

The Future of Feeding the World  
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When our ancient ancestors gave up hunting and gathering to begin growing crops and taming livestock, our numbers grew. But even in the hunting/gathering phase, these ancestors did what no other creatures could: they tamed fire and began to cook their food.

Growing crops, a practice that began in river-watered lands (the Fertile Crescent, Egypt, and China) required another innovation, replacing dependence on rainfall with irrigation. Again, population growth exploded.

Human ingenuity then recognized that thinking ahead was necessary to survival. Crops needed to be stored in good years to then use in bad years. However, there were still times that all the ingenuity was not enough. There were periods of climate change, little ice ages, unusual floods or droughts, in which large numbers of human beings died. Famine was a specter that haunted our dreams.

Today, in a world in which famine is no longer an inevitable natural event, human beings are starved only when war or a deliberate act of evil leadership withholds food as a power move (Stalin starving the Ukrainians, Mao's Famine, and Kim Jong-Un's starvation policy). The world has evolved to the point that famines anywhere (other than during war) can be relieved by the advanced countries or the United Nations.

Although science and technology have made this food bounty possible, there are some among us who long for what they imagine is "natural agriculture," plants grown without chemical fertilizers or pesticides, animals reared in natural settings (free-range), and fishing done only with lines, not nets. These "natural" methods that provide organic foods and free-range meat and eggs come at a price and are at the moment a luxury afforded only by the well off.

Scientists, fortunately, have not rested on their laurels of bounty. Some exciting work is being done right now that may keep the bounty coming, using technology in ways never employed before. Scientists and governments with foresight are doing research on fisheries, urban agriculture, and animal husbandry that can correct current practices and actually address how climate change will affect the world's food supply. Human beings survive when they are inventive.

The growing wealth of once lesser-developed countries is producing middle classes that want what the West has always had: meat, particularly beef. Cattle, raised in large numbers, produce methane gas, a global warming product, in their digestive process. Just by adding a small amount of seaweed to their feed, the methane is reduced by half. Other technologies are addressing using the methane as a fuel.

Seaweed research is producing not only nourishing foods for human beings, but also the possibility of producing a non-polluting fuel that can power engines. Oceanographers are producing tracking systems on food fish, with joint international efforts to prevent overfishing of species and introducing less familiar fish to diners. It seems that the octopus population is sustainable, and many of us who had never tasted squid or octopus are finding it delicious.

The Dutch, who know so much about agriculture in a country without much going for it (far north, much of the land below sea level) have doubled in size in a century by reclaiming land from the sea. They have been brilliant dairy cattle growers, developing breeds that flourish and produce huge quantities of milk. Now, they have devised a new way to raise dairy cattle on three-story structures that float offshore of Rotterdam. These could be used by any metropolis near waterways.

Two robots care for the cattle, one milking and the other scooping up the manure for use elsewhere. The structure's roof collects rainwater and solar panels floating alongside produces 40% of the energy needed by the farm.

The cattle eat a mixture of grass cut from a local golf course, spent grain from beer breweries, and potato peelings, all automatically cut, mixed, and transported to food troughs by conveyer belts. This provides local food to cities, no long-distance transport needed.

Technology is also being used in "vertical farms," buildings the size of a warehouse, that can grow successive crops of produce using recycled water, no pesticide, and can feed cities locally. Human ingenuity is still with us.

685 words

Laina Farhat-Holzman is a historian, lecturer, and author of *God's Law or Man's Law*. You may contact her at [Lfarhat102@aol.com](mailto:Lfarhat102@aol.com) or [www.globalthink.net](http://www.globalthink.net).