

07/13/05 - Studies Show How and Why Organic Farming Must Become the Norm in the USA

Susan S. Lang Cornell University, July 13, 2005 [via aynet]

ITHACA, N.Y. -- Organic farming produces the same yields of corn and soybeans as does conventional farming, but uses 30 percent less energy, less water and no pesticides, a review of a 22-year farming trial study concludes.

David Pimentel, a Cornell University professor of ecology and agriculture, concludes, "Organic farming offers real advantages for such crops as corn and soybeans." Pimentel is the lead author of a study that is published in the July issue of *Bioscience* (Vol. 55:7) analyzing the environmental, energy and economic costs and benefits of growing soybeans and corn organically versus conventionally. The study is a review of the Rodale Institute Farming Systems Trial, the longest running comparison of organic vs. conventional farming in the United States.

"Organic farming approaches for these crops not only use an average of 30 percent less fossil energy but also conserve more water in the soil, induce less erosion, maintain soil quality and conserve more biological resources than conventional farming does," Pimentel added.

The study compared a conventional farm that used recommended fertilizer and pesticide applications with an organic animal-based farm (where manure was applied) and an organic legume-based farm (that used a three-year rotation of hairy vetch/corn and rye/soybeans and wheat). The two organic systems received no chemical fertilizers or pesticides.

Inter-institutional collaboration included Rodale Institute agronomists Paul Hepperly and Rita Seidel, U.S. Department of Agriculture's Agricultural Research Service research microbiologist David Douds Jr. and University of Maryland agricultural economist James Hanson. The research compared soil fungi activity, crop yields, energy efficiency, costs, organic matter changes over time, nitrogen accumulation and nitrate leaching across organic and conventional agricultural systems.

"First and foremost, we found that corn and soybean yields were the same across the three systems," said Pimentel, who noted that although organic corn yields were about one-third lower during the first four years of the study, over time the organic systems produced higher yields, especially under drought conditions. The reason was that wind and water erosion degraded the soil on the conventional farm while the soil on the organic farms steadily improved in organic matter, moisture, microbial activity and other soil quality indicators.

The fact that organic agriculture systems also absorb and retain significant amounts of carbon in the soil has implications for global warming, Pimentel said,

pointing out that soil carbon in the organic systems increased by 15 to 28 percent, the equivalent of taking about 3,500 pounds of carbon dioxide per hectare out of the air.

Among the study's other findings:

In the drought years, 1988 to 1998, corn yields in the legume-based system were 22 percent higher than yields in the conventional system.

The soil nitrogen levels in the organic farming systems increased 8 to 15 percent. Nitrate leaching was about equivalent in the organic and conventional farming systems.

Organic farming reduced local and regional groundwater pollution by not applying agricultural chemicals.

Pimentel noted that although cash crops cannot be grown as frequently over time on organic farms because of the dependence on cultural practices to supply nutrients and control pests and because labor costs average about 15 percent higher in organic farming systems, the higher prices that organic foods command in the marketplace still make the net economic return per acre either equal to or higher than that of conventionally produced crops.

Organic farming can compete effectively in growing corn, soybeans, wheat, barley and other grains, Pimentel said, but it might not be as favorable for growing such crops as grapes, apples, cherries and potatoes, which have greater pest problems.

The study was funded by the Rodale Institute and included a review of current literature on organic and conventional agriculture comparisons. According to Pimentel, dozens of scientific papers reporting on research from the Rodale Institute Farming Systems Trial have been published in prestigious refereed journals over the past 20 years.