they will keep their median ages low—below 38 in 2050. If they can make their public institutions less corrupt, keep their economic policies outward-looking and invest more in education, as East Asia did, then Africa, the Middle East and India could become the fastest-growing parts of the world economy within a decade or so.

Demography, though, is not only about economics. Most emerging countries have benefited from the sort of dividend that changed Europe and America in the 1960s. They are catching up with the West in terms of income, family size and middle-class formation. Most say they want to keep their cultures unsullied by the social trends—divorce, illegitimacy and so on—that also affected the West. But the growing number of never-married women in urban Asia suggests that this will be hard.

If you look at the overall size of the world's population, then, the picture is one of falling fertility, decelerating growth and a gradual return to the flat population level of the 18th century. But below the surface societies are being churned up in ways not seen in the much more static pre-industrial world. The earth's population may never need a larger island than Maui to stand on. But the way it arranges itself will go on shifting for centuries to come.

Here's looking at you

from the print edition | Briefing