

“Farming the Forest in Agroforestry Systems: An Overview”¹

Bruce C. Wight²

ABSTRACT: What is meant by agroforestry systems? How do “specialty products” fit into agroforestry systems? This presentation will begin defining the opportunities for specialty products in the various agroforestry applications that include alley cropping, forest farming, riparian forest buffers, silvopasture, and windbreaks. Specialty products including ginseng, goldenseal, beargrass, fruit or nuts from different understory plants, etc. are often intentionally cultivated under existing forest stands. This is frequently called “forest farming.” However, can specialty products also be combined with the other agroforestry applications such as windbreaks or riparian buffers? By combining specialty products to these other practices, there may be a stronger economic motivation for agroforestry applications that are often marketed more for their environmental benefits than for their economic benefits. Even with alley cropping systems, specialty products may be able to provide more potential products into a system that is already producing at least two products. There are many questions about how to integrate specialty products into agroforestry systems, and this conference provides a starting point for finding many of the answers, as long as people keep open and inquisitive minds.

Introduction

“Farming the forest.” What image comes to mind with this phrase? Depending on an individual’s personal background, this phrase may conjure different images. For a midwesterner, perhaps it is a big green tractor crashing through the forest trying to make way for another acre of corn. Or, a person from a developing country may see a farmer with a shovel or hoe cultivating a crop under a large spreading tree. Most likely it is somewhere in between, with both hand labor and some mechanized equipment, being used.

This conference is focusing on intentional cultivation of herbaceous plants in conjunction with woody plants and how that can fit into different farm, ranch or forest enterprises. Herbaceous plants include ginseng, goldenseal, beargrass, black cohosh, saw palmetto and other plants that perform well in shady conditions. Developing additional specialty products from fruit, nuts and other plant parts of the woody plants in these systems is also important. Today, the image of “forest farming” includes the growing of a variety of herbaceous plants under a forest canopy for eventual harvest, possibly in conjunction with nuts or fruit from the trees, to provide economic diversification for the enterprise. But, what is meant by: “Farming the forest in an agroforestry system?”

What Is Agroforestry?

Agroforestry is a group of practices that combine trees and shrubs with crop or livestock operations to help create more integrated, diverse, and sustainable farms, ranches, and rural communities. The goal of all agroforestry systems is to optimize benefits of the biological interactions created, when trees and/or shrubs are deliberately combined with crops and/or livestock. Agroforestry systems must meet the following four criteria (AFTA 1997):

- **Intentional:** Combinations of trees, crops, and/or animals are intentionally designed and managed as a whole unit, rather than as individual elements which may occur in close proximity but are controlled separately.
- **Intensive:** Agroforestry practices are intensively managed to maintain their productive and protective functions, and often involve annual operations such as cultivation, fertilization, and irrigation.
- **Interactive:** Agroforestry management seeks to actively manipulate the biological and physical interactions between tree, crop, and animal components. The goal is to enhance the production of more than one harvestable component at a time, while also providing conservation benefits such as nonpoint source water pollution control or wildlife habitat.
- **Integrated:** The tree, crop, and/or animal components are structurally and functionally combined into a single, integrated management unit. Integration may be

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²Agroforester, USDA Natural Resources Conservation Service, National Agroforestry Center, East Campus-UNL, Lincoln, NE 68583-0822

horizontal or vertical, and above- or below-ground. Such integration utilizes more of the productive capacity of the land and helps to balance economic production with resource conservation.

Agroforestry Benefits

Agroforestry contributes significantly to more sustainable land use systems by improving soil quality, microclimate, water cycling, waste management, pest management, aesthetic values, economic diversification (Rietveld, 1997). When these different agroforestry roles are combined, the end result is greater stability in the land-use systems including the ability to be more resilient to disturbances and stresses applied to the system.

As the result of these agroforestry roles and processes, multiple benefits accrue to the individual farmer, rancher, or forest owner. Different agroforestry practices will provide some or all of the following benefits:

- Improved income by increasing crop yields and providing alternative income sources or long-term profits.
- Control of drifting snow and reduced energy use in buildings.
- Protection of natural resources through reduced wind and water erosion, improved water quality, and enhanced wildlife habitat.
- Improved quality and quantity of crops and livestock from improved soil quality, more efficient water cycling, and a modified microclimate.
- Diversified farm, ranch or forest enterprise reduces the economic risk by not depending solely on one or two products. Diversifying sources of income is a major goal of agroforestry and is of special interest to small farm operators.

Agroforestry is not a “stand-alone” answer to all conservation or economic concerns. It needs to be carefully integrated into the overall conservation and economic strategy for the entire farm or ranch.

Rural communities can also derive direct and indirect benefits from agroforestry. The direct benefits include applying agroforestry practice technologies to:

- Provide visual screens
- Abate dust and noise

- Modify extreme temperatures
- Provide greenways for recreation, aesthetics and wildlife.

Indirectly, agroforestry application in rural areas can enhance the economic stability of the community as a whole through the diversification of products sold.

Integrating Specialty Products in Agroforestry Applications

There are five general categories of agroforestry recognized in the United States and Canada. Each serves a specific function in the whole conservation/diversification picture. Specialty products can potentially be incorporated into each of the different practices.

Forest Farming

In a forest farming operation, high-value specialty crops are cultivated under the protection of a forest canopy that has been modified to provide the appropriate amount of light for the understory plants. Many of the other papers will describe a variety of forest farming systems including such plants as sword fern, beargrass, ginseng, and goldenseal to name a few. This is why many of you are here. But what about other agroforestry practices. How do they fit into this theme of specialty products from farming agroforestry systems?

Alley Cropping

Alley cropping is simultaneously growing rows of trees/shrubs with some type of crop in-between the rows of trees. Sometimes this is referred to as intercropping. Depending on the distance between the rows of trees and the type of tree, a variety of crops can be grown including traditional agricultural crops such as corn, soybeans, winter wheat, etc.; horticultural crops like vegetables; or more alternative crops like catnip, St. John’s wort or echinacea. Since these are dynamic systems, the growing conditions will change over time resulting in either changes in the companion crops being grown or modification of the trees such as thinning to maintain certain light requirements. Since the goal is to maximize the diversity of outputs while making the most efficient and wisest use of the land, why not consider growing a third crop immediately under the rows of trees in the alley cropping system. As the trees grow, shade levels

increase. Rather than bemoan the fact of less productive acres, the grower should make full use of both the horizontal dimension as well as the vertical. One grower in West Virginia took advantage of this space opportunity by planting ginseng under his rows of black walnut. There are numerous other possibilities including fruit or nut producing shrubs.

Riparian Buffers

Riparian forest buffers are composed of tree, shrub, and grass plantings. They are used along streams, ponds, lakes, and wetlands to remove or intercept sediment, nutrient and pesticide runoff from adjacent land. However, devoting land to riparian forest buffers also removes land from agricultural production in the eyes of many farmers. How can the environmental goals of the buffers be achieved while also enticing the landowner economically? Currently, government incentives such as the Conservation Reserve Program offer rental payments and cost sharing as an enticement to farmers and ranchers. Perhaps another option would be to include products in part of the buffer that may be harvested. An Oregon farmer is planting hybrid poplar in part of his buffer for future harvest and use in oriented strand board products. Another Oregon landowner is also using poplar but is experimenting with planting valuable understory plants, too.

Windbreaks

Agricultural windbreaks are most commonly planted and managed as part of a crop or livestock operation to enhance production, protect livestock, and control soil erosion. Much like the riparian forest buffer, rarely have windbreaks been planted to obtain a marketable product directly from the windbreak. There are definite economic returns to the landowner provided by the windbreak including crop or livestock production gains or savings on home heating. However, many landowners still look at their windbreak as occupying productive land. Perhaps by designing windbreaks with marketable species, either woody or herbaceous, windbreaks would gain even greater acceptance. Several landowners in the Great Plains have incorporated vegetables like melon in-between the rows of their windbreak. This works well for the first few years of the windbreak until the rows begin to close. Other landowners have incorporated nut and fruit bearing species into their windbreak designs. The fruit, vegetables, or nuts can either be used for home consumption, marketed at a roadside stand or sold at

farmers' markets. Many older multiple-row windbreaks become mini-forests as they mature. In these situations, there is a possibility to include some of the shade-loving understory crops, too.

Silvopasture

Silvopasture combines trees with forage and livestock production. The trees are managed for high-value sawlogs and at the same time provide shade and shelter for livestock. Forage is also being produced under the trees. It is difficult to visualize how specialty products might fit into this type of practice except as special added products derived from the trees such as pine straw, nuts or fruit. Adding specialty products into silvopasture systems is certainly a challenge. If anyone has suggestions of ways to manage livestock, trees, and special products simultaneously, please pass them along to those working to advocate agroforestry.

Summary

Agroforestry is not static but is constantly changing as more is learned about the wide array of interactions between different plant components. Everyone working in agroforestry must embrace these changes and seek ways to adapt them to their own situations. There are so many questions about how to integrate specialty products into agroforestry systems, and this conference provides a starting point for finding many of the answers, as long as people keep open and inquisitive minds. Finally, it must be recognized that no one has all the answers, all the time, or all the money to answer these questions. Only by working together can the following "portraits" advocated by Paul Johnson be created:

"Our farm, our neighbors' farm, and all other private land comprise a majority of the American landscape. As we use our land, we paint our individual and community portraits on the land. Done well, those portraits can be a source of pride. (NRCS 1996)"

Aldo Leopold commented in a 1939 speech entitled "The Farmer as a Conservationist," (NRCS 1996)

"When the land does well for its owner and the owner does well by his [or her] land – when both end up better by reason of their partnership – then we have conservation. When one or the other grows poorer, either in substance, or in character, or in responsiveness to sun, wind, and rain, then we have something else, and it is

something we do not like.”

Leopold continued: “Let’s admit at the outset that harmony between man [people] and land, like harmony between neighbors, is an ideal – and one we shall never attain. Only glib and ignorant men [people], unable to feel the mighty currents of history, unable to see the incredible complexity of agriculture itself, can promise any early attainment of that ideal. But any man [person] who respects himself [or herself] and his [or her] land can try....”

By integrating agroforestry into the nation’s land use systems perhaps the harmony ideal sought by Leopold may be a few steps closer.

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