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Population Growth Leading to Land Hunger

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From the beginning of agriculture until the middle of the twentieth century, increases in world food production have come largely from expanding agricultural land. Between 1950 and 1981, the area in grain expanded from 587 million hectares to its historical peak of 732 million hectares. (1 hectare = 2.47 acres.) By 2000 it had fallen to 656 million hectares. Meanwhile, with population expanding from 2.5 billion in 1950 to 6.1 billion in 2000, the cropland area per person shrank from 0.23 to 0.11 hectares—an area half the size of a housing lot in suburban America.

The world's grain area is unlikely to expand much, if at all, during the next half-century. Low grain prices in recent years have led some farmers to pull back from the more marginal lands, while others have abandoned degraded fields. In addition, agriculture has lost millions of hectares of farmland that have been paved over or covered by urban sprawl.

Where there is limited arable land, fast-growing populations can shrink cropland area per person to the point where countries can no longer feed themselves. Governments that can afford it then compensate by importing grain—the source of more than half the calories humans consume directly. But in countries that cannot import grain, people go hungry.

Cropland scarcity has forced some densely populated Asian countries to import most of their grain. After several decades of shrinking per capita grainland, farmers in Malaysia now cultivate only 0.03 hectares of grain for each resident. Japan, South Korea, and Taiwan each harvest less than 0.02 hectares. To make up for production shortfalls, these four countries currently import more than 70 percent of the grain they consume, leaving them vulnerable to supply disruptions.

Egypt is following close behind. It harvests 0.04 hectares of grainland for each of its 70 million people and imports over 40 percent of its grain. With the water from the Nile River now fully used, and with Egypt's population increasing by over 1 million annually, this share of imports will almost certainly climb.

Half of the world's annual population growth of 77 million people occurs in just six countries—India, China, Pakistan, Nigeria, Bangladesh, and Indonesia. Each of these nations faces a steady shrinkage of grainland per person and thus risks heavy future dependence on grain imports. This raises two important questions. Will these

countries be able to afford to import large quantities of grain as land hunger increases? And will grain markets be able to meet their additional demands?

In India, where one out of every four people is undernourished, 16 million people are added to the population each year. The grain area per person in India has shrunk steadily for several decades and is now below 0.10 hectares—less than half that in 1950. (See data: http://earth-policy.org/Updates/Update21_data.htm) As land holdings are divided for inheritance with each succeeding generation, the 48 million farms that averaged 2.7 hectares each in 1960 were split into 105 million farms half that size in 1990, when India's grainland expansion peaked. The average Indian family, which now has three children, will be hard pressed to pass on viable parcels of land to future generations.

Pakistan, with five children per family, is growing even more rapidly. In 1988, Pakistan's National Commission on Agriculture was already linking farm fragmentation and a rising reliance on marginal lands to declining farm productivity in some areas. Since then, the country has grown from just over 100 million to almost 150 million. Its per person grain area is now less than 0.09 hectares.

In China, the grain area per person has also shrunk dramatically to a diminutive 0.07 hectares, down from 0.17 hectares in 1950. Shifting agricultural production to higher-value crops, like fruits and vegetables, and converting farms to forest for conservation accounts for some of the grainland contraction, along with losses to nonfarm uses such as buildings and roads.

Though the shrinkage of farmland available per person in China has slowed in concert with declining family size, this country—whose population of 1.3 billion is as large as the entire world's in 1850—is still expected to add 187 million people to its ranks in the next 50 years. The robustness of China's economy enables it to turn to world markets to import grain, but this does not guarantee that those markets can support massive additional demand without hefty price increases.

The scarcity of arable cropland in sub-Saharan Africa helps to explain the region's declining production per person in recent decades. Nigeria, for example, Africa's most populous country, has seen its population quadruple since 1950 while its grainland area doubled—effectively halving the grainland per person. In northern Nigeria, pastoralists and farmers fleeing the encroaching Sahara, which annually claims 350,000 hectares of land (about half the size of the U.S. state of Delaware), have increased demands on the already scarce land elsewhere in the country, sparking ethnic tensions.

The experience in Rwanda, Africa's most densely populated country, highlights the potentially serious ramifications of land scarcity. Between 1950 and 1990, Rwanda's population tripled from 2.1 million to 6.8 million. The per capita grainland availability fell to 0.03 hectares. James Gasana, Rwanda's Minister of Agriculture and Environment in 1990-92, has noted that rapid population growth led to farm fragmentation, land degradation, deforestation, and famine. These stresses ignited the undercurrent of ethnic strife, erupting in civil war in the early

1990s and culminating in horrific genocide in 1994, when some 800,000 people were killed. Gasana points out that violence was concentrated in the communes where the food supply was inadequate.

A 2000 headline from the Pan African News Agency, discussing a ministry of lands survey, read "Rwanda: Land Scarcity May Jeopardize Peace Process." Now with a population that has rebounded to 8.1 million, and with the average family having six children, pressure on the land in Rwanda is again mounting.

Most of the 3 billion people to be added to world population in the next 50 years will be born in areas where land resources are scarce. If world grainland area stays the same as in 2000, the 9 billion people projected to inhabit the planet in 2050 would each be fed from less than 0.07 hectares of grainland—an area smaller than what is available per person today in land-hungry countries like Bangladesh, Pakistan, and Afghanistan.

By 2050, India and Nigeria would cultivate 0.06 hectares of grainland for each person, less than one tenth the size of a soccer field. China, Pakistan, Bangladesh, and Ethiopia would drop even lower, to 0.04-0.05 hectares of grainland per person. Faring worse would be Egypt and Afghanistan with 0.02 hectares, as well as Yemen, the Democratic Republic of the Congo, and Uganda, with just 0.01 hectares. These numbers are in stark contrast to those of the less densely populated grain exporters, which may have upwards of 10 times as much grainland per person. For Americans, who live in a country with 0.21 hectares of highly productive grainland per person, surviving from such a small food production base is difficult to comprehend.

With most of the planet's arable land already under the plow and with additional cropland being paved over and built on each year, there is little chance that the world grain area will rebound. At the same time, the annual rise in cropland productivity of 2 percent from 1950 to 1990 has decreased to scarcely 1 percent since 1990, and may drop further in the years ahead. This slowing of productivity gains at a time when the land available per person is still shrinking underlines the urgency of slowing world population growth.

FOR ADDITIONAL INFORMATION

From Earth Policy Institute

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Robert Engelman and Pamela LeRoy, **Conserving Land: Population and Sustainable Food Production** (Washington, DC: Population Action International, 1995).

James K. Gasana, "Natural Resource Scarcity and Violence in Rwanda," in Richard Matthew, Mark Halle, and Jason Switzer, eds., **Conserving the Peace: Resources, Livelihoods and Security** (Winnipeg, Manitoba: International Institute for Sustainable Development and IUCN-The World Conservation Union, 2002).

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LINKS

Population Action International
http://www.populationaction.org/

Population Reference Bureau
http://www.prb.org/

United Nations Food and Agriculture Organization
http://www.fao.org/

United Nations Population Division
http://www.un.org/esa/population/unpop.htm

United Nations Population Information Network
http://www.un.org/popin

United States Department of Agriculture
http://www.usda.gov/