

Feeding the Global Family

Student Reading

Anyone who has ever driven through the endless amber waves of grain in America's Midwest may find it difficult to believe that we may soon be in the midst of a global food shortage. According to the World Health Organization, 3.7 billion people are currently malnourished – lacking eight essential nutrients in their everyday diet and without enough protein and calories to sustain a normal, active life.

If a person or family goes hungry today, whether in North America or Sub-Saharan Africa, it is usually because of poverty; they do not have the money to buy enough food. Poverty and restricted access to food can arise from many different causes, including unequal distribution of wealth or economic opportunities, environmental degradation, or discrimination based on race, gender, or age.¹ However, if the world's population continues to grow faster than food production (as it does right now), not having enough food to go around may become a significant cause of hunger in generations to come. As more and more people must be fed on the food produced each year, what people eat and how food is distributed will play a larger role in whether there will be enough for everyone.

According to Lester Brown, president of the Earth Policy Institute, the world could support 2.5 billion people (well below half of the world's present population) on a North American-style diet high in animal protein; five billion on a "Mediterranean" diet, heavy in fruits, vegetables, and grains; and ten billion people on an Indian-style diet, which consists mostly of a starchy staple food.² Brown states that the healthiest of these three diets is the Mediterranean – however, at current grain production levels, world population has already outstripped the Earth's ability to provide the amount of grain to allow all the world's inhabitants to eat such a diet.

People Outpacing Food

Annual grain harvests have more than tripled since the 1950s, and recent years have seen record grain harvests. That's the good news. What's the bad news? Over the last decade, growth in amount of grain harvested each year has slowed significantly and is not increasing as fast as the world's population. This means that the amount of

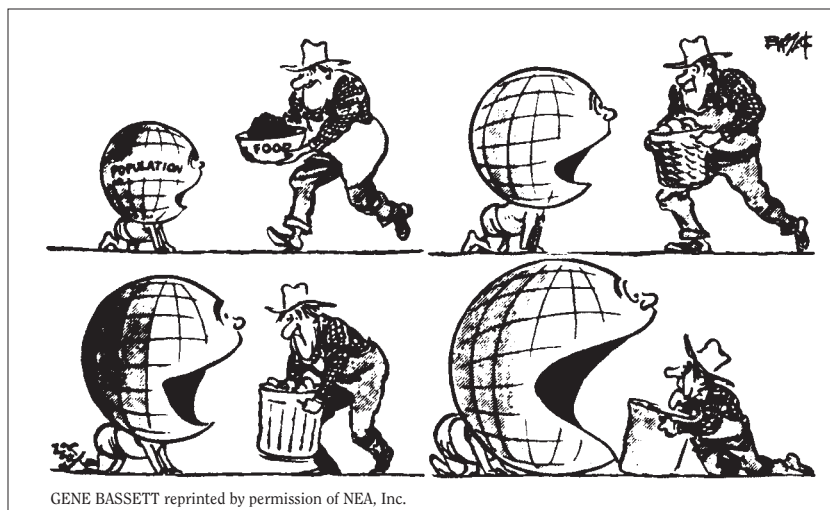
grain per person is falling. In 2006, the amount of grain per person was 303 kilograms, down from the peak of 346 kilograms per person in 1984.³

Food to feed the Earth's people comes from two sources: the land and the sea. Since 1988, the total pounds of fish taken out of the oceans each year has remained fairly constant and no longer increases with increased investment.⁴ This indicates that we have reached the sustainable limit for harvesting fish. Since the human population is still growing, the amount of fish per person is already declining. Furthermore, consider that 99.7 percent of the world's food comes from land; just .3 percent comes from oceans and aquatic ecosystems.⁵ We simply cannot count on this resource to meet the multiplying demand for food.

Meeting the increasing demand for food created by the 78 million people added to the world each year will depend on increasing grain yields, the amount of food that comes from the land.⁶ Currently, grains make up 80 percent of the world's food. The future of this primary food source depends on two main resources, land and water, both of which are themselves strained by the pressures of a growing population.

The Production Equation

Mathematically, the amount of grain produced in the world each year depends on two variables: the area of land harvested and the amount of grain harvested per unit of land. In 1981, the amount of land harvested reached 732 million hectares. This meant that there were 328 kilograms of grain per person. By 2006, grain production had increased 33 percent, but the dramatic population increase left only 303 kg of grain per person. While the amount of grain per

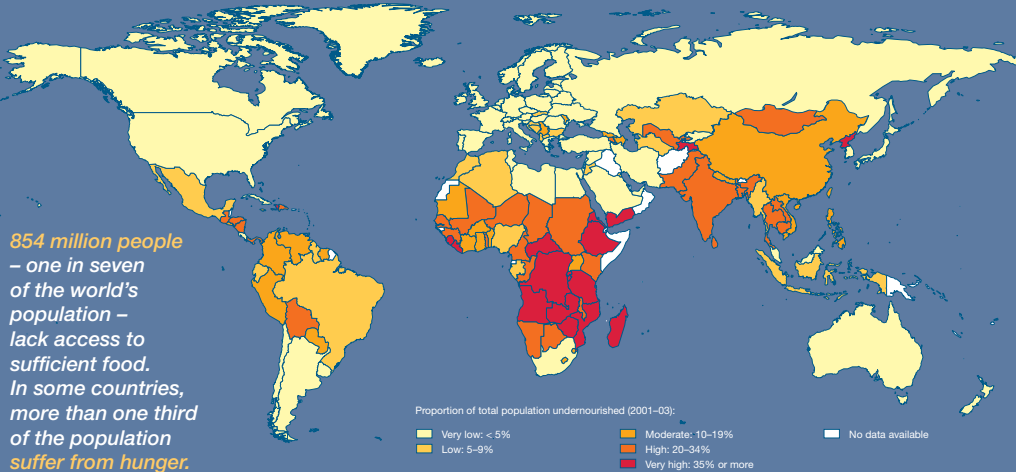


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Hunger in the World

Source: FAO, 2006. *The State of Food Insecurity in the World 2006*. Rome.

Prevalence of hunger in 2001-03



The existence of hunger in a world of plenty is unacceptable. Taking action to eradicate hunger is the responsibility of all. **It can be done.**



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Source: FAO, 2006. *The State of Food Insecurity in the World 2006*. Rome.

person has been kept around 300 kg since 1970, the total amount of farmland decreases each year due to **urbanization** and **soil degradation**.⁷ How much longer can the Earth sustain this amount of production on its quickly dwindling resources?

Urban Growth

Not only is the world population growing, but each year a larger and larger percentage of those people are living in cities. In *Plan B 2.0*, Lester Brown notes that in 1900 150 million people lived in cities. By 2000, 2.9 billion people lived in cities. Today over half of the world's people live in cities – making us, Brown says, “for the first time, an urban species.”⁸ All over the world, valuable cropland is being paved over as cities grow outward. For example, more than half of all U.S. agricultural production comes from counties on the edge of expanding cities. For each person added to the U.S. population, about one acre of land is required for urbanization and highways.⁹ In 2001, the United States contained 214 million automobiles and 3.9 million miles of roads. That's enough pavement to circle the Earth at the equator 157 times.¹⁰ On the Indonesian island of Java, enough cropland was lost to urban expansion in 1994, alone,

to supply rice to over 300,000 people.¹¹ Around the world, an area of cropland between the size of Virginia and Oregon is lost to urbanization each year.¹² The on-going trend of urbanization will continue to take more and more cropland out of agricultural use.

Blowing in the Wind

Soil degradation also reduces the area of land available for agriculture. The most common cause of soil degradation is erosion, the carrying away by wind and water of the thin layer of topsoil that holds all the nutrients necessary to grow crops. Over three billion tons of croplands in the U.S. were eroded in 1982. In 2003 this number decreased 43 percent, to 1.75 billion tons. Although a significant improvement, this still means much of the world's arable land is being lost through erosion.¹³ In fact, global erosion occurs at a rate of 75 billion tons per year.¹⁴ **Overgrazing, deforestation, agricultural mismanagement, and overharvesting** of fuelwood frequently cause erosion. These activities, in turn, are frequently the result of poverty and the unequal distribution of land. As population growth increases the demand for land, poor farmers are forced to work marginal land, such as hillsides and land cut from tropical forests, which erodes easily.

Increased irrigation, which has allowed for greater crop production in past years, is also a cause of cropland damage. Whereas rainwater is essentially distilled, irrigation water contains salts which are left in the topsoil upon evaporation. This process, called **salinization**, reduces crop yields on 50 percent of the irrigated land area worldwide.¹⁵

Wade in the Water

The yield per acre part of the production equation depends largely on the percent of land area under **irrigation**. The tripling of the world grain harvest since 1950 has been due not to great increases in land area harvested, but to the spread of irrigation.¹⁶ Irrigation improves yields in itself, but it also enables crops to get the most nutrients from the fertilizers applied to them.

However, the amount of irrigated land per person has been falling since 1979. In 1997 there were .21 hectares of land per person, but this amount is expected to drop to only .16 hectares by 2030.¹⁷ The major reason for this is that the amount of water available per person to use for irrigation is diminishing.¹⁸ More and more water that could be used for agriculture now has to be diverted to cities in response to rapid population increases in urban areas. Irresponsible use of water for irrigation, such as drawing water out of **aquifers** faster than it is being replaced, is another cause of diminishing water supplies.

Slow growth of both land area used in agriculture and grain yields per acre will make it increasingly difficult for increases in food supply to keep up with the rapid increases in world population.

An Unhealthy Diet

In order to satisfy the North American demand for meat and dairy products, much of the prime agricultural land in the U.S. is used inefficiently, feeding animals, rather than providing food for the world's growing human population. One acre of prime land can produce 20,000 pounds of apples, 40,000 pounds of potatoes, or 250 pounds of beef.¹⁹ American livestock consume more than 50 percent of the corn grown in the United States.²⁰ It is estimated that 225 million people could be adequately nourished using the land, water, and energy that would be freed from growing livestock feed if Americans reduced their intake of meat by just ten percent.²¹

This reduction in meat consumption would save water as well since about 1,000 liters of water are required to produce one kilogram of grain, versus 43,000 liters of water to produce one kilogram of

grain-fed beef or 100,000 liters of water for grass-fed beef.²² All of these facts amount to a compelling case that our diet choices have a substantial impact on land and environmental degradation, health, worldwide hunger, and food distribution.

Rich farmland is also misused in many developing countries where large landowners grow **cash crops**, such as cotton, coffee, or tobacco instead of food. To the owners, land becomes an investment, not a source of food for the people who live on it. Meanwhile, an estimated 24,000 people die each day in the world due to hunger or hunger-related causes.²³

Environmental Threats

Virtually all forms of global environmental degradation are adversely affecting food production. Damage to crops from air pollution and acid rain can be seen in industrial and developing countries alike. Global climate change, brought on by the production of greenhouse gases, poses other threats to crops. Scientists predict hot, dry summers ahead for America's breadbasket in the Midwest as a result of climate change.

Just as industrial practices threaten farmland, modern agricultural practices often pose threats to other ecosystems. The water pollution attributable to U.S. agriculture, including runoff of soil, pesticides, and chemical fertilizers, is greater than all municipal and industrial sources combined.²⁴ A growing demand for chemical-free produce in this country has led some farmers to experiment with **organic farming** practices.

Although the definition of "organic" varies from country to country, use of more sustainable farming practices has increased across the globe. Between 2001 and 2004, organically farmed area increased 14 percent in the European Union, while organic fruit and vegetable sales increased 26 percent.²⁵ In the United States, sales of organic produce have nearly tripled, with growth between 17 and 21 percent each year since 1997.²⁶

The World Food Crisis

In April 2008, the World Bank president, Robert Zoellick, noted that 33 nations were at risk of social unrest. The cause? The rising price of food. In 2007 the food import bill of developing countries increased by 25 percent as food prices soared. The price of corn has doubled in the last two years, and the price of wheat is a high not seen in almost 30 years.²⁷ The United Nations World Food Programme believes "the recent dramatic escalation in food prices worldwide has evolved into an unprecedented challenge of global proportions that has become a crisis for the world's

most vulnerable, including the urban poor.”²⁸ The World Food Programme attributes the crisis to a variety of factors, including: increasing energy prices, rising food demand, recurrent bad weather (possibly a consequence of global climate change), environmental degradation, lack of investment in the agricultural sector, and subsidized production of biofuels in place of food production.

A Sustainable Future

If we hope to stop the current world food crisis and to prevent future food shortages, we must commit ourselves to sustainable agricultural practices. Sustainable agriculture means using the land in such a way as to safeguard its natural productive capacity for generations to come. It is not enough to focus on the most efficient and profitable way to grow food today. Ensuring that an ample amount of land will remain for tomorrow's food supply must also be our concern. For example, destroying rainforest to create cropland provides productive land for only a few years before topsoil erodes. Leaving the rainforests intact and harvesting renewable products, such as fruits and nuts, insures a steady stream of produce indefinitely.

With such finite cropland, we must use this precious resource judiciously. Crop diversification, moderate irrigation, and responsible land management are just a few ways to produce food more sustainably. Eating a wide variety of foods and not depending heavily on animal products (as recommended in the USDA's Food Pyramid) will allow us to use land more efficiently to feed more people. Better distribution of available food is also essential in preventing mass starvation in poor countries.

While there are multiple ways to address the problem of global hunger, most experts agree that unless population pressures ease, a lasting victory over hunger will not be achieved. Feeding people adequately throughout the 21st century will depend on slowing world population growth to bring it in line with food production. Hunger and malnutrition are the number one risks to health worldwide.

Endnotes

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