FOREST PRODUCTS
Project Fact Sheet

HIGH INTENSITY FOREST MANAGEMENT

BENEFITS

- Enhanced information base on the response of different soils to intensive hardwood production
- Increased soil sustainability
- Increased knowledge about the effectiveness of buffer strips in stopping runoff and protecting surface water and wetlands
- Improved models for choosing commercial forest sites and identifying best management practices
- Enhanced timing for application of fertilizers to minimize groundwater contamination

APPLICATIONS

The data analysis will provide information that forestry managers can use to manage their commercial tree crops.

Forests Will Help Forest Products Industry Attain Environmental and Economic Goals

The forest products industry is developing improved methods for managing its forests to ensure the long-term sustainability of its raw materials. By increasing the use of intensively managed tree crops and maximizing the yield of fiber in each harvested tree, at the lowest cost, the industry expects to attain its economic goals. Intensive management can deplete soil nutrients and requires the use of fertilizers, which raises concerns about their effect on water quality in the area. By reducing the ecological impact of these management techniques, the forest products industry will be able to realize its environmental goals of sustainable production..

The U.S. Department of Energy is funding this cooperative research project to demonstrate the effect of intensive management of tree crops on soil and water quality, at plot-scale industrial sites. The forest products industry will gain access to quantitative data on the best practices for maximizing soil productivity while minimizing the contamination of surface and ground water by fertilizers in areas where tree crops are managed.

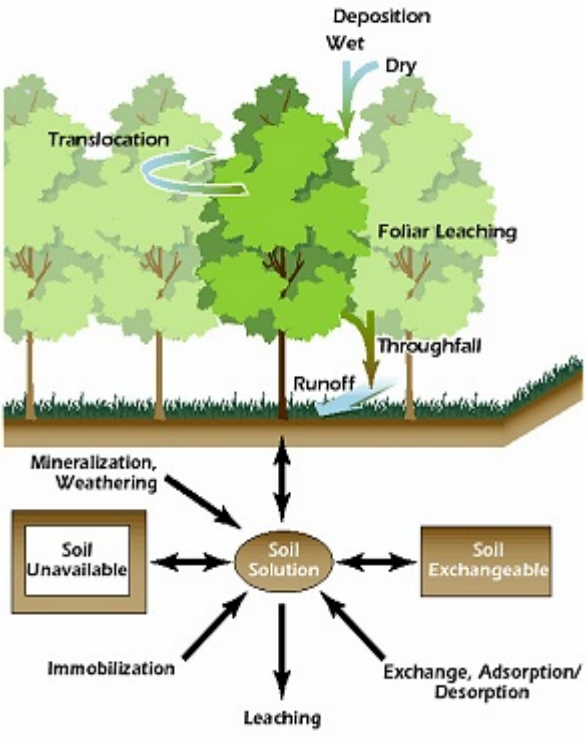


Figure 1. Diagram of an intensively managed forest area.

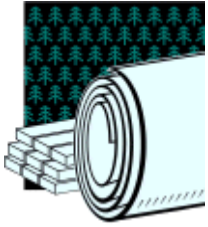
PROJECT DESCRIPTION

Goal: To quantitatively measure the physical and chemical changes in farmland soils after they are converted to the production of intensively managed tree farms, and to study water resources in relation to fertilizer use.

Using short-rotation crops of sweetgum, sycamore, and cottonwood trees, researchers are studying the depth of nutrient pools, the quantity and quality of surface runoff, and the quality of groundwater. Surface water runoff is being monitored at plot-scale sites in Alabama and Tennessee and at both the watershed and sub-basin scales of an industrial tree crop production site on the coastal plain of South Carolina to determine nutrient losses from large-scale experimental plots. Subsurface water is being monitored on these experimental sites to determine the movement of nutrients through the soil. Water level manipulations are being installed to determine the ability to manage runoff from the watersheds, ensure water availability, and to minimize offsite movement of fertilizer and sediment. Hydrologic and hydrochemical models developed by North Carolina State University are being linked to predict the movement of water and nutrients from the study sites, as well as from the sub-basin and watershed levels on a regional scale. Models will be validated using data from the large-scale field experiments to determine their applicability on a regional scale. A literature review and meta analysis are being conducted to identify information on the parameters that affect fiber production in intensively managed, short-rotation tree crops. These analyses and associated nutrient modeling will help develop management methods to maximize sustainable productivity of intensively managed tree crops.

PROGRESS & MILESTONES

- The literature and ongoing research related to forest fertilization, nutrient cycling, and water quality have been reviewed.
- Study sites have been identified and developed, and data collection is ongoing.
- Samples of soils have been collected and analyzed for nutrient budget studies.
- Water quality is being monitored in association with rainfall events and fertilizer applications.
- Hydrologic and nutrient models are being parameterized with site-specific data.
- The data analysis is underway, and project reports and other publications will be prepared.



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