

2050: HOW TO FEED 9 BILLION PEOPLE

The United Nations estimates that by 2050 the planet will be home to 9.6 billion people—2 billion more than our current population. Many experts insist that crop production must double to keep pace, yet agriculture is one of the greatest contributors to global warming and water pollution. Entire ecosystems have disappeared as crop and cattle fields push ever outward. How to balance the needs of a growing population while protecting the environment is at the heart of debates raging across the scientific world.

Jonathan Foley, director of the Institute on the Environment at the University of Minnesota, wrote “A Five Step Plan to Feed the World,” for *National Geographic’s* May 2014 issue to lend his perspective on this important question. Many in the scientific community agree with much of Foley’s thinking, but a sampling of the criticisms Foley’s

plan has received is included.

Step One: Freeze Agriculture’s Footprint

We need to stop clearing land that’s rich in biodiversity—especially tropical rainforests. Foley estimates that the land cleared for agriculture is approximately the size of South America. Land cleared for cattle is even larger; it’s the size of Africa. The clearing trend in recent years mainly benefits the middle class through meat, timber, and biofuels, while it does little to help the poor.

Few in the developed world debate the wisdom of freezing agriculture’s footprint; bees are on the verge of global collapse, butterfly populations have dropped dramatically. What Foley fails to explain is how to accomplish such a feat in a world of 195 independent countries, many of which are extremely poor. Nearly one billion people suffer from chronic undernourishment, and an estimated 26% of children suffer from stunted growth due to poor diet. How do you convince someone in such a predicament not to increase the amount of land they farm if it can help them feed their family?

Step Two: Grow More on Farms We’ve Got

There are many places in the world where yield gaps (the difference between what is grown versus maximized productivity) could be closed, especially in Eastern Europe, Africa, and Latin America. Beginning in the

1960s, the Green Revolution began selectively breeding plants that would be more productive when raised with farming methods that required massive water consumption and chemicals (pesticides, herbicides, and fertilizers). The legacy of this practice has been water shortages and a poisoned environment. Foley believes that with technology, conventional farming can build on the successes—nearly one billion lives were saved—without the crippling land and water degradation of the past.

In dysfunctional countries and those too poor to access world markets, the yield gap can be as wide as 60 percent between average and maximum yields. Yet the public worries about the long-term consequences of engineered food and the continued strain that chemicals put on soil.

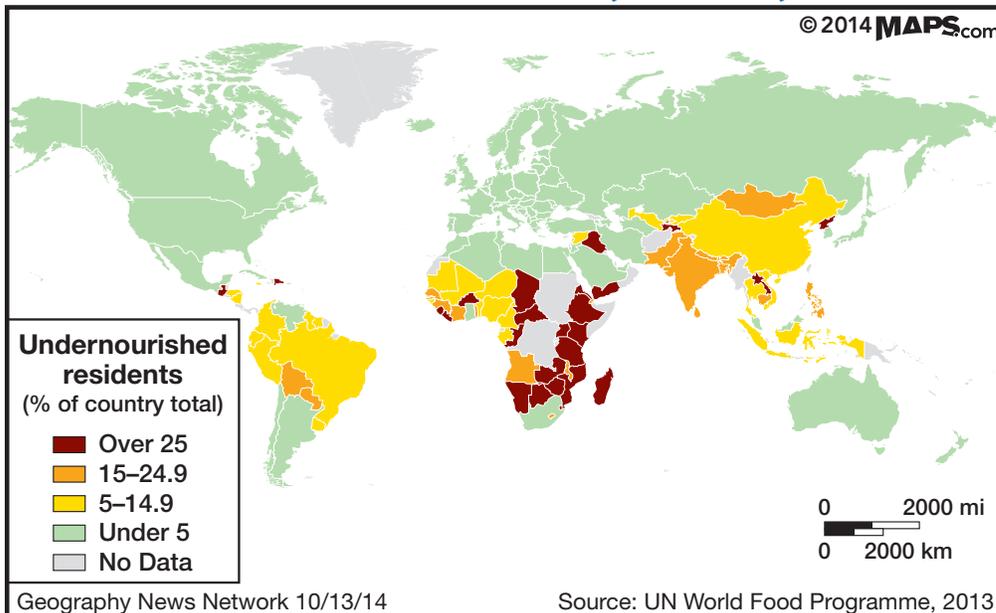
Food activist Tristram Stuart, points out that the central problem with genetically modified food is that the GM crops aren’t raised to feed the world. Their main concern is increasing the profits of large agribusiness monopolies, which often take land away from small farms. As agroecologist and author Eric Holt-Giménez writes, the food crises of 2008 and 2011 took place during bountiful harvests worldwide. Agri-businesses made record profits. The food crises were not a product of scarcity but rather of poverty. Ironically, most of the malnourished are peasant farmers who are not paid fairly for their crops.

Step Three: Use Resources More Efficiently

Foley is a proponent of both conventional and organic farming and hopes to use the best of each method. High-tech tractors with sensors and GPS would provide the right blend and amount of fertilizer and seeds to curb runoff into water systems. Organic farming uses cover crops, mulching, and composting to improve soil quality, conserve water, and replenish nutrients. Large monocrops like maize, wheat, and rice have led to soil eroding at tremendous rates, plus the crops and nutrients go to cities and nutrients aren’t returned to the land. Perennial

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Undernourishment by Country



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grain crops such as legumes function more like natural ecosystems, which have more resilience to global climate change and drought.

Eric Holt-Giménez states that vast areas of organic farming are just as inefficient with resources as conventional farming. Further, he believes industrial agriculture and globalization are destroying small land farmers worldwide, citing the 3 million smallholder bankruptcies in Mexico following the North American Free Trade Agreement. The monopolization of food and worldwide land grabbing has and will continue to hurt the poor.

Step Four: Shift Diets

While the population will increase by 35%, we will need to double the food grown to keep the most vulnerable from starving. We would not need to double our crops if we lived on a plant-based diet; we have enough crops to feed 10 billion **now**. The problem stems from only 55% of the crops grown being consumed by people; the rest are

used to fatten livestock (36%) or for biofuel (9%). Foley's research included the following caloric breakdown: For every 100 calories of grain we feed animals, we get 40 new calories of milk, 22 calories of eggs, 12 of chicken, 10 of pork, or 3 of beef. As countries like India and China become more affluent, their demand for meat, eggs, and dairy will increase, putting pressure on wealthier nations to cut down on the meat they eat.

As farmer and author George Naylor states, "Our current assembly line approach to animals is inhumane...treating livestock as assembly line widgets while over-fertilizing land and polluting air and water with vast amounts of manure." In addition to eating less meat, we need to support the grass-fed animal market. Animals can digest grass; we cannot. Livestock should not be fed grains that could be supporting human life.

Step Five: Reduce Waste

25% of the world's food calories are wasted. Up to 50% of total food weight

is wasted. That is 40 million tons in the United States alone. While poorer nations tend to waste through unpendable transportation and storage, wealthy nations' waste arises in grocery stores, homes, and restaurants. Grocery stores often throw out food before the sell-by date and refuse to buy "ugly" fruits and vegetables.

Tristram Stuart launched the international Feeding the 5,000 campaign—a series of one-day events in which 5,000 people get a lunch made from food that would otherwise have been wasted by grocery stores. "We need to change people's attitudes and make it socially unacceptable to waste food," he says.

There are many visions of how to protect our food resources and the earth. While not everyone agrees on the solution, it is positive to see *National Geographic* creating conversations that will lead us to be more prepared for 2050.

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QUESTIONS:

1. Do you believe Foley's 5-step plan can work? Why or why not?
2. Is hunger a matter of scarcity or poverty?
3. What, if any, steps of the plan are you willing to implement in your life? Do you think Americans are willing to eat fewer meat products or make wasting food unacceptable?

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