USDA

United States Department of Agriculture

National Agroforestry Center

2017 Highlights

The mission of the National Agroforestry Center (NAC) is to advance the health, diversity, and productivity of working lands, waters, and communities through agroforestry. This work advances USDA's goals to "strengthen the stewardship of private lands through technology and research" and "facilitate rural prosperity and economic development."

With its national network of partners, NAC conducts and supports research, develops technologies and tools, and provides educational materials and training on agroforestry – the intentional integration of trees and agriculture. Agroforestry systems in the United States typically include at least one of five practices: windbreaks/shelterbelts, riparian forest buffers, silvopasture, forest farming, or alley cropping.

This report highlights some key accomplishments made in FY2017.

Ecosystem Services

By helping to understand and quantify the ecosystem services that agroforestry systems can provide, such as water quality, pollinator habitat, and soil health, NAC is supporting the development of science-based technologies, programs, and design tools for enhancing these services.

NRCS

Enhancing yields and conservation benefits on the great plains

The National Agroforestry Center provided leadership and support for the advancement of Great Plains agroforestry through two major efforts. The first, a Great Plains Windbreak Action Plan workshop, was organized with State forestry agencies from six states, NRCS representatives and other conservation partners from across the region. The ultimate goal is to support profitable and resilient farms and ranches, conserve natural resources, and enhance soil health through agroforestry. Workshop results included a final report, the formation of four working groups and the identification of action items.

In addition, NAC has supported a multi-agency effort housed at Kansas State University to collect GPS and crop yield data from producers to quantify the relationship between windbreaks and crop-yields under today's farming systems. This project will provide critical updates to data from the early 1970s – the last time such data was collected. The big question is "do modern crop hybrids and modern farming techniques still have a positive yield response to windbreaks?"

Protecting water quality

The National Agroforestry Center updated AgBufferBuilder, a tool to help natural resource professionals design cost-effective buffers to improve water quality. Available on NAC's website, the tool is compatible with current versions of ESRI ArcGIS software. The Kansas Forest Service began using the tool this year for planning riparian buffers that reduce sediment loads in Kansas surface waters, their primary source of drinking water.

Promoting food security through pollinator conservation

Agroforestry offers numerous benefits for pollinators and crop pollination services, thus enhancing food security. This year, NAC produced a technical note entitled Using Agroforestry Practices to Reduce Pesticide Risks to Pollinators & Other Agriculturally Beneficial Insects and initiated a science synthesis to guide the design and management of agroforestry practices beneficial to pollinators. In addition, NAC partnered with the University of Nebraska to evaluate the role of woody buffers in reducing pesticide exposure and promoting beneficial insect and pollinator communities in agricultural landscapes.

Nancy Adamson

NAC and **NRS-FIA** are partnering **to develop techniques for** high-resolution land cover **mapping** to fill a monitoring role for **trees outside forests.**

Inventorying trees outside of forests for ecosystem services accounting

In partnership with staff at the USFS Northern Research Station — Forest Inventory and Analysis, NAC is developing and applying techniques for high-resolution mapping and monitoring of trees outside forests, including windbreaks and riparian forest buffers. Such data is critical to understanding the ecosystem service benefits provided by windbreaks, riparian buffers, and other agroforestry systems. Agreements with the University of Nebraska-Lincoln and Kansas Forest Service have resulted in completion of an entire data set for Kansas. A dataset for Nebraska is anticipated for completion in 2017. This effort has involved training of students and staff across the Great Plains in the use of these new technologies.

Human Dimensions

Landowners, managers, Tribes and communities are the ultimate decision-makers on agroforestry adoption. Such decisions can be influenced by the resource professionals that provide technical assistance and training. Understanding factors influencing agroforestry outreach and adoption can help focus research and outreach efforts.

Priya Jaishanker

Providing opportunities through increased land access

In FY2017, NAC supported two partners - the Savanna Institute and Farm Commons – to increase opportunities for agroforestry adoption among the large number of farmers who rent land. Products have included a directory of existing resources, as well as updates to a workbook based on stakeholder input, titled Inspirations for Creating a Long-Term Agricultural Lease for Agroforestry. The National Agroforestry Center also convened a panel on land access at the North American Agroforestry Conference; panelists included farmers who rent land and technical assistance providers.

Making economic decisions

The National Agroforestry Center has developed two new tools that help landowners evaluate the income potential of agroforestry practices. The Non-Timber Forest Product (NTFP) Calculator provides estimates of income potential from harvesting and selling non-timber forest products (e.g. edible, herbal and medicinal products) produced through agroforestry. A second tool, the Buffer$: West Virginia CREP Payment Calculator, will assist landowners to estimate Federal and State financial incentives for implementing riparian forest buffers. Use of this tool will strengthen participation by West Virginia's landowners in efforts to restore the Chesapeake Bay watershed.

The **exploration of** individuals' and organizations' stories and goals revealed diverse objectives **from enhancing water quality, soil, wildlife,** or **crop and livestock production,** to the **advancement** of **social** and **environmental justice.**

Sharing experiences on agroforestry decision-making

In two issues of our quarterly Inside Agroforestry newsletter, entitled **Why Agroforestry?** NAC exposed readers to a range of motivations for practicing, researching, and adopting agroforestry. The stories of landowners, researchers, educators, planners, technology transfer specialists and others revealed a diverse range of objectives, from enhancing water quality, soil, wildlife, crop or livestock production, to the advancement of social and environmental justice. These human dimension stories were well received by the agroforestry community.

Appalachian Beginning Forest Farmer Coalition:

Growing opportunities beneath the forest canopy

With the support of a Beginning Farmer and Rancher Development Grant from the National Institute of Food and Agriculture and staff support from NAC, the Appalachian Beginning Forest Farmer Coalition provided training and information to landowners and technical service providers across five Appalachian states. The effort also resulted in increasing the coalition to more than 1,000 members. Workshops, training and other outreach will continue in the coming years.

Outreach & Education

NAC provides national leadership in agroforestry outreach by facilitating the production of agroforestry information for technical service providers who assist landowners, including new farmers, limited resource landowners, and Tribes, in agroforestry adoption. Catalyzing and supporting exchanges of agroforestry information across these groups is critical to achieving NAC's mission.

Richard Straight

Training the Trainers:
Outreach and education on agroforestry

Training technical assistance providers, including state forestry and state agriculture staff, NRCS employees, conservation district staff, non-profits, consulting foresters, and many others, is an important part of NAC's technology transfer work. This year NAC worked with partners to support workshops and training in Hawaii, Kansas, Missouri, Nebraska, Pennsylvania, Saipan, and Virginia on a range of topics from windbreaks to multifunctional riparian buffers.

Extending our reach:
Agroforestry working groups

Leadership and support for national and regional agroforestry working groups strengthens network development, adoption of regionally-specific agroforestry systems, enhanced coordination, and new opportunities for agroforestry research and outreach. This year, NAC supported monthly webinars and calls as well as workshops by the Northeast/Mid-Atlantic Agroforestry Working Group, agroforestry training academies by the Mid-America Agroforestry Working Group, and network development by the Pacific Northwest Agroforestry Working Group. Coordination among working groups, on next steps and best practices, was strengthened through a NAC-led panel at the 2017 North American Agroforestry Conference.

At the national level, NAC staff provided leadership for the USDA Interagency Agroforestry Team and USDA Agroforestry Executive Steering Committee, leading to the development of a draft updated USDA Agroforestry Strategic Framework, to be released in FY2018.

In FY2017, **NAC continued** its longstanding **efforts** to **provide** new **engaging informative publications** on agroforestry.

Reaching out through publications and more

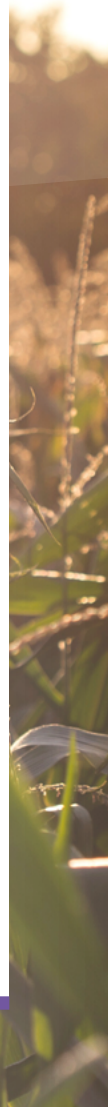
In FY2017, NAC continued its longstanding efforts to provide new engaging, informative publications on agroforestry for use by the general public, farmers, and technical assistance providers through print and web distribution. In addition to distributing new publications, NAC fulfilled requests by Federal, State, and non-profit partners for more than 36,000 copies of publications printed in prior years. These were used to educate farmers, landowners and others at workshops and other venues. In addition, NAC reached out to diverse audiences through its email update, Agroforestry Connection, and through social media accounts managed by the US Forest Service, NRCS, USDA Climate Hubs, and others. Information was also disseminated by NAC staff through scientific journal articles, tools, and other research publications.

Increasing information access through new online resources

In addition to publications, NAC released several online resources and tools in FY2017. These include an interactive map that allows resource professionals, landowners, and interested users to identify the agroforestry-related Practice Standards offered by the Natural Resources Conservation Service (NRCS) in every state. The map also provides links to each states' Field Office Technical Guide. This is the first resource that provides information on NRCS Practice Standards in one easy to use, centralized location.

The NAC webinar library, developed to provide easy access to agroforestry-related webinars, was expanded further this year to include more than 75 webinars. Covering each of the most common agroforestry practices, the site now allows users to filter and sort content by topic area.

The NAC website also includes an image gallery as well as information on agroforestry for new and beginning farmers.



2017
Selected Publications:

Ballesteros, P.W.; Brandle, J.R.; Schoeneberger, M.M. 2017. Potential of windbreak trees to reduce carbon emissions by agricultural operations in the US. Forests 8(5), no. 138; doi: https://doi.org/10.3390/f8050138

Liknes, G.C.; Meneguzzo, D.M.; Kellerman, T.A. 2017. Shape indexes for semi-automated detection of windbreaks in thematic tree cover maps from the central United States. International Journal of Applied Earth Observation and Geoinformation. 59:167-174; doi: https://doi.org/10.1016/j.jag.2017.03.005.

Paull, Darci A.; Whitson, Jakob W.; Marcotte, Abbey L.; Liknes, Greg C.; Meneguzzo, Dacia M.; Kellerman, Todd A. 2017. High-resolution land cover of Kansas (2015). Fort Collins, CO: Forest Service Research Data Archive.

Inside Agroforestry: Why Agroforestry? I

Inside Agroforestry: Why Agroforestry? II

Inside Agroforestry: New & Beginning Farmers and Ranchers: Opening Up Possibilities through Agroforestry

Working Trees Information Sheet: Can alley cropping provide more farming options?

Working Trees Information Sheet: Can windbreaks benefit your soil health management system?

Working Trees Information Sheet: Can alley cropping support soil health?

Working Trees Display: Working Trees for Pollinators

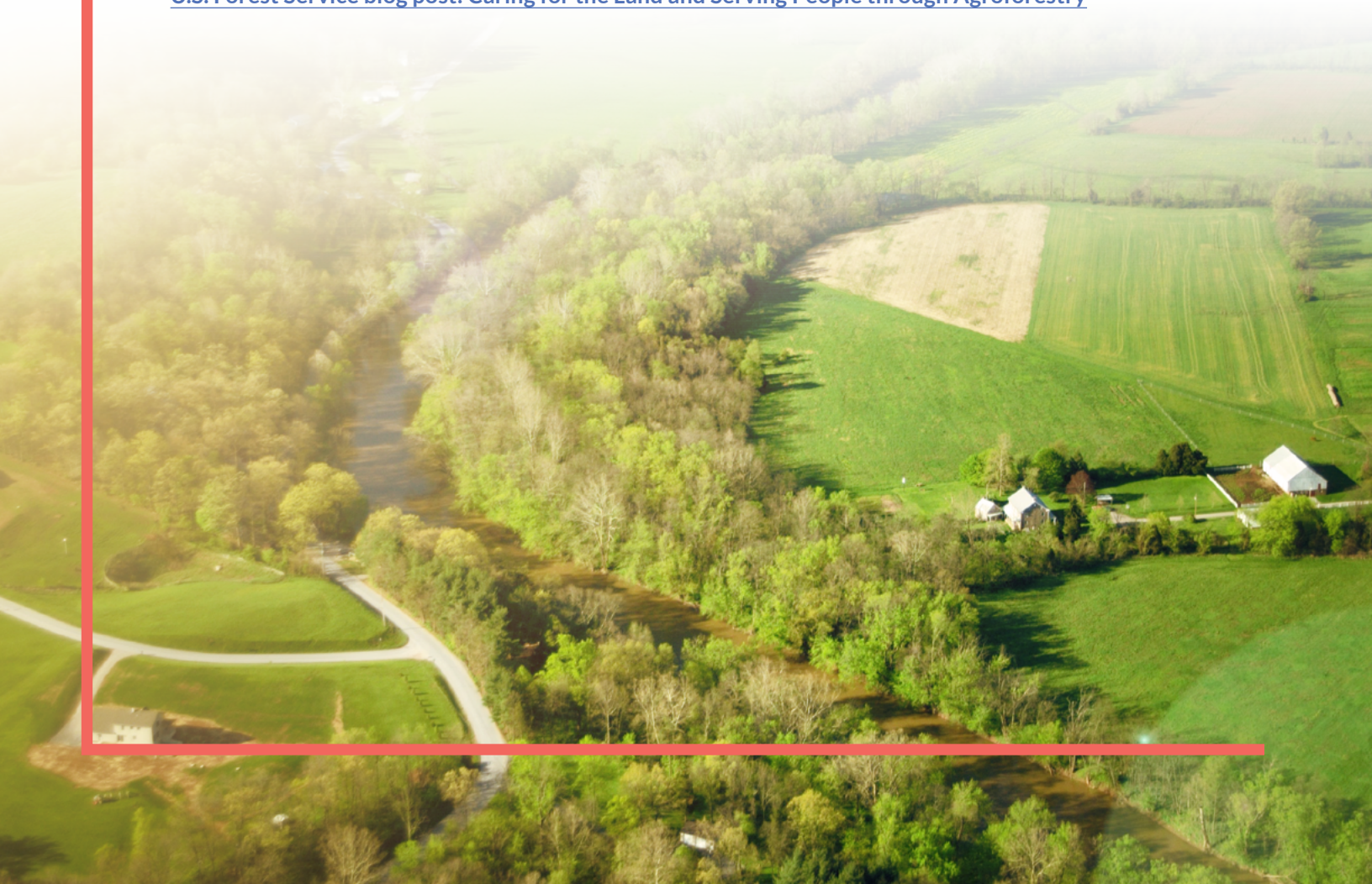
Agroforestry Note #49: Riparian Forest Buffers: An Agroforestry Practice

Agroforestry Note #12: Alley Cropping: An Agroforestry Practice (revised)

Agroforestry Note #35: Using Agroforestry Practices to Reduce Pesticide Risks to Pollinators & Other Agriculturally Beneficial Insects

USDA blog post: Five Ways Agroforestry Can Grow Forest Products and Benefit Your Land, Your Pockets & Wildlife

U.S. Forest Service blog post: Caring for the Land and Serving People through Agroforestry



Our Partners

We appreciate the many individuals and organizations that comprise NAC's national network of partners.

Here are some of the partners that we worked with in FY2017:

1890 Agroforestry Consortium

Agriculture and Agri-Food Canada

Appalachian Beginning Forest Farmer Coalition

Appalachian Sustainable Development

Association for Temperate Agroforestry

Cornell Small Farms

Cornell Cooperative Extension

Commonwealth of the Northern Mariana Islands Division of Agriculture — CNMI Forestry

Farm Commons

Kansas Forest Service

Kansas State University

Mid-America Agroforestry Working Group

National Association of Conservation Districts Forestry Committee

Nebraska Forest Service

North Dakota Forest Service

Northeast/Mid-Atlantic Agroforestry Working Group

NRCS Hawaii

NRCS Puerto Rico

Oregon State University

Pacific Northwest Agroforestry Working Group

The Pennsylvania State University

Pennsylvania Department of Conservation and Natural Resources

The Savanna Institute

South Dakota Department of Agriculture, Conservation & Forestry

Texas A&M Forest Service

Virginia Polytechnic Institute and State University

University of Minnesota

University of Vermont Center for Sustainable Agriculture

University of Missouri Center for Agroforestry

University of Nebraska

USDA Agricultural Research Service

USDA Agricultural Marketing Service

USDA Farm Service Agency

US Forest Service Northern Research Station

US Forest Service Southern Research Station

USDA National Institute of Food & Agriculture

USDA Natural Resources Conservation Service

USDA Rural Development

Washington State University Extension

Xerces Society for Invertebrate Conservation

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Or browse the NAC website at: https://fs.usda.gov/nac

About NAC

Located in Lincoln, Nebraska, NAC is a long-standing partnership between the United States Forest Service (USFS), Research & Development and State & Private Forestry Deputy Areas and the Natural Resources Conservation Service (NRCS).

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