POPULATION AND RESOURCES

2

PREVIEW

This chapter looks at human population trends and their links with natural resources, as well as some of the key demographic trends shaping (and being shaped by) the global system. It begins with an assessment of key population changes before focusing on the causes and effects of urbanization. It then looks at the challenges of feeding a growing human population, noting that the problem is more one of quality than of quantity. The chapter finishes up with a review of how natural resources are used (and misused), focusing on the cases of energy, forests, and oceans.

CONTENTS

HIGHLIGHTS

- The growth of the global population has accelerated in recent decades, leading to many worried conversations about the mismatch with food and other resources.
- Although the global population is growing, it is levelling out in the North (and even declining in some countries), while the numerical balance is shifting towards Asia.
- One of the most important population developments has been the shift to towns and cities; more than half the people in the world now live in an urban area.
- We have enough food to meet global demand, but there are problems with distribution, and climate change poses a threat to future production.
- The world still continues to rely heavily on pollutive and non-renewable sources of energy, a reliance that leaves many problems in its wake.
- Our failure to take a global approach to the use of natural resources has not been easy, as our mixed record with energy, forests, and oceans reveals.

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THE GLOBAL POPULATION

In 1798, a book titled *An Essay on the Principle of Population* was published in Britain. Written by the cleric and scholar Thomas Malthus, it quickly became a bestseller. The global population at the time was much smaller than it is today – just under one billion – but Malthus was worried by what he saw. He argued that the natural rate of population growth was geometrical (doubling every 25 years), while that of food production was arithmetical (growing at a constant rate), as a result of which he predicted that population numbers would eventually outstrip the available food supply, leading to widespread famine (Malthus, 1798). For this pessimistic view of the world he earned the nickname the 'dismal parson'.

While his argument was provocative, it was poorly timed, because it came just as Britain was undergoing an industrial revolution that was transforming the economy in general, and agriculture in particular: farming techniques were improving, trade was expanding, and new food producers such as Australia and Argentina were becoming part of the global economy. With food supply increasing and the quality of life improving, Malthusian ideas became less relevant.

Jumping forward to the 1960s, a renewed debate over population was sparked by the publication of another book: *The Population Bomb*, written by the American biologist Paul Ehrlich (1968). The global population had by then grown to about 3.5 billion, prompting Ehrlich to warn (somewhat like Malthus) that unless action was taken to control growth, the limits of human capability to produce food by conventional means would be reached, and millions would suffer from starvation. Ehrlich's book was also a bestseller, but again was badly timed, because it was published at the peak of the **green revolution**, a phenomenon that had led to higher levels of food production.

Green revolution: The post-war growth in global food production resulting from changes in agricultural science, including the use of chemicals, improved water supply, and the development of high-yield crops.

More than 50 years later, the global population has reached 7.8 billion, and is projected to reach nearly 10 billion by mid-century before growth starts to tail off. The kinds of famines that Malthus and Ehrlich warned of are not unknown, to be sure, but they are rarely the result of a mismatch between population numbers and food supply, and are more often the result of war, conflict, and the disruption of supplies. There is more than enough food and water to meet the needs of the world's people, and more than enough space to go around (although this may not be convincing to the millions of people who live in crowded urban slums and the millions more who struggle for access to land).

Despite this, the debate over the relationship between population and resources has never entirely gone away (see Harper, 2016), with pessimists pointing to the shrinking gap between milestones in population growth: while it took centuries for the human population to reach one billion in 1804, it took only 123 years to reach two billion, and just 13 years to grow from six billion to seven billion (see Figure 2.1). However, projections by the UN Population Fund suggest that, thanks mainly to declining fertility rates, global population growth is slowing, and that the total will level off to about 11 billion by the end of the century.

Demography: The study of statistics and trends relating to population, including birth and death rates, income, disease, age, and education.

The relationship between human numbers and food supply is just one example of the many findings of **demography** (for a brief survey, see Harper, 2018). It shows, above all, that when it comes to understanding population trends, we need to look not just at absolute numbers but at the details behind those numbers. In this regard, there are four key measures to take into consideration:

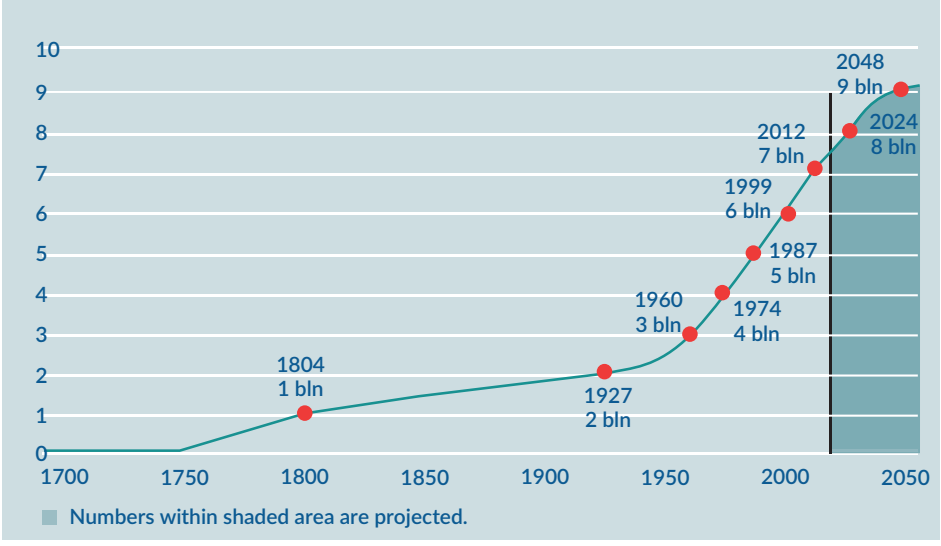


Figure 2.1: Global population growth
Source: Based on United Nations Population Division (2020).

- *Fertility*, or the average number of children to which women give birth. Globally, this number has fallen from 4.5 to 2.5 since 1970, although it ranges as high as 5.0 or more in parts of Africa, and as low as 1.5 in China, Japan, and parts of Europe.
- *Mortality*, or the death rate among humans, based on a combination of infant mortality and life expectancy. Thanks to improvements in health care and nutrition (see Chapter 12), infant mortality rates have come down and life expectancy has grown, helping explain the overall growth in human population.
- *Replacement*, or the rate at which population numbers remain stable, which – in low-mortality communities – has been calculated at 2.1 children per couple. Above that number, a population will increase, while below that number it will decrease.
- *Growth*, or the annual rate at which population grows. This had never been greater than 0.5 per cent prior to the industrial revolution, but it reached 2 per cent after World War II before tailing off to its current rate of just over 1 per cent. While several African states have rates as high as 4 per cent, several European countries have achieved **zero population growth**, while the populations of Greece, Italy, Japan, Spain, Russia, and several Eastern European countries are all declining.

Zero population growth: A rate at which fertility and mortality balance each other out so that population neither increases nor decreases.

The overall trends in population change are explained by the **demographic transition** model (see Dyson, 2010), which uses fertility and mortality rates to identify four core stages. In the first – and pre-industrial – stage, both rates are high, because problems such as disease and famine encourage people to have more children in order to ensure that as many as possible survive into adulthood. Fertility and mortality rates offset each other to result in a stable or slowly growing population. In the second stage, as we saw during the industrial revolution, a combination of improved health

Demographic transition: A model used to explain how population numbers change in concert with changes in economic and social patterns, and improved health care.

Source: Getty Images/filadendron, Todor Tsvetkov

Crowds flock through the streets of Istanbul, Turkey, exemplifying the growth in human population as well as the new urban majority.

care, food supply, and living conditions leads to a decline in mortality rates, although fertility rates continue to be high because of a combination of social expectations and a slowness to respond to the changing quality of life. In Europe and North America, more children were surviving beyond infancy during this stage, but often continued to be seen as essential parts of the labor force on farms and in cities. As a result, the population began to grow rapidly.

In the third stage, fertility rates begin to drop as families adjust to reduced mortality rates, and to the changes brought by better education and access to contraception. As a result, population growth tails off. The fourth stage, which most Northern states have entered, sees more women entering the workforce and delaying motherhood. Having children also becomes an increasingly expensive proposition, given the costs involved in providing nutrition, shelter, and education. As a long-term result, there is a decline during this stage both in fertility rates and in population growth.

Although the model is based on the European experience, and does not allow for cultural or regional differences, the kinds of trends seen in 19th-century Europe are now being repeated in Asia and Africa, most parts of which are currently at the second stage of the transition, and witnessing high fertility rates and rapid growth in population; see Comparing North and South 2. As a result, the regional balance of population is changing: in 1960, about one-quarter of the world's population lived in the North, a share that has since fallen to 15 per cent, and that is projected by the UN to continue falling. Thanks mainly to changes in China and India, the greatest concentration of human population is today found in eastern and south-eastern Asia – see Map 2.1.

COMPARING NORTH AND SOUTH 2

THE CHALLENGES OF POPULATION CHANGE

The broad numbers tell us that world population has been growing rapidly over the last century, and that it will continue growing for several more decades before it starts to tail off. However, these numbers miss many of the nuances in rates of growth, fertility, and replacement, a closer examination revealing some important differences in trends in the North and the South – see examples in Figure 2.2.

The concern in much of the North is less with population growth than with population *decrease*. With fewer people having children, and more people delaying parenthood, fertility rates are falling. Meanwhile, people in these countries are living longer, their median age climbing to as high as 40 or more. With populations aging and either declining or remaining static, fewer new workers are being injected into the economy, and younger workers must bear a greater burden of the costs of health care and social security for retirees.

These concerns have spilled over into debates about immigration; some worry that too many immigrants are arriving in North America and the wealthier European countries, and yet the most realistic option for significantly expanding their work forces lies with immigration. Without more babies or immigrants, argue Kassam et al. (2015), Europe faces a 'population disaster'. Otherwise, the only options are to increase worker productivity, raise the age of retirement, or require workers to shoulder more of the burden for paying for their own retirement.

In the South, meanwhile, it is the opposite problem: high fertility rates have combined with falling mortality rates to generate high population growth. The conversations are less about how to look after older people than about how to make the kinds of investments in job creation, education, health care, shelter, clean water, food supply, and infrastructure that are needed to keep up with demand. The mixed record is reflected in the problems of slums, congested streets, crime, and inadequate water quality and sanitation found in many (but not all) Southern cities.

In few places are the pressures greater than in China and India, the two most populous countries in the world. India is projected soon to overtake China, reaching almost two billion before its numbers start to decline after 2050. Considerable growth is also expected in Africa, where many countries – including some of the world's poorest – have high fertility rates. The changes are happening fast: your author was raised in Kenya at a time when the population of the country was about 10–12 million, and the population of the capital city of Nairobi was about 500,000. By the 1980s, Kenya had the fastest population growth rate in the world (it became the first country to cross the 4 per cent mark), and there are today more than 50 million Kenyans. Nigeria, meanwhile, is projected to overtake the United States in 2050 to become the world's third most populous country.

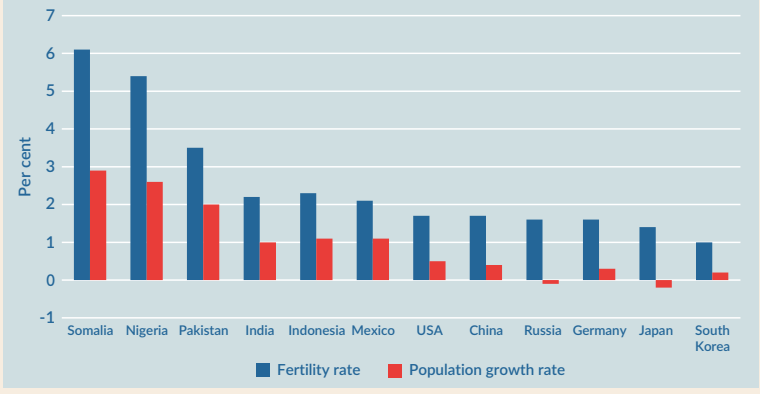
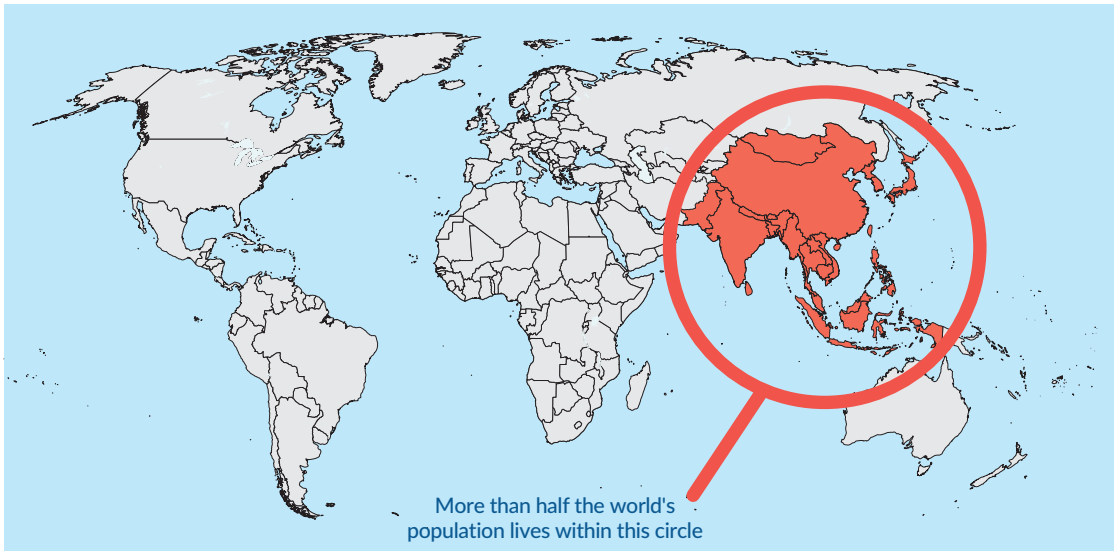


Figure 2.2: Comparing fertility and population growth rates

Source: World Bank Economic Indicators (2021). Figures are for 2019.



Map 2.1: The population dominance of Asia

THE NEW URBAN MAJORITY

At some time in 2007, according to UN research, a child was born somewhere in the world who nudged the number of people living in towns and cities above those living in rural areas for the first time in human history – see Figure 2.3. After millennia in which most people had lived directly off the land, making their homes in isolated shelters or in villages and hamlets, they had finally been overtaken in number by their urban peers. The switch had been a long time coming, its seeds sown with the

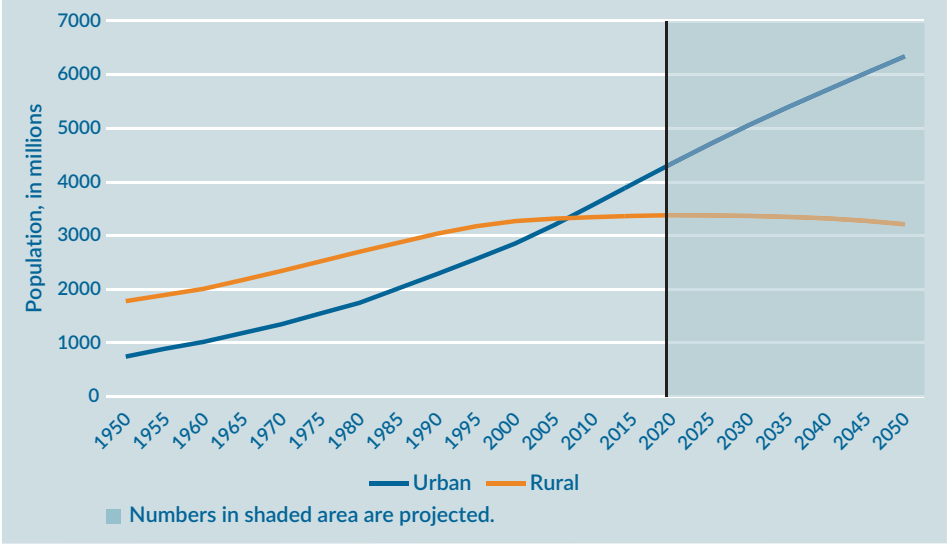


Figure 2.3: The changing urban–rural divide

Source: United Nations Population Division (2019).

industrial revolution, when the rise of factories and mass production drew people from the rural areas of Europe and North America into expanding towns and cities. Even as late as 1960, though, about two-thirds of humans still lived in rural areas, because industrialization had not yet taken hold in most of the South. Then new industry, improvements in health care, and population growth began to feed off each other in Asia, Africa, and Latin America, whose towns and cities began to follow the same growth patterns as their European and North American predecessors. Today, about 54 per cent of humans live in a town or city, and by 2050 the urban–rural ratio is expected to be the opposite of the number in 1960, with two-thirds of the world population living in towns and cities.

There is little consistency in the definition of the term *urban*, which might be a settlement of a few thousand people or one of millions of people, depending on which government is doing the defining. Nonetheless, UN data reveal some startling developments, as reflected – for example – in the numbers for the world's largest cities. In the 1950s, those cities were almost all in the North, and only two could be classified as a **megacity**: New York and Tokyo, each with about 12 million people. Today there are 28 megacities – all but 6 of them in the South – and by 2030 there are projected to be 41 (United Nations Population Division, 2019). The biggest changes have come in Asia and Latin America (see examples in Figure 2.4), but Africa is expected to catch up, with one projection (Hoornweg and Pope, 2014) suggesting that the biggest cities in the world in 2100 will be Lagos in Nigeria and Kinshasa in the Democratic Republic of Congo, each with more than 80 million people. Meanwhile, today's biggest city – Tokyo – will have shrunk to 25 million and fallen to 28th on the global ranking. Only two other Northern cities – New York and Los Angeles – will still be in the top 50.

Megacity: A city with a population of at least ten million people. The list has been growing, and is today topped by Tokyo, Delhi, Shanghai, Mexico City, and Sao Paulo.

Although cities have grown in part because people have chased the opportunities they offer, the quality of urban life varies. On the one hand, cities provide access to a variety of jobs, schools, hospitals, consumer goods, business opportunities, entertainment, services, a relatively high standard of living,

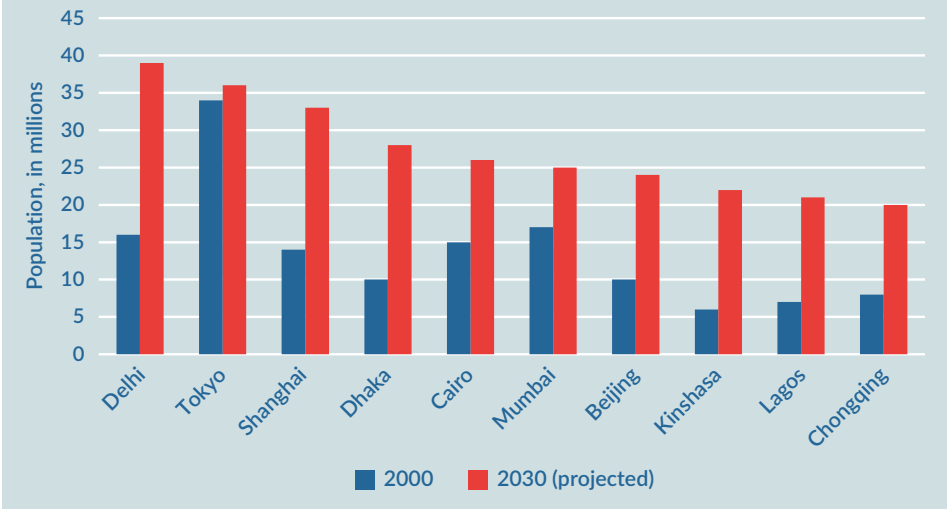


Figure 2.4: The world's ten biggest cities, 2030
Source: United Nations Population Division (2019).

advanced communication systems, public transport, improved opportunities to engage in civic life, and easier connections to other cities and other parts of the world. On the other hand, many have become nightmares of congestion, the lives of their residents often made worse by crime and pollution, and the distinctions between wealth and poverty clearly evident in the proximity of rich and poor neighborhoods, and the problem of homelessness. In the fastest-growing cities of the South, and even some in the North, planners have been unable to keep up with the demand for good transport, clean water, and reliable services (Webster and Burke, 2012).

In spite of this mixed record, cities – points out Glaeser (2012) – have throughout history been the engines of growth and innovation. In the North, he argues, they have 'survived the tumultuous end of the industrial age and are now wealthier, healthier, and more alluring than ever', while those in the South 'are expanding enormously because urban density provides the clearest path from poverty to prosperity'. Change may be on the way, though, as a result of the Covid-19 pandemic; one of the more notable effects of which was the emptying of city centers as people were encouraged to work from home and fewer people visited the shops, restaurants, bars, and theatres that are found in their highest density in downtown areas. It is too early to know what effect this will have on the biggest urban areas, but there is speculation that working from home will become permanent for many people, and that office buildings will have to be repurposed as they start to empty. Commuting patterns might also permanently change, with implications for urban streets and public transport.

Looking at their global impact, the growth of cities and rise of the urban majority have changed the world in many different ways:

- Politically, the focus of power has been shaped increasingly by the needs, priorities and values of urban residents. Living closer to one another and to the seats of government, they are more motivated to participate in the political process and to use multiple channels for political engagement. Such has been the dominance of cities that it has often led to resentment in rural areas; at least part of the explanation for the turn against mainstream political parties in Europe and the United States in recent years, for example, has stemmed from a sense among rural voters that they are being overlooked.
- Economically, cities have swallowed up a bigger share of spending (although they also produce a bigger share of government revenues), and they consume more food and energy as well. The cost of living is also higher in cities, because more people are chasing a smaller area of property in which to live or from which to run a business. Inequalities in wealth and income are evident in the division of most cities into wealthier and poorer neighborhoods. High prices can combine with congestion to encourage more urban dwellers to move to the suburbs, or even nearby towns, expanding the economic footprint of a city.
- Environmentally, cities have created more pollution and waste, and some have become so big that they can even impact local weather patterns; they are warmer than the rural areas that surround them, creating heat islands that both radiate more heat back into the atmosphere and generate more precipitation. They also produce more waste, which must either be placed in landfill or recycled, and they create more polluted run-off into rivers and groundwater.

Global city: A city whose size and political/economic reach is such that it has come to exert an influence beyond the state in which it is located.