3.2.1.2 CONVERTING CROPLANDS TO RESERVES AND BUFFERS

Technology Description

Converting croplands to other less-intensive land uses such as conservation reserve and buffer areas increases soil carbon because soils are not subjected to tillage and other disturbances that lead to soil carbon losses.

System Concepts

- Conversion of croplands to reserves and buffers provides environmental benefits by removing potentially degradable land from production, but competes with crop production needs and markets.
- Reserves receive minimal long-term management and may be converted back to cultivation.
- Soil carbon can be rapidly lost if reserves or buffers are converted back to cultivation.
- Reduce land under cultivation, which then would directly or indirectly free up land for conservation purposes.

Representative Technologies

- *Conservation Reserve Program*. Converts cropland in environmentally sensitive areas to grass or forest land for a contractual time period (e.g. 5-15 years).
- *Riparian Buffers.* Land adjacent to streams is converted from cropland into grass and forest land.
- Technologies that increase agricultural productivity (e.g. by increasing yields or minimizing spoilage and increasing shelf life, because each would minimize area under cultivation.

Technology Status/Applications

- Almost 34 million acres of land have been entered into the Conservation Reserve Program as of 2002.

Current Research, Development, and Demonstration

RD&D Goals

- Quantify the carbon sequestration potential of buffer and reserve programs for various climates and soils.
- Develop the combination of practices (e.g., plant species, siting, establishment practices) that optimize carbon sequestration and minimize production losses for various types of reserves and buffers.
- Develop decision support tools for farmers, other land managers, and policy makers to inform which areas to put into reserves and the relative costs and benefits of different land conservation approaches, both in terms of carbon sequestration and production.

RD&D Challenges

- Improve measuring and monitoring procedures for accurate, low-cost, efficient carbon inventories.
- Determine the effects of conservation reserves on non-CO_2 greenhouse gases.
- Develop the optimal combination of practices for each system for each area of the country and soil type.
- Develop better models and decision support systems.

Recent Progress

- Estimates of the potential for reserve and buffer area soils to sequester soil carbon have been published and provide a baseline for future activities.
- DOE's Carbon Sequestration in Terrestrial Ecosystems project is investigating carbon sequestration in prairie restoration.
- Ongoing programs have been established in USDA to promote and assist in buffer and conservation reserve programs.
- Preliminary models and decision support systems have been developed.

Commercialization and Deployment Activities

- USDA has an established Conservation Reserve Program and riparian buffer program.
- Technical support is available from USDA on how to implement technologies and practices.

Market Context

- The market for implementing land conservation through reserves and buffers will be driven by other conservation priorities such as erosion control and water quality, and crop commodity prices.
- Possible synergies with developing markets for ecosystem services.