SRS-4352 – National Agroforestry Center – Research
       Huntsville, AL; Lincoln, NE; Blacksburg, VA; Moscow, ID
       Project Leader: Michele M. Schoeneberger

Mission: To provide the scientific knowledge and tools required to effectively manage trees and forests in mixed land-use landscapes for providing, restoring, and sustaining ecosystem services nationally.

Problem 1: Ecological Services in Mixed Land-Use Landscapes

Trees and forests provide an array of critical ecosystem services in mixed land-use landscapes, like clean water, soil conservation, wildlife habitat, and renewable energy. However, trees and forests must be integrated on agricultural lands, and in urban areas in ways that complement these other land uses to achieve adoption by landowners and must be strategically arranged, designed, and managed within larger landscapes in to realize environmental benefits.

Problem 1a - Develop scientific knowledge and tools to support site design of agroforestry systems.
Unit will conduct studies on the ecological functions and values of tree-based practices in mixed land-use settings and develop tools that enable creation of designs that efficiently produce ecological benefits.

Problem 1b – Develop scientific knowledge and tools for strategic placement and management at landscape scale.
Unit will conduct studies of landscape-scale ecological relationships between tree-based practices and other land uses and develop tools that enable proper juxtapositions of trees and forest in mixed landscapes that augment the ecological services that they provide.

Problem 1c - Develop knowledge of factors that influence the adoption of agroforestry practices.
Unit will conduct research on the use of visual simulations, economic models, and other communication tools that can foster adoption of tree-based practices in order to modify communication tools for promoting implementation.

Problem 2: Sustainable Management of Non-Timber Forest Products

The knowledge needed to understand the ecologic, economic, or social impacts of sustainably collecting and trading non-timber forest products (NTFP) is lacking. This hinders the United States's efforts to adhere to the requirements of international agreements on NTF resources. Likewise, landowners interested in alternative income opportunities, lack the knowledge needed to sustainable harvest or profitably cultivate forest botanicals and other NTFPs.

Problem 2a. – The amount of NTFPs and their potential contribution to local and regional economies is lacking.
Unit will develop methods to collect and validate non-timber production output

Problem 2b. – Sustainable harvest levels for most NTFPs have not been established.
Unit will develop and test methods and protocols to establish sustainable harvest practices.

Problem 2c. – The information needed to successfully cultivate forest botanicals and other NTFPs is lacking.
Unit will investigate interactions methods to better integrate non-timber forest products into forest farming to provide cultivation protocol and improve landowner opportunities.

Problem 3: Alternative Forest Management Options for Landowners

The pulpwood market in the southeastern U.S. has weakened making it difficult for pine plantation owners to generate a profit or even pay for the cost of a mid-rotation thinning. If left unthinned, the plantation stagnates; producing a stand that poses a high risk for wildfire and insect damage, and it fails to realize its potential to produce quality sawtimber. Agroforestry practices, such as silvopasture and alley cropping, are alternative forest management options for landowners who desire both annual and long-term income generation from their lands.

Problem 3a. The economics and management of pine silvopasture systems need further research.
Unit will determine system guidelines for the production of southern pine sawtimber in combination with the production of understory forage and browse needed to profitably graze livestock.

Problem 4. Nursery and Reforestation Technologies for Native Plants Propagation

There is an increasing demand for tree and plant materials for reforestation and conservation programs. Very little is known about their propagation of most native plant species. Production protocols must also take into account

environmental concerns regarding nursery operations, necessitating the formulation of new water and nutrient management guidelines. Further, most disease problems in nurseries are associated with poor water management practices.   As a component of the intra-deputy area Reforestation, Nurseries and Genetics Resources (RNGR) team, this Problem Area addresses the need to provide nurseries, on regional and national scales, information about producing commercial and non-commercial species of importance for ecosystem restoration, function, and health.

<u>Problem 4a. – Information is lacking on how to produce native plants required for ecosystem restoration.</u>
Unit will develop techniques for the collection, propagation, and deployment of native plants for restoration.

<u>Problem 4b. – Fusarium root disease is a major pest in western conservation nurseries.</u>
Unit will investigate potential biological controls for Fusarium root disease.

<u>Problem 4c. – Science synthesis is needed to improve nursery efficiency.</u>
Unit will transfer technology about nursery systems and plant propagation to traditional and underserved portions (indigenous peoples) of the nursery industry.

<u>Problem 4d. –Plant and water relationships during nursery production are poorly understood.</u>
Unit will investigate nursery—plant water interactions and effects on seedling quality and outplanting performance.

Problem M1: USDA National Agroforestry Center (NAC)

The NAC is a formal partnership between US Forest Service Research & Development and State & Private Forestry and the USDA Natural Resources Conservation Service. In addition to the research program of RWU SRS-4352, this national Center has a strong technology transfer mandate. It develops and delivers technology on a broad suite of agroforestry practices, like alley cropping, forest farming, riparian forest buffers, silvopasture, and windbreaks. The Center gathers and packages research into technology transfer products that include field demonstrations, training workshops, a quarterly newsletter, technology notes, computer software, videos, brochures, and displays. Another component of NAC is the Forest Service National Reforestation, Nurseries, and Genetics Resources (RNGR) Team's unit for Nursery and Reforestation Technologies located in Moscow, ID. In addition to its research as described under Problem 4, RNGR delivers technology, and tools to enhance nursery production and increase the survival of trees and other native plants used in ecosystem restoration projects nationally.

Environmental considerations: Proposed research activities under each of the problem areas outlined in this Research Work Unit Description are limited in context and intensity and are not expected to have a significant effect on the quality of the human environment. The environmental effects of specific actions will be considered during the development of study plans, as well as the existence of extraordinary circumstances related to any proposed action, and categorical exclusion will be documented as a part of the study plan according to FSH 1909.15, Chapter 30. Where environmental concerns exist regarding particular studies, these may be evaluated within individual study plans, or by Environmental Assessments or Environmental Impact Statements prepared with and reviewed by the cooperating District or Forest staffs.

Key Partners:
       USDA Natural Resources Conservation Service
       USDA Agricultural Research Service – National Soil Tilth Lab
       USDA Global Change Program
       Virginia Landcare
       Intertribal Nursery Council
       University of Nebraska / University of Missouri / Purdue University / University of Idaho
       University of Georgia / University of Minnesota/Virginia Polytechnic Institute and State University, Alabama A&T University, North Carolina A&T University, Alabama A&T University
       1890 Agroforestry Consortium
       The Nature Conservancy
       National Association of Regional Councils
       National Association of Conservation Districts
       National Association of State Foresters
       IUFRO-5.11-Non-wood Forest Product