Feeding the World

In *Fresh*, Andy Kimbrell of the Center for Food Safety confronts the core question "Can organic farming feed the world?" by saying –

"One of the complaints we often hear about organic is…you can't feed the world with it. We know now that is just wrong. We have the science….Medium size organic is far more productive than any size industrial agriculture…we have the studies, the data…"

Kimbrell is correct, in that there have been several studies in the last few years that have concluded that organic farming systems are the more productive and practical alternative in the developing world, where soils are typically run down from years of production with little rest and few off-farm inputs. A 2008 report from the United Nations Environment Program (UNEP) analyzed 286 projects encompassing 37 million hectares in 57 countries. They concluded that where organic and/or near-organic practices were adopted, crop yields increased by more than 100 percent, compared to existing practices.

The enhanced performance of organic systems in most of these studies arises from incremental improvement in soil quality, which in turn improves water conservation and utilization. The increase in biodiversity on farms adhering to organic principles also helps prevent the buildup of pests and lessens the risk of catastrophic crop losses, while also improving diets.

Despite the existence of hundreds of studies carried out in the developing world that conclude that organic farming is the soundest system to pursue, there are not enough data and studies to convince everyone. In addition, success with organic practices requires a higher level of knowledge and management skill, in order to utilize local resources to best advantage, overcome yield constraints, and maximize the biological health of diverse farming systems. Attaining such knowledge and skill takes time and a degree of trial and error. Some believe these knowledge and management-related hurdles are just too high, and for this reason place their faith in technologies that bring solutions to farmers in a bag or can, or embedded in the genetic traits of seeds.

In the developed world, most studies show that crop yields on organic farms lag conventional farming yields by a few percent to as much as 30%, except in dry years during which organically managed soils often take in and hold more moisture, and produce higher yields than on nearby conventional farms.

While crop yields are typically a bit lower, organic farms often produce more crops in a given year than on nearby conventional farms. Plus, nutrients are typically present in higher concentrations in crops harvested from well-managed organic farms. A 120-bushel organic corn crop that contains 8% protein will produce about as much milk or meat as a 130-bushel conventional corn crop with 6.5% protein.

In the case of livestock production in developed counties like the United States, conventional animal production systems push cattle, pigs, and chickens to grow faster and produce more than the case on organic and sustainable livestock farms.

The Organic Center

For example, the average dairy cow on a conventional farm produces one-quarter to one- third more milk than the average cow on an organic farm. But as a consequence, the milk from highly productive conventional cows typically contains lower levels of fat, protein and vitamins. In addition, the cows often suffer higher rates of illness and lameness and are often hard to rebreed. For these reasons, the productive life of a dairy cow on a high-production conventional farm is far shorter than on a typical, well-managed organic dairy farm.

But after watching these films, more people are likely to question whether the single-minded pursuit of faster growth on chicken farms and more milk per cow has served us well when the full range of consequences from high-yield production systems are taken into account. Pushing animals to produce more and grow faster also inevitably increases the risk of animal health and disease problems, some of which turn into new food safety problems. Two examples are touched upon in both films –

- Feeding beef cattle corn-based diets to make them grow faster alters the ecology of their rumen in ways that opens the door to infections with *E. coli* O157:H7. Cows did not evolve eating grain; forcing them to do so takes a toll on their health.

- The stress and dirty conditions in confined animal operations expose animals to sometimes extreme disease pressure, necessitating daily doses of antibiotics to keep animals growing and producing. This use of antibiotics triggers the emergence on farms of strains of bacteria resistant to antibiotics. The resistance genes that are part of these strains then find their way from animals on farms, to people, and then from a vet or worker on a farm, to a family member, to a schoolmate, and on through the human population.

Pushing animals to produce at a pace and at levels where their bodies break down, where they cannot walk without falling over, and where normal behaviors are nearly impossible, is now common on a majority of large-scale conventional hog and poultry operations. This tradeoff is, for the most part, accepted by most farmers and industry leaders as necessary to maximize efficiency and productivity, and lower costs. Both films raise awareness that there are tradeoffs between production levels, efficiency and animal well being, but neither addresses the nuts and bolts, or costs and consequences of changing the current system on the scale needed to transform the U.S. food system.

The Roots of Food Insecurity

Research from around the world supports the clear conclusion that both input-intensive, conventional farming systems and organic farming have the technical capacity to meet the caloric and nutritional needs of the human population. With few exceptions limited to the specific regions in the aftermath of serious weather events, war, or social collapse, hunger is caused by poverty, not a shortage of food.

While both systems of agriculture can meet the world's nutritional needs, neither system can hope to replicate today's U.S. or European diet for all of humanity. As world population grows and affluence spreads, there will need to be changes in the composition of the diet. For example, one to two ounces of meat or fish per person during the evening meal will have to be regarded as satisfying and ample, as

opposed to the six, eight, or even more than 12 ounce servings of meat and poultry that are common in the U.S. and much of Europe.

In addition, both food losses to pests prior to cooking and consumption and plate waste and spoilage will need to be reduced dramatically as a percent of the total global food supply. Experts project that at least 25%, and perhaps as much as a one-third of all food production, is lost to pests and diseases before consumption.

The lack of adequate grain storage and refrigeration facilities for perishable produce and animal products in much of the developing world is a primary cause for such losses.

Waste accounts for a surprisingly significant portion of the total U.S. food and beverage supply. The latest data for the United States projects average per capita food and beverage disappearance at about 3,900 calories per day. Yet our average per capita daily caloric intake is on the order of 2,400 calories, suggesting that about 1,500 calories worth of food per person per day are never ingested. This plate waste, combined with food that is discarded as spoiled, too old, or just not needed accounts for an amazing 38% of the total U.S. food supply, based on the USDA estimate of total daily caloric disappearance.

Accordingly, losses to pests and spoilage and waste "consume" over one-half of total U.S. food and beverage production, when measured on the basis of caloric intake. Reducing these enormous losses will help free up agricultural resources for the production of food for export and will also lower the nation's overall food bill.