Agroforestry in the 2007 Farm Bill and Beyond

Briefs:

- Agroforestry is "**Productive Conservation**" *p.* **2**
- Agroforestry and **U.S. Agricultural Competitiveness** *p.* **4**
- Agroforestry and **Energy Security** *p.* **6**
- Agroforestry and **Rural Economic Development** *p.* **8**
- Agroforestry and **Environmental Services** *p.* **10**
- Agroforestry and **Wildlife Habitat** *p.* **12**
- Agroforestry **Research Needs** *p.* **14**

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The Association for Temperate Agroforestry Inc. (AFTA) is a private, non-profit, 501(c)(3) organization formed in 1991 to promote the exchange of scientific and practical information about temperate agroforestry, and to promote wider adoption of agroforestry by landowners in temperate regions of North America.

Agroforestry is *Productive* Conservation

Agroforestry is the intentional blending of agriculture and forestry production with diverse conservation practices that enhance income diversification, energy security, and environmental protection. The appeal of agroforestry is that environmental and social contributions can be made without sacrificing financial profitability for the landowner (Garrett *et al.*, 1994). Adoption of agroforestry *is* in the interest of policy-makers, as it *is* more cost-effective than standard conservation programs by allowing for concurrent production. Agroforestry can be sustained by landowner profit and limit the need for government investments.

Key Benefits of Agroforestry:

Rational Management of Private Lands – Agroforestry provides a way for private landowners to make personal choices on their lands and to make investments beneficial to the environment. These benefits can be realized while maintaining productivity and with no additional financial sacrifice.

U.S. Agricultural Competitiveness – To maintain our market share, U.S. policy makers must ensure competitiveness through continued diversification of commodity crops. Agroforestry provides a diversity of commodity products such as hardwoods, biomass for energy, and food production for domestic and international markets.

Energy Security – U.S. policy makers have stated a desire to become more energy independent and more food secure in a generally less secure world. Agroforestry can contribute to energy security and independence as well as rural development through production of biomass for ethanol, biodiesel, and electricity.

Rural Economic Development – Subsidy programs provide a robust support structure for the principal commodity crops, discouraging diversification. Dependence on a 2-3 crop rotation system limits farmers' ability to recover from economic and production problems. Agroforestry cropping systems, on the other hand, provide diversified income sources to growers, supplement farm incomes, enhance local economies, and promote self-sufficiency in domestic and global economic markets.

Environmental Services – Agroforestry provides public benefit through enhanced water quality, emission reductions and carbon sequestration, while still maintaining production for domestic and international markets. Tree-crop and livestock combinations address today's pressing environmental issues while providing landowners with a diversified and more secure portfolio of income sources.

Wildlife Habitat – Agroforestry practices establish diverse plant communities necessary for increased wildlife and fish habitat. Thus, farmers and forest managers who can provide wildlife habitat through agroforestry can make significant contributions to environmental health.

Policy Needs to Realize Agroforestry Benefits:

Risk Mitigation – Making loan protection and crop insurance available for agroforestry and other alternative cropping systems means that farmers will not have to incur additional risk to plant non-traditional commodity crops. Risk could be further mitigated by maintaining crop histories for farmers implementing agroforestry options.

Producer Investment Costs – Agroforestry requires some different equipment than that used in conventional cropping systems. Financial assistance is necessary to offset initial capital investment for long term crops that can then be harvested in out-years.

Research Funding – Sustained funding is needed for research on new crop production systems and their management. Providing seed funding for research into high potential crops and their processing and marketing will facilitate the development of new markets and hasten research and development by the private sector.

Technological Development – Processing technologies are constantly evolving. Initial technology development requires investment that may not show returns for several years. Government support is thus crucial to initiate and sustain research that can provide important future economic and environmental benefits. Soybeans, for example, were considered an alternative crop for more than a century until government support launched them into the spotlight and encouraged adoption by private industry (Jolliff, 1999).

Market Research – Research on production and processing must be accompanied by market research to match production to the demand that will drive adoption and provide development opportunities for rural communities.

Payments for Environmental Services – Targeted payments can help offset start-up costs and place value on alternative crops' contributions to environmental quality. Agroforestry systems store significant amounts of carbon, protect water quality, and provide erosion control with no financial sacrifice. Agroforestry must be explicitly incorporated into U.S. policy on greenhouse gases, climate change, and air quality.

Recognition – In order for these benefits to be realized, agroforestry must also become recognized more widely as an important land management option. This can be done by explicitly incorporating agroforestry practices into relevant legislation, promoting and distributing information on such practices, and encouraging the implementation of agroforestry provisions at a local and regional level.

Policy Solutions:

Groups committed to socially, economically, and environmentally sustainable land management must work together to meet the afore-mentioned needs by promoting the following policy changes:

Incorporate Agroforestry into Existing Programs – Incorporate explicit agroforestry language and definitions into all relevant titles of the 2007 Farm Bill authorizations (especially **CSP, EQIP, FLEP,** and **CRP**)

- Expand the **CSP and EQIP** programs that pay farmers for conservation practices such as erosion control and watershed protection on working lands.
- Fully fund and expand **FLEP** to reward a broader range of agroforestry practices.
- Incorporate agroforestry options into payment-for-environmental-service programs.

Create New Programs – Develop new programs dedicated to agroforestry and other productive conservation systems.

Active Implementation of Agroforestry – Promote the active implementation of agroforestry practices on a local or regional level (e.g. NRCS, SWCD, and RC&D).

By following through on these recommendations in the 2007 Farm Bill and beyond, agroforestry will help U.S. farmers produce internationally competitive products, greater domestic self sufficiency, and community benefits that are socially, economically, and environmentally sustainable. The result will surely be improved landowner wellbeing, rural development, and environmental health.

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Agroforestry: U.S. Agricultural Competitiveness

Foreign competition threatens U.S. agriculturalists' market share as lower production costs and subsidized transportation infrastructure help raise production in competitor countries. Pressure to reduce subsidies to American farmers may further limit the U.S.'s ability to compete in commodity markets. To maintain our market share, U.S. policy makers must use a new strategy that ensures competitiveness through continued diversification of commodity crops. Agroforestry systems, or tree-crop combinations, provide such an opportunity to revitalize agriculture in socially, economically, and environmentally sustainable ways.

Agroforestry's Contributions to U.S. Competitiveness:

Food and Energy Independence − U.S. policy makers have stated a desire to become more energy independent and more food secure in a generally less secure world. Agroforestry contributes to energy independence through production of biomass (ethanol and bio-diesel).

Expanding Export Crops − The U.S. should expand production and trade of specialized agricultural products for which it has unique advantage over other countries. A variety of specialty agricultural products such as hardwoods, biomass for energy, and food production for domestic and international markets are easily produced within agroforestry systems.

Support for Farmers – Despite pressure to reduce domestic subsidies, most U.S. policy-makers feel it is important to continue supporting farmers. This can be done in a trade-compliant manner with conservation-oriented subsidies (like the Conservation Security Program) that conform to WTO rules.

No Additional Financial Sacrifice – Contributions to the environment can be made without sacrificing landowner profitability (Garrett *et al.,* 1994). Tree-crop and livestock combinations provide landowners with a diversified and more secure income portfolio.

Policy Needs to Realize Agroforestry Benefits:

Risk Mitigation – Making loan protection and crop insurance available for agroforestry and other alternative cropping systems means that farmers will not have to incur additional risk to plant non-traditional commodity crops. Risk could be further mitigated by maintaining crop histories for farmers implementing agroforestry options.

Research Funding – Sustained funding is needed for research on new crop production systems and their management. Providing seed funding for research into high potential crops and their processing and marketing will facilitate the development of new markets and hasten research and development by the private sector.

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Agroforestry: Energy Security

The energy crisis of the 1970's marked the beginning of a steady decline of U.S. oil resources. Domestic production was soon outpaced by foreign competitors, and lacking a strategic plan to mitigate a shrinking supply of oil, the U.S. developed a foreign dependency. Now eager to end expensive foreign oil reliance, U.S. policy makers have expressed a desire to develop a diversity of domestic energy sources, while reducing consumption patterns. Agroforestry offers domestic agricultural producers the ability to fulfill the needs of policy makers by attaining energy independence through the strengthening of domestic energy sources, in turn promoting rural development through the production of biomass for ethanol, bio-diesel, and other biomass generated energy while still meeting the need for food crops.

Agroforestry Facilitates Energy Security and Independence:

Provide Renewable Energy Sources – The production of woody and herbaceous perennials can replace fossil fuels while conserving soil, taking up excess nutrients, and minimizing chemical and fertilizer inputs.

Energy Conservation – Systems like windbreaks save energy by cutting down on heating costs by protecting homes and outbuildings from cold winds.

Attain Energy Independence – By blending timber and crop production, agroforestry facilitates the growth of commodity crops and fast growing trees that are ideal for energy sources such as ethanol, bio-diesel**,** and biomass generated energy. Combined with traditional energy sources, the U.S. can sustainably end its dependence on expensive foreign oil.

Provide Energy Security – Energy costs comprises anywhere from 22 percent (cotton) to 52 percent (wheat) of total agricultural production costs, leaving farmers vulnerable to fluctuating energy prices (McBride et al 2006). Agroforestry can contribute to rural development through production of biomass for ethanol, bio-diesel, and biomass generated electricity and energy. Food and biomass crops can be used by rural communities for needed energy generation, reducing the need to purchase food and energy outside of the community.

Combine Food and Energy Production – Agroforestry systems allow for the simultaneous growth of timber and commodity crops and can thus provide renewable energy sources while maintaining domestic and international food supplies.

Change Energy Consumption Patterns – Windbreaks increase per acre crop yields by providing wind protection in turn raising soil temperatures. Production capacity is increased on smaller acreages, decreasing tractor fuel and fertilizer consumption*, two highly energy dependent expenses.* (Brandle *et al* 2003).

Produce While Conserving –. The intent of policy makers can be realized as agroforesters produce energy and food *while* conserving the country's rich natural resource base.

Policy Needs to Realize Agroforestry Benefits:

Risk Mitigation – Making loan protection and crop insurance available for agroforestry and other alternative cropping systems means that farmers will not have to incur additional risk to plant non-traditional commodity crops. Risk could be further mitigated by maintaining crop histories for farmers implementing agroforestry options.

Research Funding – Sustained funding is needed for research on new crop production systems and their management. Providing seed funding for research into high potential crops and their processing and marketing will facilitate the development of new markets and hasten research and development by the private sector.

Technological Development – Processing technologies are constantly evolving. Initial technology development requires investment that may not show returns for several years. Government support is thus crucial to initiate and sustain research that can provide important future economic and environmental benefits. Soybeans, for example, were considered an alternative crop for more than a century until government support launched them into the spotlight and encouraged adoption by private industry (Jolliff, 1999).

Recognition – In order for these benefits to be realized, agroforestry must also become recognized more widely as an important land management option. This can be done by explicitly incorporating agroforestry practices into relevant legislation, promoting and distributing information on such practices, and encouraging the implementation of agroforestry provisions at a local and regional level.

Policy Solutions:

Groups committed to economically, socially, and environmentally sustainable land management must work together to meet the afore-mentioned needs by promoting the following policy changes:

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- Fully fund and expand **FLEP** to reward a broader range of agroforestry practices.
- Incorporate agroforestry options in payment-for-environmental-service programs.

Create New Programs – Develop new programs dedicated to agroforestry and other productive conservation systems.

Active Implementation of Agroforestry – Promote the active implementation of agroforestry practices on a local or regional level (e.g. through NRCS, SWCD, and RC&D).

By following through on these recommendations in the 2007 Farm Bill and beyond, agroforestry will help U.S. farmers produce internationally competitive products, greater domestic self sufficiency, and community benefits that are socially, economically, and environmentally sustainable. The result will surely be improved landowner wellbeing, rural development, and environmental health.

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Agroforestry: Rural Economic Development

Rural areas are faced with particular economic challenges. Even income from agriculture and associated services, businesses, and government payments does not always accrue to local communities. For example in the year 2000, more than 20 percent of set-aside payments from conservation programs such as CRP were made to urban rather than rural residents (McGranahan and Sullivan, 2005). Incorporating agroforestry into *productive conservation* systems, however, would allow income to stay in rural communities, generating employment by maintaining production agriculture alongside environmental protection. In addition, locating relevant processing industries and businesses in rural areas provides additional employment and capital flow for local businesses.

Economic Benefits of Agroforestry to our Rural Communities:

Alternative crops – There are several alternative crops whose addition to agricultural systems can complement traditional crops while providing alternative income sources for rural communities. Three examples of such crops are hardwood products, food products, and biomass for energy.

Expanding Job Opportunities – Consolidation of farms has led to a decreasing rural population accompanied by a decline and loss of the services and businesses important to rural vitality. Production of new food and biomass crops, on the other hand, *generates jobs in rural communities*.

Meeting Energy Needs – Agroforestry can contribute to rural development through production of biomass for ethanol, bio-diesel, and electricity. Food and biomass crops can be used by rural communities for needed energy generation, reducing the need to purchase food and energy outside of the community.

More Intensively Managed Crops on Smaller Acreages – The majority of farms are getting smaller (Norton 1998). To support families on smaller farms requires more intensive management options that generate greater income per acre. Alternative crops could form the basis for rural enterprise and industry. Such high value crops can tap into existing markets further diversifying producer market options.

Policy Needs to Realize Agroforestry Benefits:

Risk Mitigation – Subsidy programs provide a robust support structure for the principal commodity crops, while ignoring new alternative crops and ultimately discouraging diversification. Thus, farmers planting new crops are on their own. Making loan protection and crop insurance available for agroforestry and other alternative cropping systems means that farmers will not have to incur additional risk to plant non-traditional commodity crops. Risk could be further mitigated by maintaining crop histories for farmers implementing agroforestry options.

Research Funding – Sustained funding is needed for research on new crop production systems and their management. Providing seed funding for research into high potential crops and their processing and marketing will facilitate the development of new markets and hasten research and development by the private sector.

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Agroforestry: Environmental Services

Policy makers have an obvious interest in protecting our country's rich natural resource base, and increasingly, citizens understand the inextricable connection between their communities' quality of life and environmental quality. Agroforestry systems, or tree-crop combinations, provide critical environmental benefits to the American public in ways that are economically and socially sustainable. They store carbon to mitigate climate change, protect water and air quality, and hold promise as renewable energy sources. Promoting agroforestry in a policy context is crucial in today's search for environmental services.

Agroforestry's Environmental Services:

Carbon Sequestration – Agroforestry systems sequester nearly 83,000 lbs of carbon per acre over 60 years. Agroforestry systems mitigate global warming more than conventionally cropped land (Montagnini & Nair 2004).[1]

Emission Reductions – Windbreaks increase per acre crop yields by providing wind protection, raising soil temperatures, creating microclimates, and improving water use efficiency. This in turn increases production capacity on smaller acreages, decreasing *tractor fuel and fertilizer consumption and the release of atmospheric carbon* (Brandle *et al* 2003).

Improved Water Quality – Tree roots can extend 7-10 feet into the earth, holding soil in place, increasing soil water-holding capacity, controlling floods, and restoring natural hydrology (Schultz *et al.* 2004). Riparian buffers, or woody vegetation near stream banks, can absorb 80% of sediment and pollutants draining to water bodies from farm-forest harvest lands, thus reducing individual TMDL contributions (AFTA, 2000).

Renewable Energy Sources – Fast-growing trees are a renewable resource identified as a promising source of biomass for energy and removing excess nutrients from the soil (Lin *et al.* 2004; Rockwood *et al*., 2004).

No Financial Sacrifice – The appeal of agroforestry is that each of these contributions to the environment can be made without sacrificing financial profitability for the landowner (Garrett *et al.,* 1994). Tree-crop-livestock combinations provide landowners with a diversified and thus more secure portfolio of income sources, while addressing today's pressing environmental issues.

Policy Needs to Realize Agroforestry Benefits:

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Payments for Environmental Services – Targeted payments can help offset start-up costs and place value on alternative crops' contributions to environmental quality. Agroforestry systems store significant amounts of carbon, protect water quality, and provide erosion control with no financial sacrifice. Agroforestry must be explicitly incorporated into U.S. policy on greenhouse gases, climate change, and air quality.

[1] Tree-based intercropping systems sequester 6 times more carbon than similar size cornfields (Thevathasan & Gordon, 2004). Agroforestry silvopastures sequester 660 kg/ha/yr more carbon than forest or pastures (Sharrow & Ismail, 2004).

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Agroforestry: Wildlife Habitat

Agroforestry systems, or tree-crop combinations, can enhance wildlife habitat in economically and socially sustainable ways. And because 60% of U.S. agricultural and forested lands are privately owned,[2] the ways in which private individuals manage their land has a significant impact on the provision of contiguous wildlife habitat and other environmental issues (NWI, 1995). Farmers and forest managers who can provide wildlife habitat through agroforestry are thus well prepared in the current policy context to contribute to environmental health.

Wildlife Benefits of Agroforestry:

Provides Wildlife Habitat – Agroforestry trees provide crucial wildlife habitat for terrestrial animals, insects, and crop pest predators in ways that commercial agricultural does not (Christian *et al.*, 1997)

Protects Fish Habitat – Streamside tree buffers keep stream temperatures low and protect fish habitat (AFTA 2000).

Meets Specific Wildlife Needs – Agroforestry systems such as hybrid poplar plantings can be designed with specific wildlife needs in mind (Tolbert & Wright, 1998).

No Additional Financial Sacrifice – The appeal of agroforestry is that each of these contributions to wildlife can be made without sacrificing financial profitability (Garrett *et al.,* 1994). Tree-crop-livestock combinations provide landowners with a diversified and thus more secure portfolio of income.

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Research Funding – Sustained funding is needed for research on new crop production systems and their management. Providing seed funding for research into high potential crops and their processing and marketing will facilitate the development of new markets and hasten research and development by the private sector.

Payments for Environmental Services – Targeted payments can help offset start-up costs and place value on alternative crops' contributions to environmental quality. Agroforestry systems store significant amounts of carbon, protect water quality, and provide erosion control with no financial sacrifice. Agroforestry must be explicitly incorporated into U.S. policy on greenhouse gases, climate change, and air quality.

Recognition – In order for these benefits to be realized, agroforestry must also become recognized more widely as an important land management option. This can be done by explicitly incorporating agroforestry practices into relevant legislation, promoting and distributing information on such practices, and encouraging the implementation of agroforestry provisions at a local and regional level.

Policy Solutions:

Groups committed to economically, socially, and environmentally sustainable land management must work together to meet the afore-mentioned needs by promoting the following policy changes:

[2] And these lands in turn comprise over half of land-use in the U.S. (ERS, 2003).

Incorporate Agroforestry into Existing Programs – Incorporate explicit agroforestry language and definitions into all relevant titles of the 2007 Farm Bill authorizations (especially **CSP, EQIP, FLEP,** and **CRP**)

- Expand the **CSP and EQIP** programs that pay farmers for conservation practices such as erosion control and watershed protection on working lands.
- Fully fund and expand **FLEP** to reward a broader range of agroforestry practices.
- Incorporate agroforestry options into payment-for-environmental-service programs.

Create New Programs – Develop new programs dedicated to agroforestry and other productive conservation systems.

Active Implementation of Agroforestry – Promote the active implementation of agroforestry practices on a local or regional level (e.g. NRCS, SWCD, and RC&D).

By following through on these recommendations in the 2007 Farm Bill and beyond, agroforestry will help U.S. farmers produce internationally competitive products, greater domestic self sufficiency, and community benefits that are socially, economically, and environmentally sustainable. The result will surely be improved landowner wellbeing, rural development, and environmental health.

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Agroforestry: Research Needs

Many promising agroforestry crops have been identified but require fundamental research that will allow landowners to more effectively produce for market demand. The majority of public and private research funding in the U.S. is concentrated on a few major commodity crops (corn, soybeans, wheat, oats, cotton), creating markets that are vulnerable to international disruptions, natural disasters and other climatic events. Emphasis on a handful of major commodity crops also yields damage to the environment and disincentives to producing other increasingly competitive crops. Providing research for the production, processing and marketing of an expanded mix of crops holds tremendous potential for the U.S. farm sector, especially for those agroforestry crops currently constrained by research and market limitations.

The U.S. has one of the richest agricultural natural resource bases in the world and has the potential to produce a wider variety of food, oil, energy and bio-based products that will increase food security and minimize our reliance on foreign imports. Realizing this potential requires a commitment to, and provision of resources for, research that will make new production options a reality.

Research Needs:

Production – Basic research is needed that will help farmers to efficiently manage and produce viable agroforestry products from environmentally beneficial cropping systems.

Processing – Products including food, bio-fuels and bio-products require different levels of processing. The development and testing of processing techniques can improve efficiency and lower the cost of bringing products to market that will support a vibrant economy and contribute to food and energy security.

Marketing – Ultimately, the driver behind adoption of production options that provide energy security, food and environmental conservation is a market that demands those products at a competitive price.

Policy Changes:

National, state and local policies will play an important role in supporting research and development of promising agroforestry options. Policy change is essential for developing agroforestry related enterprises and industries and requires:

Funding – Provide the funding for research on production systems for promising alternative crops and their management. This long term process requires sustained funding. Seed funding for research on high potential crops and their processing and marketing will facilitate market creation and hasten research and development by the private sector.

Technological Development – Processing technologies are constantly evolving. Initial technology development requires investment that may not show returns for several years. Government support is thus crucial to initiate and sustain research that has the potential for important future economic and environmental benefits. Soybeans were considered an alternative crop for more than a century but with government support it gained popularity before being adopted by private industry (Jolliff, 1999).

Market Research – Research on production and processing must be accompanied by marketing research to match production to the demand that will drive adoption and provide development opportunities for rural communities.

By following through on these recommendations in the 2007 Farm Bill and beyond, agroforestry will help U.S. farmers produce internationally competitive products, greater domestic self sufficiency, and community benefits that are socially, economically, and environmentally sustainable. The result will surely be improved landowner wellbeing, rural development, and environmental health.

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