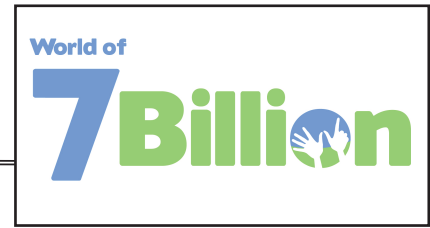


Seven Billion and Counting



Student Reading

The growing human population places huge amounts of pressure on the Earth. The sheer number of people, and their behaviors, contributes to many of the environmental, social, and economic issues facing the planet. Although it may not seem as if the world is getting more crowded, growing population threatens the health of our ecosystems and the quality of life for Earth's inhabitants.

In the six seconds it takes to read this sentence, 15 more people will be living on the Earth. In fact, the world's population grows at a near-record pace, with a population equal to New York City added every month, and equal to Germany added every year. In the year 2000, there were six billion of us, and the number of people is growing every second. This growth in human numbers has been called a "population explosion."

What Ignited the Explosion?

The population explosion has been very recent in the scope of human history. People lived on Earth for about three million years before the world population reached 500 million, around the year 1600. Until then, **birth rates** and **death rates** were about the same, keeping the population stable. People had many children, but a vast number of them died before age five. Without modern medicine, vaccines, and clean, healthy living conditions, many children did not survive common diseases.

The late 1700s and the 1800s was a time of great advancement in science and technology in Europe and North America. The Industrial Revolution produced many inventions that promoted longer life, such as improvements in farming, nutrition, medicine, and sanitation. By 1930, the world population had reached two billion.

As people moved to cities to live and work, families became smaller. It was no longer necessary to have many children to work on family farms in Europe and North America, and birth rates dropped in industrialized countries. By the mid-twentieth century, death rates throughout the rest of the world also began to drop as medical technologies spread across the globe. But, birth rates remained high in developing countries, since their economies still relied largely on farming. Families in these places still needed many children to work the land. Although population growth slowed in developed countries, the "population explosion" continued in the less developed world.

In 1960, the global population reached three billion. Just 15 years later, in 1975, the population soared to four billion and it topped five billion in 1987. In 1999, the Earth became home to six billion people, and the population had doubled in less than 40 years. Although population growth is now slowing, the population reached seven billion in late 2011, and demographers predict that the world will grow by two to three billion more people by the year 2050.¹

Crowding the Earth

No one knows for sure how many people the Earth can support. Every environment has a **carrying capacity** – the point at which there are not enough natural resources (food and fuel) to



support any more members of a given species. This concept applies to people too. The carrying capacity of humans is hard to estimate because it greatly depends on how people use the Earth's resources.

The population issue relies on the concept of carrying capacity rather than numbers alone. The entire world population could fit into Texas and each person could have an area equal to the space of a typical American family home. But, this ignores the amount of land required to provide the resources (food, water, shelter, clothing, and energy) that we need to maintain our lifestyles. Though there is enough space for the people, the ecological footprint – the land and water area that would be required to support the region's population and lifestyle – would need a space much larger than Texas. There is a limited amount of gas to power our cars and trees to provide lumber for heating and cooking. The more resources that each person uses, the fewer people the earth can support.

Only a small amount, 10 percent, of all land is **arable** (able to be farmed). The rest is built up into cities and towns or is too cold, wet, rocky, or dry to grow crops. As the number of people continues to grow, the small portion of land which must provide food for these people remains the same, or becomes smaller as cities expand. Already, one billion people suffer from **malnutrition** because they do not have enough to eat.²

Upsetting the Ecological Balance

Many countries try to grow more food in order to feed their growing numbers of people. Each year, about 18 million acres of forests (an area equal to the size of Vermont and New Hampshire combined) are cut down to create more farmland and grazing land and to obtain wood for fuel and other uses.³ The loss of these forests affects the entire Earth. Consider that rainforests are home to half of the world's animal and plant species, some of which may provide key ingredients for medical innovations. The loss of these species could devastate the delicate ecological balance.

Water supplies also suffer as the population continues to grow, especially in less developed regions that lack the ability to transport water across long distances. As more food is needed to support greater numbers of people, a larger amount of water is dedicated to agriculture. This greatly depletes water supplies and leaves less available for drinking and **sanitation**. Currently, almost one million people around the world lack safe drinking water and 2.6 billion people suffer from inadequate sanitation.⁴

Loss of **biodiversity** is another problem associated with overpopulation. As cities expand with population growth, previously uninhabited lands, such as forests and prairies, are developed for human use. Many of the most biologically diverse regions on Earth have lost more than 70 percent of their vegetation due to human activity. As the ranges of the native species in these regions diminish, they are much more likely to become **extinct**.⁵

Even the ground we live on is affected by overpopulation. Soil is destroyed as larger livestock herds become necessary to produce more food. Billions of animals are now over-grazing the world's grasslands, turning them to dust. Croplands are destroyed when the rich topsoil blows away after being overworked and misused. This devastation of land has left millions of environmental refugees worldwide, as people are forced to migrate from their homes in search of more-fertile land, cleaner water, and a better quality of life.



Population Growth: North American style

You might associate overpopulation with the teeming masses of people in countries like India and China. Surely, a huge, wealthy country like the United States doesn't have a problem, does it? Every year, our country's population grows by almost three million people, which is about the population of Houston. The U.S. has one of the highest birth rates among industrialized countries.

Some argue that population growth in the U.S. may have more serious environmental impacts than growth in any other part of the world because of the "typical American lifestyle." Each American uses more energy, more water, and produces more garbage than a person living anywhere else in the world. While Americas are less than five percent of the world population, we consume 19 percent of the world's energy and produce 18 percent of the world's carbon dioxide emissions.^{6,7} In one year, the average American uses almost two times as much energy as the average Japanese person, almost four times the average person in China, and 15 times as much as the average Kenyan.⁸ This immense energy use also adds to the world's air and water pollution as fossil fuels such as oil and coal are burned. All of the carbon dioxide released from burning these fuels makes the U.S. one of the leading contributors to global warming.

What Can Be Done?

There are better alternatives than competing with one another for the last best space or the only remaining clean water. Certainly, we can encourage our government to help us and other nations deal with population and environmental problems. Individuals can also make lifestyle decisions that will significantly reduce the stress on our resources and environment. We can protect our environment by making thoughtful choices about where we live, how we use energy in our homes, what we eat, how we travel, and how much garbage we produce. By considering the environment in these important decisions, we can have a collective, healing impact on the biological systems that sustain us.

Choices in family size can also impact how people stress natural resources and the environment. Many American parents already limit their families to one or two children (a number that would lead to population stabilization). These choices really do make a difference. After four generations, a two-children-per-generation family will consume 160 percent fewer resources (including fish, meat, wood, and vegetable products) than a family with a three-child tradition.

Overpopulation can negatively impact the environment and the health and quality of life of people everywhere. Every decision we make affects not only those around us but also the entire planet. Even the small choices we make every day can make a difference. By thinking carefully about the impact we want to leave on the Earth, we can ensure that future generations are able to enjoy this planet and access its bountiful natural resources in the same ways that we do today.



Glossary

arable: land in which crops can be grown

biodiversity: the variety of species in nature and the genetic diversity within each species

birth rate: the number of births each year per 1,000 people

carrying capacity: the number of people who can be supported at a sustainable level in an area with given resources and technology

death rate: the number of deaths each year per 1,000 people

demographer: a scientist who studies the characteristics of human populations, such as size and growth rate

extinct: no longer existing; when a plant or animal species dies off, we say it is extinct

sanitation: the prevention of disease and promotion of good hygiene by maintaining clean conditions and safe drinking water

¹ Population Reference Bureau, *2013 World Population Data Sheet*, July 2010.

² *The State of Food Insecurity in the World 2009*. Food and Agriculture Organization of the United Nations, <http://www.fao.org/docrep/012/i0876e/i0876e00.htm>.

³ *State of the World's Forests 2007*. Food and Agriculture Organization of the United Nations, <http://www.fao.org/docrep/009/a0773e/a0773e00.HTM>.

⁴ *Progress on Sanitation and Drinking Water 2010 Update*. World Health Organization/United Nations, Children's Fund, http://whqlibdoc.who.int/publications/2010/9789241563956_eng.pdf.

⁵ "The Biodiversity Hotspots" Conservation International, 2007. <http://www.biodiversityhotspots.org>

⁶ The U.S. Energy Information Administration, *Frequently Asked Questions: How much of the world's energy does the U.S. use?* <http://www.eia.gov/tools/faqs/faq.cfm?id=87&t=1>.

⁷ International Energy Agency, *CO2 Emissions from Fuel Combustion Highlights*, 2012 edition. <http://www.iea.org/co2highlights/co2highlights.pdf>

⁸ "Energy Use (kg of oil equivalent per capita). World Bank. 2011. <http://data.worldbank.org/indicator/EG.USE.PCAP.KG.OE>