

Sustainable Organic Agriculture Conserves Energy Resources

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Abstract

With shortages of fossil energy, especially oil and natural gas, and heavy biomass energy use occurring in developed and developing countries, a major focus has developed worldwide concerning biofuel production. Biofuels made from crops, such as corn, sugarcane, and soybeans are being used as an energy source. In addition, wood and crop residues also are being used as fuel. However, the use of crop residues and other biomass for biofuel raises many concerns about the environmental consequences.

Conflicts exist today in the use of land, water, energy, and other environmental resources, and between food and biofuel production. Already, there are more deaths from malnutrition than from any other cause of death in the world. The World Health Organization reports that 3.7 billion people are currently malnourished. The Food and Agricultural Organization of the United Nations (FAO) reports that per capita grain production has been declining for the past 23 years. Grains make up more than 80% of the world food supply. Although grain and other crops occupy much land worldwide, malnutrition is still significant globally.

Fossil energy is essential for world and US food production. In the US, about 19% of all fossil energy is utilized in the food system. Organic agriculture provides an opportunity to maintain the yields of crops like corn and other grains, while employing less fossil energy, maintaining the productivity of the land, and conserving water resources. In a 22-year experiment using corn and soybeans, we found that fossil energy use was reduced by about 33% in the organic managed systems. The yields of both corn and soybeans during the 22-year experiment equaled those of conventional corn and soybean grown following Pennsylvania State University recommendations. The prime energy benefit came from using cover crops to provide nitrogen, plus avoiding the use of herbicides and insecticides.

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