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Organic farming offers societal benefits, but it needs support

Creating a more sustainable food and agriculture system is a daunting and urgent issue, both in principle and execution.

Organic agriculture presents an opportunity to improve the economic, environmental and social sustainability of agriculture.

The potential for organic agriculture to contribute solutions to the challenges facing sustainable food production, however, has been thwarted by the scant research attention it has received from major research institutions, including Penn State. In contrast, the cheap and abundant food produced by our chemically-based conventional systems has been supported by many millions of dollars to research from all levels of government and agribusiness.

The real costs of conventional chemical agriculture -- in terms of potential negative impacts on our food and environment -- continue to be externalized (go unaccounted for in current assessments).

The scientific data that are available are compelling and point to the need for more research. Expanding knowledge about organic systems will likely provide spill-over benefits for all of agriculture.

Organic production can benefit food quality. A 2001 survey of 41 scientific publications on nutritional qualities of food found organic crops contained significantly more vitamin C, iron, magnesium and phosphorus and significantly less nitrates than conventional crops. There were trends showing higher quality protein and nutritionally significant minerals and lower amounts of some heavy metals in organic crops.

Conventional production systems are largely dependent on the use of synthetic pesticides. Scientific data from studies representing more than 94,000 food samples revealed that conventional produce had significantly greater concentrations of pesticide residues than did organically grown produce. But even organic food may not be entirely pesticide-free due to problems such as pesticide drift.

Soil degradation in modern agriculture is a critical issue. In conventional systems, emphasis on subsidized annual crops, often accompanied by use of larger, heavier equipment and lack of cover during winter months, all contribute to increased opportunities for soil loss and degradation.

In organic systems, use of compost and animal and green manures add soil-building organic matter, and the use of cover crops and perennial crops protect the soil surface from wind or rain.

In a USDA study comparing organic and conventional farms in the Midwest, researchers found that soil on organic farms tended to have more organic carbon, lower compaction and higher water-holding capacity -- all indicators of soil quality.

Another critical issue in agriculture is its impact on water quality. A recent 10-year assessment by the U.S. Geological Survey provides the most comprehensive national-scale analysis to date of pesticides in streams and ground water. Among the major findings are that streams and shallow wells in agricultural areas frequently contained complex mixtures of pesticides used in conventional agriculture at levels damaging to aquatic life and animals that feed on it.

Organic production has the potential to help protect water quality because the use of synthetic pesticides is not allowed.

Many question whether we can feed the world with organically grown food. We are not feeding it now with conventionally grown food.

Hunger today is not so much a problem of insufficient food production, but instead a largely political and

socio-economic problem of equitable food allocation and distribution. About a third of the world's children suffer from malnutrition, yet 80 percent of them are from countries with food surpluses.

Using synthetic pesticides and fertilizers may increase production yields in the short term, but this comes at a long-term cost in local sustainability, local knowledge and local environmental quality.

In a survey of 154 research trials, organic crops yielded on average a respectable 95 percent of yields produced in conventional systems.

If research funding were increased to support the science of organic production, organic yields would likely meet and perhaps even surpass conventional yields.

The good news is that farmers today have many options to sustain their lands and livelihoods. Based on the emerging evidence, organic agriculture is likely one important option.

But much more scientific research integrating the natural and social sciences must be supported by government at all levels, and must be given credence by all U.S. land-grant universities. Indeed, there are a growing number of researchers at many institutions, including Penn State, who are focusing their attention on organic agriculture.

We will not know the full potential of organic agriculture until we have had the opportunity to study it with the same resources that have been available to study and develop conventional agricultural systems.

This column was written by Mary Barbercheck, Clare Hinrichs, Heather Karsten, David Mortensen, Nancy Ostiguy, Tom Richard and Carolyn Sachs, faculty in Penn State's College of Agricultural Sciences, and Lyn Garling, education specialist in the integrated pest management program. The opinion of the columnists does not necessarily reflect the viewpoint of the university.