



Introduction to the Compendium: Environmentally Sound Sustainable Agriculture

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In addition to the energy from the sun, a sustainable agricultural system depends on fertile land, adequate water, fossil energy, and biological resources. To ensure that such a system remains not only productive but ecologically sound, careful management of these basic resources is imperative. At present, the environmental status of U.S. agriculture is being assailed in a variety of ways. Furthermore, agriculture is considered the prime non-point polluter of both soil and water beyond the cropland and pasture border.

Consider that nearly five billion tons of U.S. agricultural soils are eroded each year, thereby diminishing the fertility of crop and pasture lands. In addition, eroded soils reach waterways, aquatic ecosystems, and other sectors of natural and urban environments.

To ensure adequate yields, about 20 million tons of commercial fertilizer nutrients (nitrogen, phosphorus, potassium) are applied to U.S. farmland annually. When erosion occurs, considerable quantities of these fertilizer nutrients find their way into the environment and cause serious pollution problems.

In animal production systems, livestock wastes accumulate, and their nutrients often are not used properly. Much of the estimated one billion tons of livestock wastes produced each year further pollute the environment.

In addition, U.S. farmers apply about a billion pounds of pesticides to their agricultural lands each year to prevent pest insect, diseases, and weed problems. Similar to fertilizers and manures, chemical pesticides accompany eroding soil and adversely affect terrestrial and aquatic ecosystems.

As a result, agriculture has become the prime polluter of soil and water resources. The off-site damages caused by soil erosion are estimated at \$17 billion annually, while the environmental impacts of pesticides are estimated to be more than \$8 billion each year. The total cost of the environmental crisis caused by eroding soil and chemicals from agriculture is unknown but could easily total as much as \$50 billion each year.

Much remains to be done to diminish these environmental damages. At first glance, the banning of DDT in 1972 along with most of the other chlorinated insecticides in the United States, significantly reduced fish and bird kills. Unfortunately, since then the total amount of pesticide use has increased about 20 fold, and more toxic pesticides are now in use. Yet in several countries, sincere efforts are being made to decrease pesticide use and also to develop non-chemical pest control alternatives.

Soil erosion by wind and rainfall continues to damage the fertility of crop and pasture lands. Numerous methods exist to prevent erosion and conserve our land resources. These include: crop and pasture rotations, no-till, contour planting, grass strips, strip cropping, use of mulches, ridge-planting, terracing, cover crops, and combinations of these technologies.

This compendium includes reference sources and scientific information dealing with environmental pollution, contamination, poisoning, soil erosion, degradation, and depletion of land, water, energy, and biological resources in current U.S. agriculture. In addition, several references focus on strategies to help make agriculture environmentally sound, sustainable, and economic.

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