

## Human Population Growth

Since the Agricultural and Industrial Revolution, human populations have experienced a period of explosive growth. To date, over-population poses a real threat to plant lives, ecosystems and the long-term sustainability of the Earth.

### Growth Pattern

Just 11,000 years ago, there were only roughly 5 million humans who lived on the planet Earth. The initial population growth was slow, due largely to the way humans were living - by hunting. Such life style limited the size of family for practical reasons. A woman on the move cannot carry more than one infant along with her household baggage. When simple birth control means-often abstention from sex failed, a woman may elect abortion or, more commonly, infanticide to limit the family size. Further, a high mortality among the very young, the old, the ill and the disabled acted as a natural resistance to a rapid population growth. Thus it took over one million years for human population to reach the one billion mark. But the second billion was added in about 100 years, the third billion in 50 years, the fourth in 15 years, and the fifth in 12 years.

Ever since humans became sedentary, some limits over the family size were lifted. With the development of agriculture, children may have become more of an asset to their families in helping with farming and other chores. By the beginning of the Christian era, human population grew to about 130 million, distributed all over the Earth. By 1650, the world population had reached 500 million. The process of industrialization had begun, bringing about profound changes over the lives of humans and their interactions with the natural world. With improved living standard, lowered death rate and prolonged life expectancy, human population grew exponentially. By 1999 there were about 6 billion people, comparing with 2.5 billion in 1950. The world population is well on its way to 7 billion with an annual growth rate of over 90 million.

### Plants, Agriculture and Human Population

Starting about 11,000 years ago (5 million people), humans began to cultivate such plants as barley, lentils, wheat, and peas in the Middle East -- an area that extends from Lebanon and Syria through Iraq to Iran. In cultivating and caring for these crops, the early farmers changed the characteristics of these plants, making them higher yielding, more nutritious and easier to harvest. Agriculture spread and first reached Europe (Britain) by approximately 6,000 years ago. Agriculture might also have originated independently in Africa in one or more centers. Many crops were domesticated there, including yams, okra, coffee, and cotton. In Asia, agriculture based on staples such as rice and soybeans, and many other crops such as citrus, mangos, taro, bananas, etc. was developed. Agriculture was developed independently in the New World. It began as early as 9,000 years ago in Mexico and Peru. Columbus and his followers found many new crops to bring back to the Old World, including corn, kidney beans, lima beans,

tomatoes, tobacco, chili peppers, potatoes, sweet potatoes, pumpkins and squashes, avocados, cacao and the major cultivated species of cotton.

For the last 5-6 centuries, the important crops have been cultivated throughout the world. Wheat, rice, and corn, which provide 60% of the calories we consume, are cultivated wherever they will grow. Other crops including spices and herbs were also brought under cultivation. The growing population has changed the landscape, distribution and diversity of plant dramatically. Clear cut and deforestation have driven many species (both plant and animals) to extinction. Relatively little has been done to develop agricultural practices suitable for tropical regions. As a result, the tropics are being devastated ecologically, with an estimated 20% of the world's species will likely be lost over the next three decades.

### A Threat to Sustainability

Without effective measures of control, the population will soon exceeds Earth's carrying capacity. Humans at present are estimated to consume about 40% of the total net products generated via photosynthesis by plants. Yet human activities have reduced the productivity of Earth's forests and grasslands by 12%. Each year, millions of acres of once-productive land are turned into desert through overgrazing and deforestation, especially in developing countries. Due to over-fertilization and aggressive practices in agriculture, loss of topsoil occurs at an annual rate of 24 billion metric tons. Collectively, these actions caused the destruction of 40 million acres of rain forest each year and the extinction of enormous numbers of species yet to be discovered.

Through technological innovation and aggressive practices in agriculture, we have achieved a 2.6-fold increase in world grain production since 1950. But this increase in food output is not nearly enough to feed the population. Based upon an estimate by the World Bank and FAO, one out of every five of us is living in absolute poverty, unable to obtain food, shelter, or clothing dependably. About one out of every ten receives less than 80% of the daily intake of food calories recommended by the United Nations. In countries as Bangladesh and Haiti and in regions as East Africa, humans are dying in increasing numbers because of the lack of food. The growing population also post threats to the environment, aggravating acid rains, toxic and hazardous wastes, water shortages, topsoil erosion, ozone layer punctuation, greenhouse effects and ground water contamination. We must do more to control our population growth and find better ways to manage the natural resource to preserve long-term sustainability of the Earth.

### Sources for Further Studies

Brown, L. State of the World 2000. Norton, W. W. & Company, New York, 2000. Provides a comprehensive framework for the global debate about our future in the new century. Presents invaluable analysis of negative environmental trends and a guide to emerging solutions.

Heiser, C.B., Jr. *Seed to Civilization: The Story of Food*, 2nd ed., W.H. Freeman and Company, San Francisco, 1981. A concise account of the plants that feed people.

National Research Council. *Lost Crops of the Incas*. National Academy Press, Washington D.C., 1990. Presents an excellent example of ways in which new economically useful plants may be used for food.

Weiner, J. *The Next One Hundred Years: Shaping the Future of Our Living Earth*. Bantam Books, New York, 1990. Well-written account of the ecological problems confront us as human population continues to expand.

See Also: Agriculture revolution; Agriculture: modern problems; Agriculture: traditional; Agriculture: world food supplies; Biomes; Biomes: types; Ecosystems: overview; Plant domestication and breeding; Sustainable agriculture

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