United States Department of Agriculture

Introduction to Agroforestry and the USDA Agroforestry Strategic Framework




Pacific Northwest Agroforestry Workshop
Spokane, WA
September 17-19, 2019

Outline

- What is agroforestry?
- Why use agroforestry?
- Overview of agroforestry practices
- Federal support for agroforestry & the USDA Agroforestry Strategic Framework

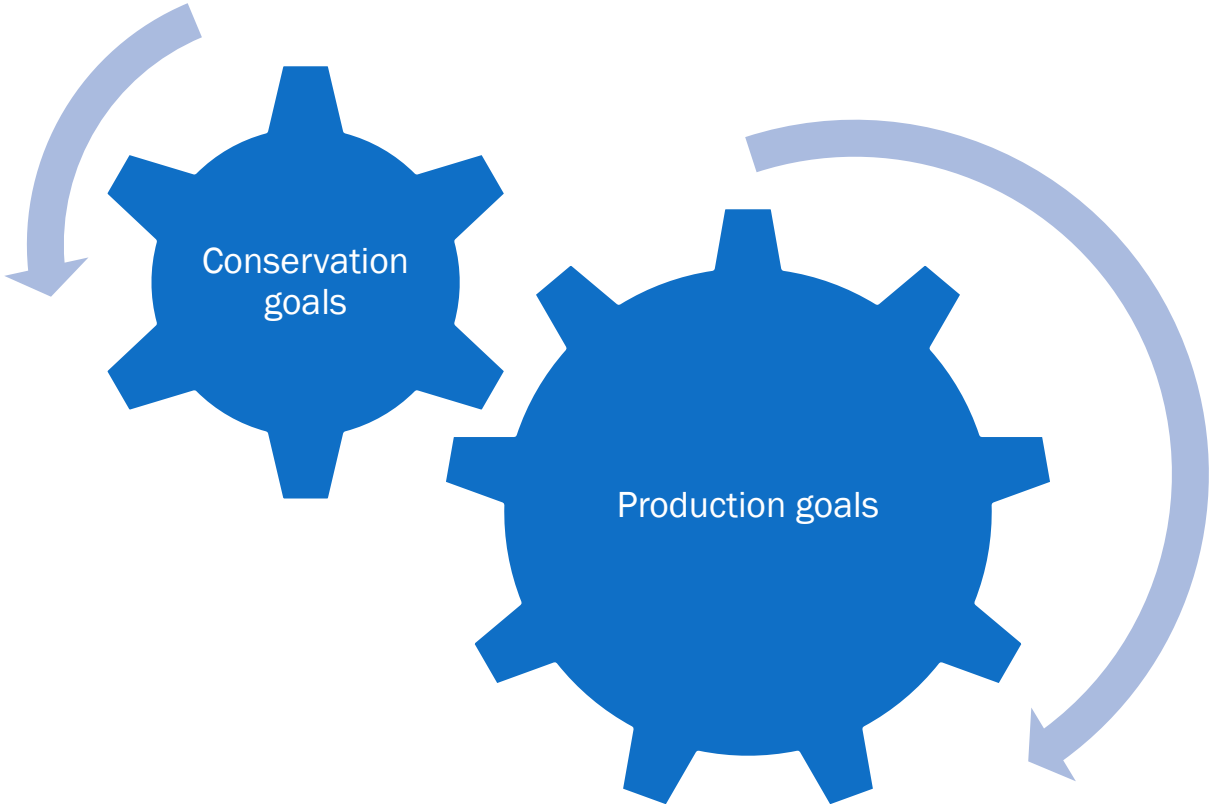
What is agroforestry?

Agroforestry is the intentional integration of trees or shrubs with crop and/or animal production to create environmental, economic, and social benefits.



Why use agroforestry practices?

Help meet producer production goals & Help meet producer conservation goals



Why use agroforestry practices?

- Protection for valuable topsoil, livestock, crops, and wildlife
- Increased productivity of agricultural and horticultural crops
- Diversified local economies
- Improved water quality
- Reduced energy and chemical inputs
- Increased water-use efficiency by plants and animals
- Enhanced biodiversity and landscape diversity

Agroforestry is part of a larger agricultural and forested landscape

Crop rotation

Forest farming

Rotational grazing

Managed woodland

Multifunctional Riparian Buffer

Silvopasture

Alley cropping

Cover cropping

Photo credit:
Jwheeler12 at Pixabay

What is agroforestry?

Agroforestry is the intentional integration of trees or shrubs with crop and/or animal production to create environmental, economic, and social benefits.

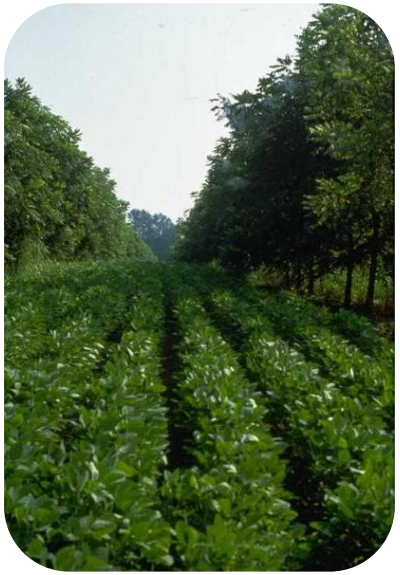


Most Common Temperate Agroforestry Systems (NRCS Conservation Practices)

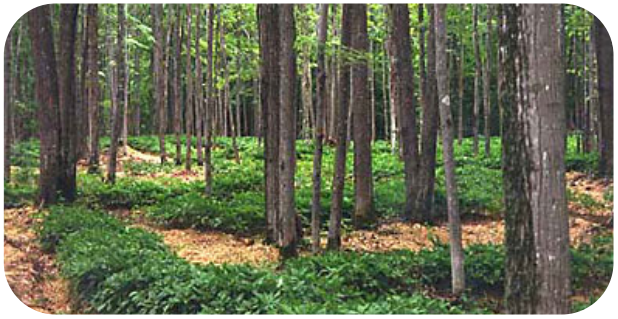
Silvopasture

Windbreaks

Riparian buffers



Alley cropping



Forest farming

... putting the right plants, in the right location, for the right reason.

.....the intentional integration of agriculture and working trees to create sustainable farming and ranching systems

Silvopasture

Windbreaks

Riparian buffers

Alley cropping

Forest farming

.....the intentional integration of agriculture and working trees to create sustainable farming and ranching systems

Silvopasture

Windbreaks

Riparian buffers

Alley cropping

Forest farming

.....the intentional integration of agriculture and working trees to create sustainable farming and ranching systems

Silvopasture

Windbreaks

Riparian buffers

Alley cropping

Forest farming

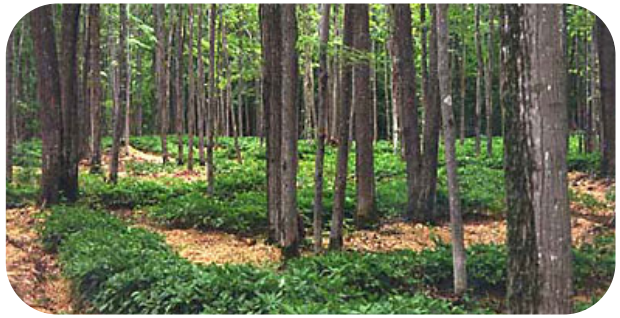
.....the intentional integration of agriculture and working trees to create sustainable farming and ranching systems

Silvopasture

Windbreaks

Riparian buffers

Alley cropping



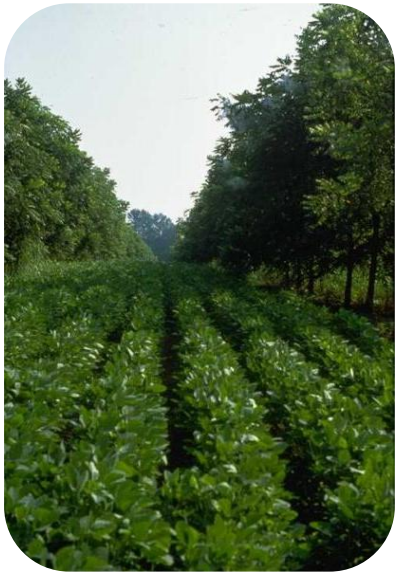
Forest farming

.....the intentional integration of agriculture and working trees to create sustainable farming and ranching systems

Silvopasture

Windbreaks

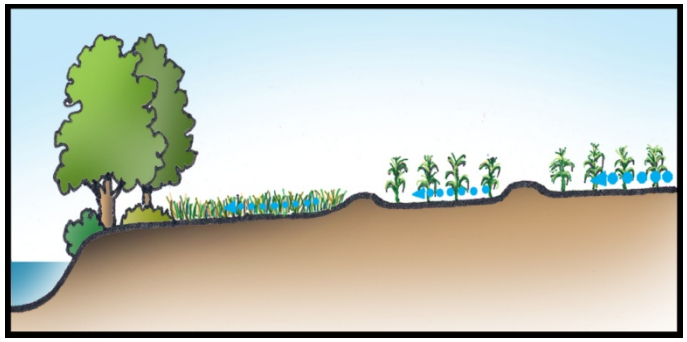
Riparian buffers



Alley cropping

Forest farming

Riparian Forest Buffers



Riparian forest buffers are natural or planted woodlands adjacent to water bodies. They are designed with trees, shrubs, and grasses to protect water resources from non-point source pollution.

Riparian Forest Buffer Benefits

- *Improve water quality*
- *Protect aquatic habitat*
- *Protect stream banks*
- *Flood protection*

- *Provide additional crops: fruit and nuts, decorative woody florals, etc.*
- *Provide recreation resources*
- *Enhance pollinator habitat*

Windbreaks (and Hedgerows)

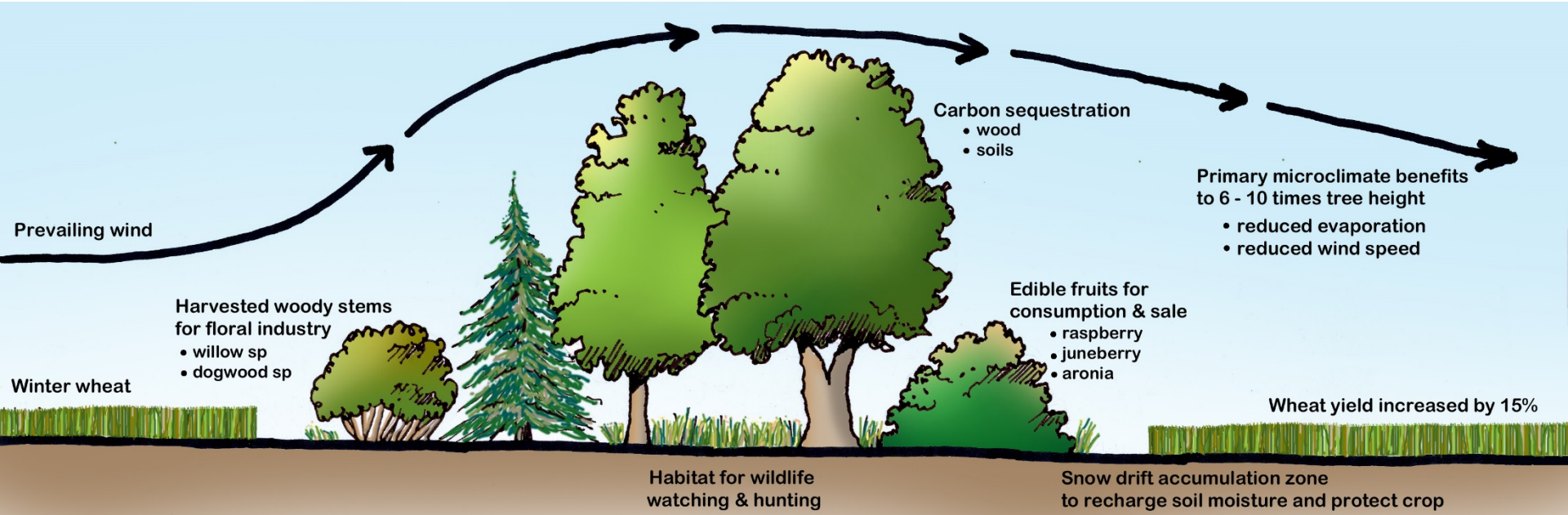





Plantings of single or multiple rows of trees or shrubs that redirect or modify the wind or are established for additional purposes.

Windbreak and Hedgerow Benefits

- *Reduce soil erosion*
- *Reduce pesticide drift*
- *Improve irrigation use*
- *Manage snow*
- *Mitigate odors and dust*
- *Act as upland buffer*
- *Increase crop yield and quality*
- *Shelter livestock*
- *Grow additional crops*
- *Provide pollination services*
- *Sequester carbon*



Silvopasture

Silvopasture combines timber, livestock, and forage production on the same acreage. Silvopasture can involve adding trees to pastures or bringing pasture into trees.

Photo credit: Brett Chedzoy (Cornell) and John Munsell (Virginia Tech)

Silvopasture Benefits

Pasture to silvopasture

- *Improve soil health in pastures*
- *Diversify pasture*
- *Provide habitat*
- *Sequester carbon*

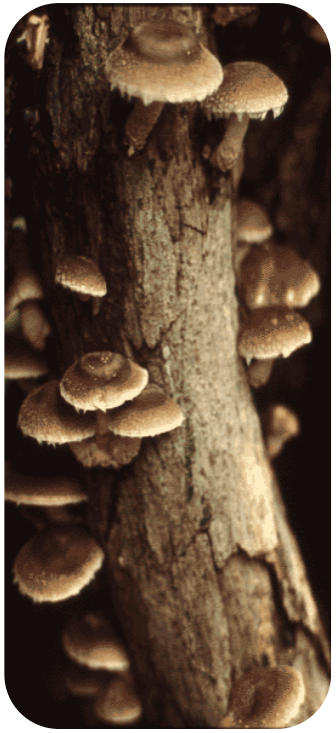
Both systems

- *Reduce animal stress: heat and cold stress, increased weight gain, increased milk yields*
- *Diversify income: annual (grazing, hay) and long-term income (timber); potential for fruit and nuts*

Forest to silvopasture

- *Potential forest stand and understory improvement*
- *Hazardous fuels reduction*
- *Provides intentional management plan*

Forest Farming



The intentional manipulation, integration, and intensive management of woodlands to produce non-timber forest products.

Forest Farming Benefits

- *Helps people know and manage their woods*
- *Supports forest health and diversity*
- *Reduces impacts on native plant populations from wild harvesting*
- *Improve economic value of existing forests – keep forests as forests*
- *Diversify income sources – helps farms see more value in their woods*

Ginseng photo: Priya Jaishanker, https://www.flickr.com/photos/forestfarming/

Alley Cropping

Growing an annual or perennial crop simultaneously in the alley ways between rows of a long term tree crop.

Alley Cropping Benefits

- *Enhanced pollination*
- *Diversify income sources*
- *Create favorable microclimates*

- *Reduce erosion*
- *Improve utilization of nutrients*
- *Potential to hold water higher in the landscape*

Many other agroforestry practices

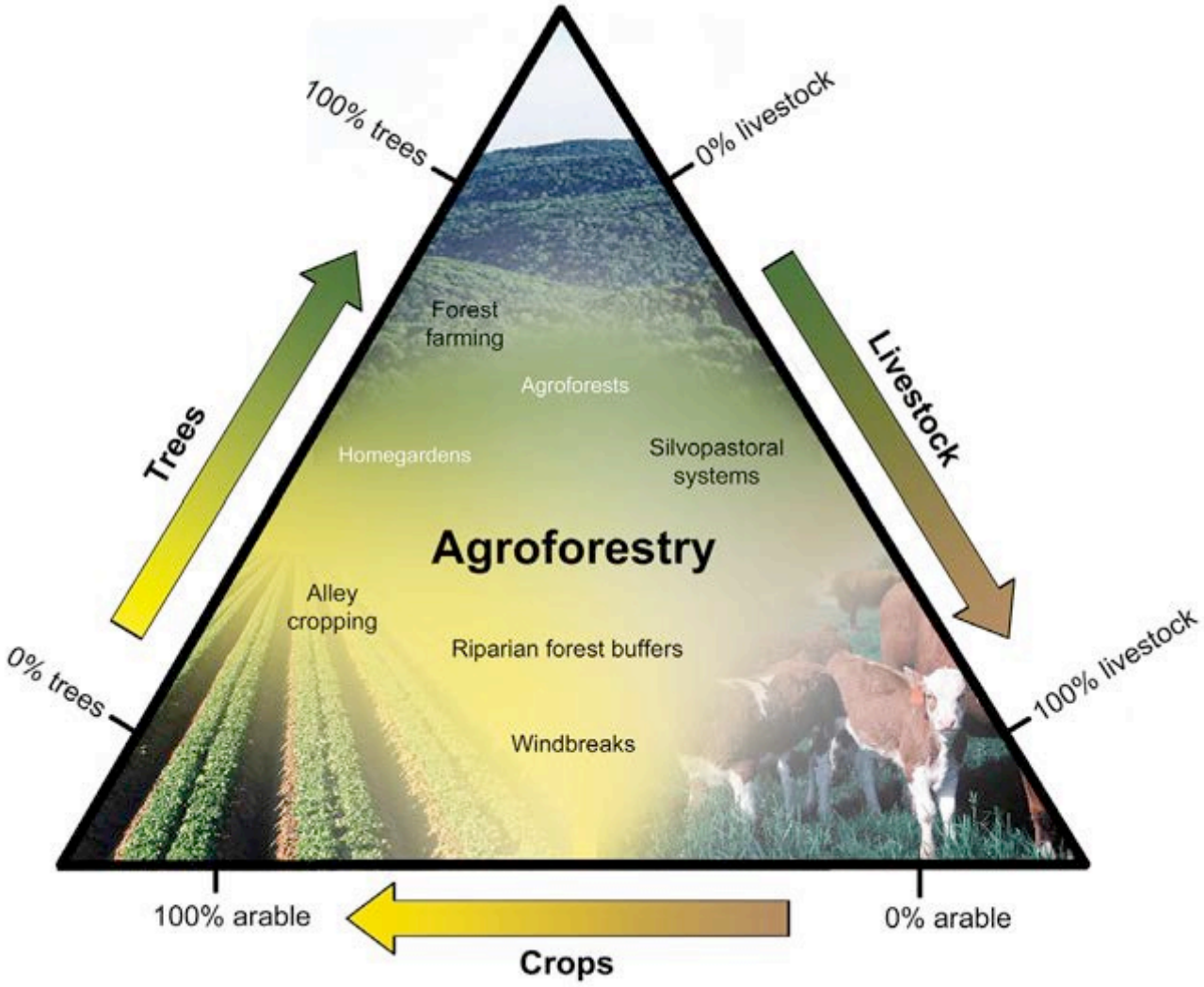


Figure adapted from den Herder et al. 2015

What can this look like across the northwest?

- Managing livestock, forage, and trees together
- Using trees to modify the wind to protect livestock from winter storms
- Adding pollinator hedgerows to a diversified vegetable farm to support crop production
- Adding fruit or nut trees on contour to a row crop farm
- Growing crops under the forest canopy in the woods

Why use agroforestry?

- Multiple crops from the same acre - enhancing yield - long and short term income
- Perennial plants support soil health, enhance water quality, and provide wildlife habitat.
- “Working lands” conservation opportunity: opportunity to achieve conservation outcomes while keeping land in production
- Support local and regional food systems: existing and emerging cooperatives and food & herb hubs to support woody crop and forest farming markets

Why use agroforestry?

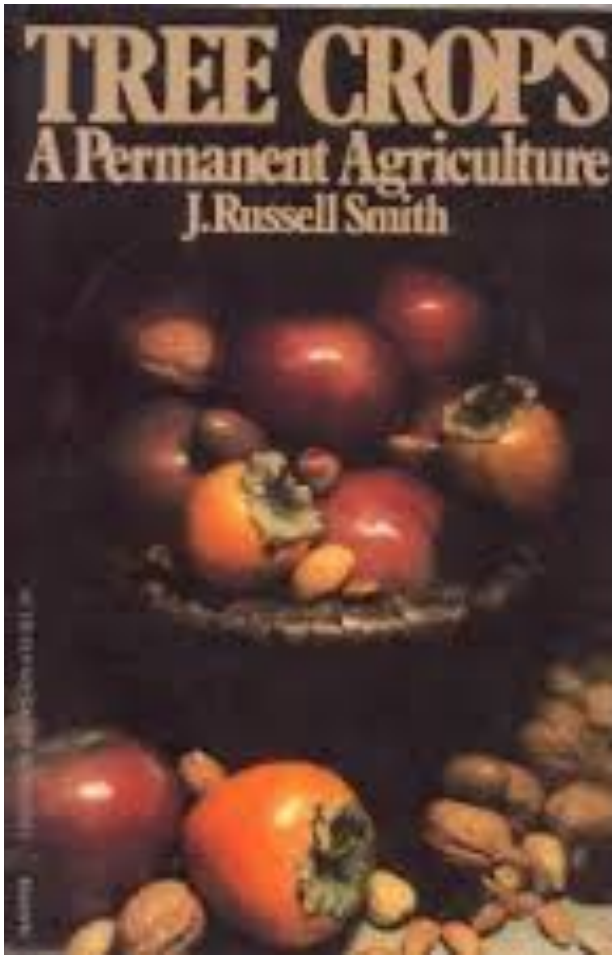
- Opportunities for climate adaptation and mitigation
- Support for pollinator habitat
- Address forest fragmentation and encourage land management
- Support landscape scale management through building connections between ag and forest lands, supporting corridors, and addressing challenges at rural/community interface

Where does agroforestry come from?

- Many indigenous communities have long histories of managing crops under forest canopies and with trees
- Many Tribal communities and programs are using agroforestry-related practices to achieve resource objectives that integrate local values
- Many producers have benefited from these indigenous agroforestry methods

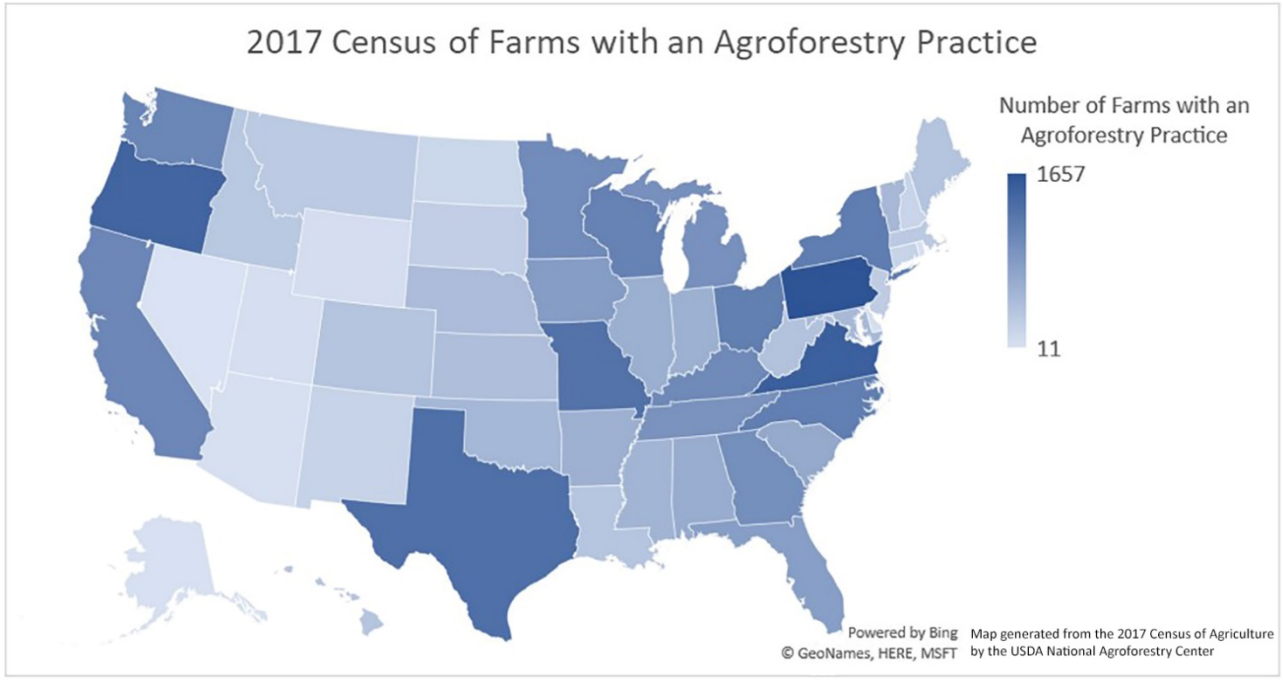
Where does agroforestry come from?

- Long history of agroforestry research and practice internationally, especially in the tropics
- Temperate agroforestry has been less of a research focus until more recently
- Tree Crops: A Permanent Agriculture by J. Russel Smith (1929)



How much agroforestry is out there?

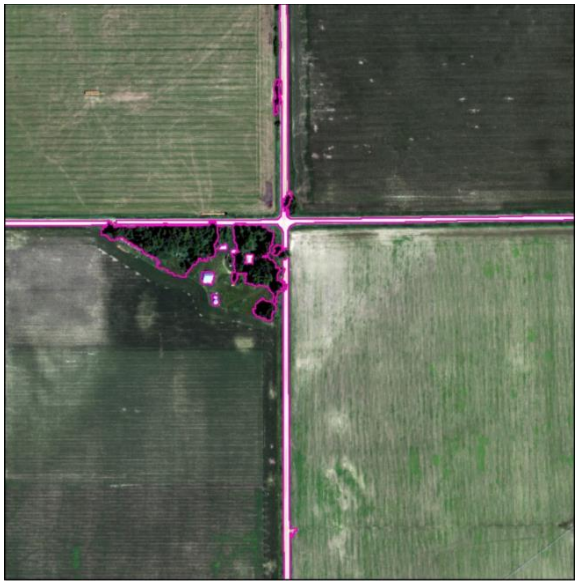
- Challenges in agroforestry inventory
  - NASS Census of Agriculture: practices & products
  - Challenges in terminology

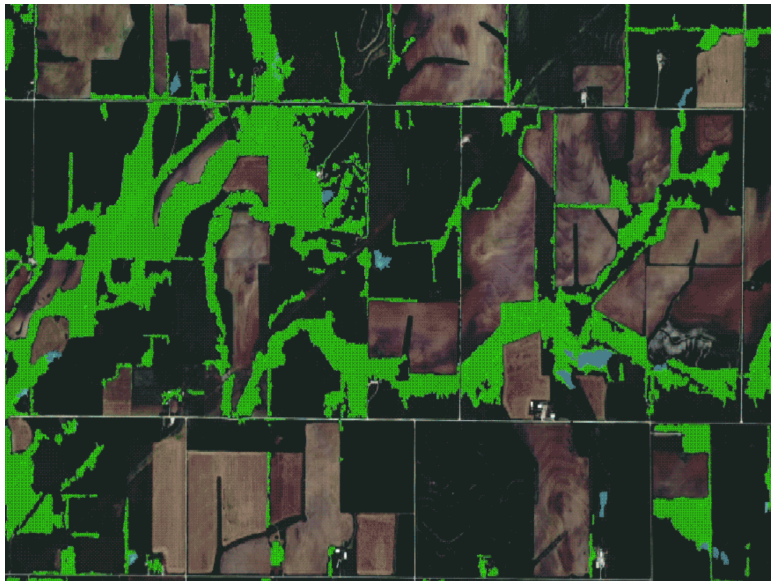


- Washington: 1,076 farms
- Oregon: 1,467 farms
- Idaho: 317 farms

How much agroforestry is out there?

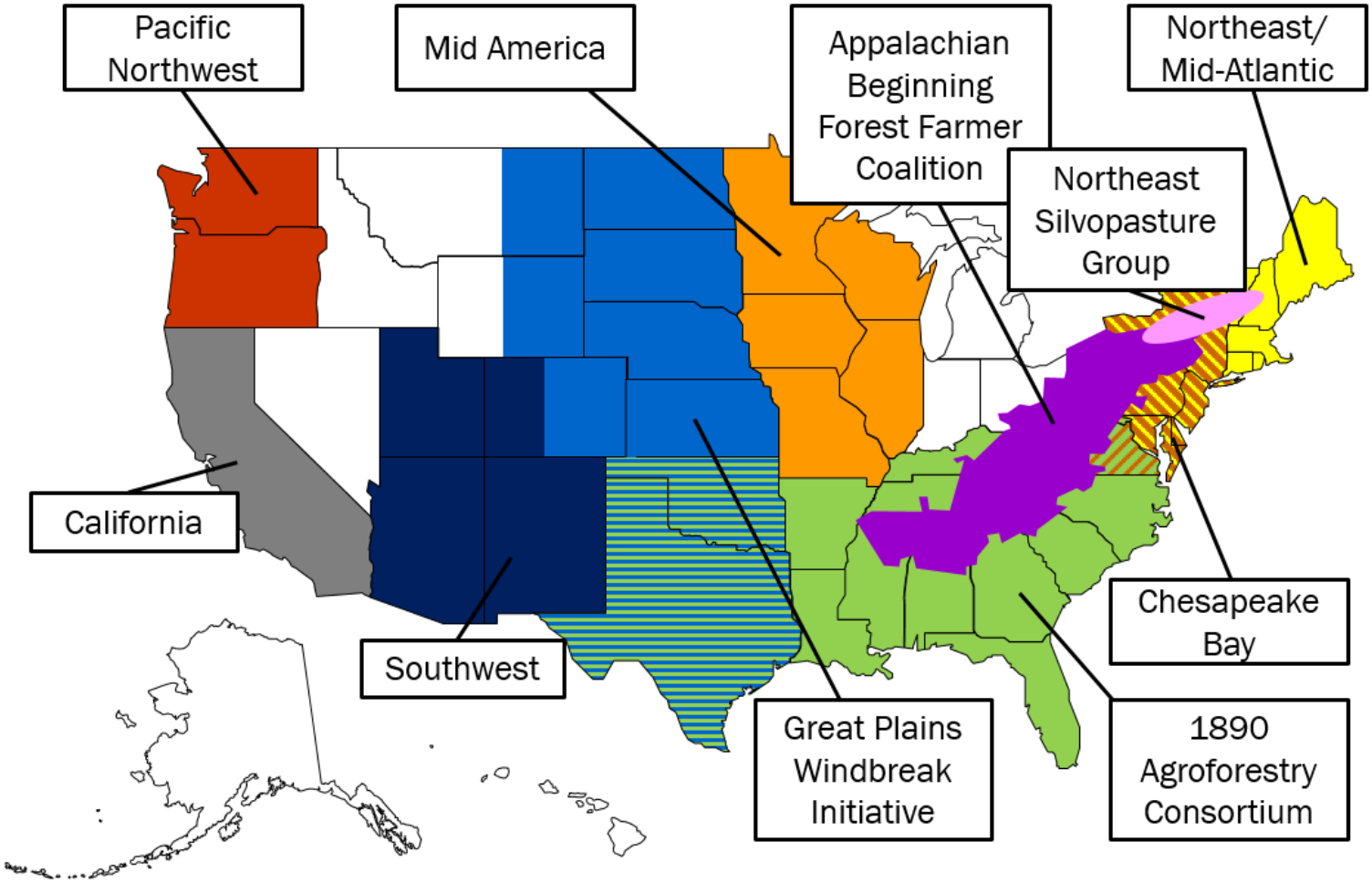
- Challenges in agroforestry inventory
  - Government cost share programs
  - Remote sensing data: Trees Outside of Forest Image-based Inventory





How much agroforestry is out there?

Regional Agroforestry Working Groups



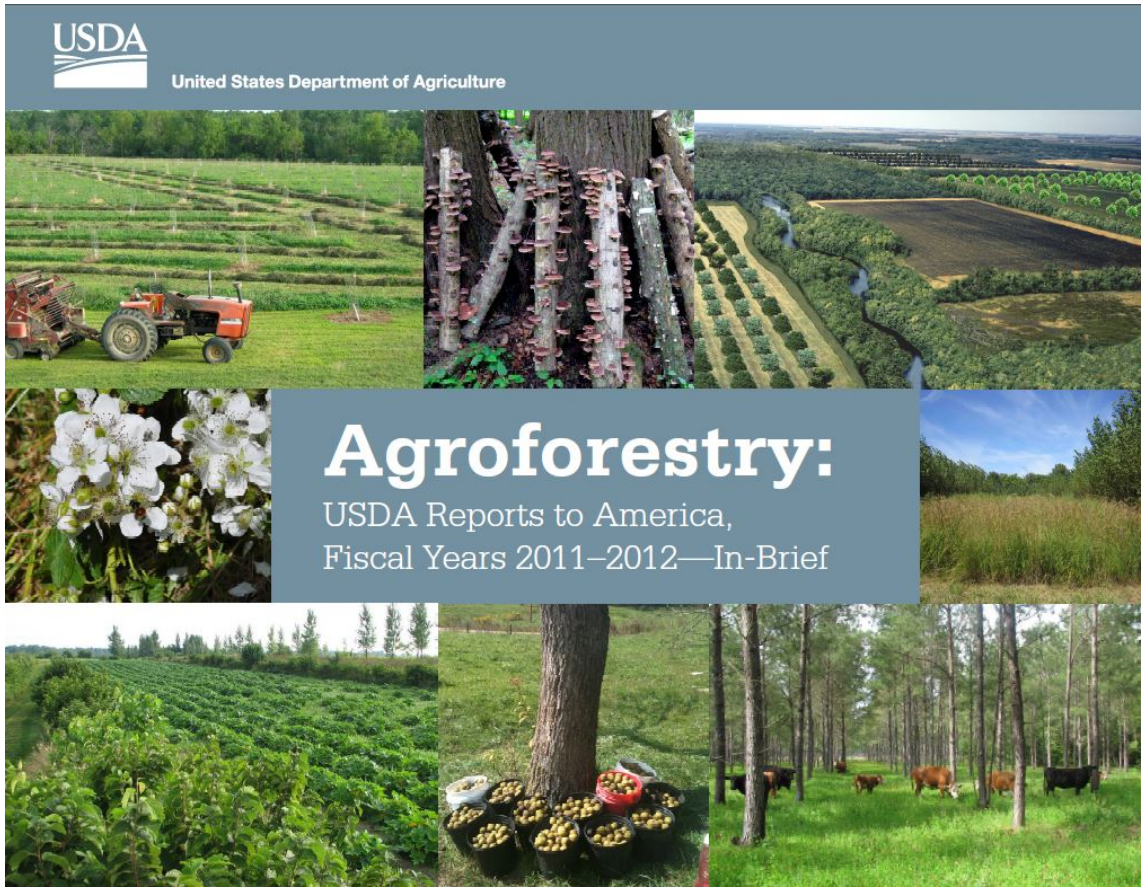
Why hasn't adoption happened faster?

- Agroforestry adds complexity – much of agriculture is focused on simplification and becoming less diversified
- Long time horizon for profitability
- Requires diverse knowledge and skills

Why hasn't adoption happened faster?

- Landowners don't know about agroforestry
- Technical assistance providers don't know about agroforestry
  - Jacobson and Kar 2013 study: extension provided agroforestry assistance in 16 of 32 states
- Agroforestry draws on expertise from many siloed fields: forestry, agriculture, and more

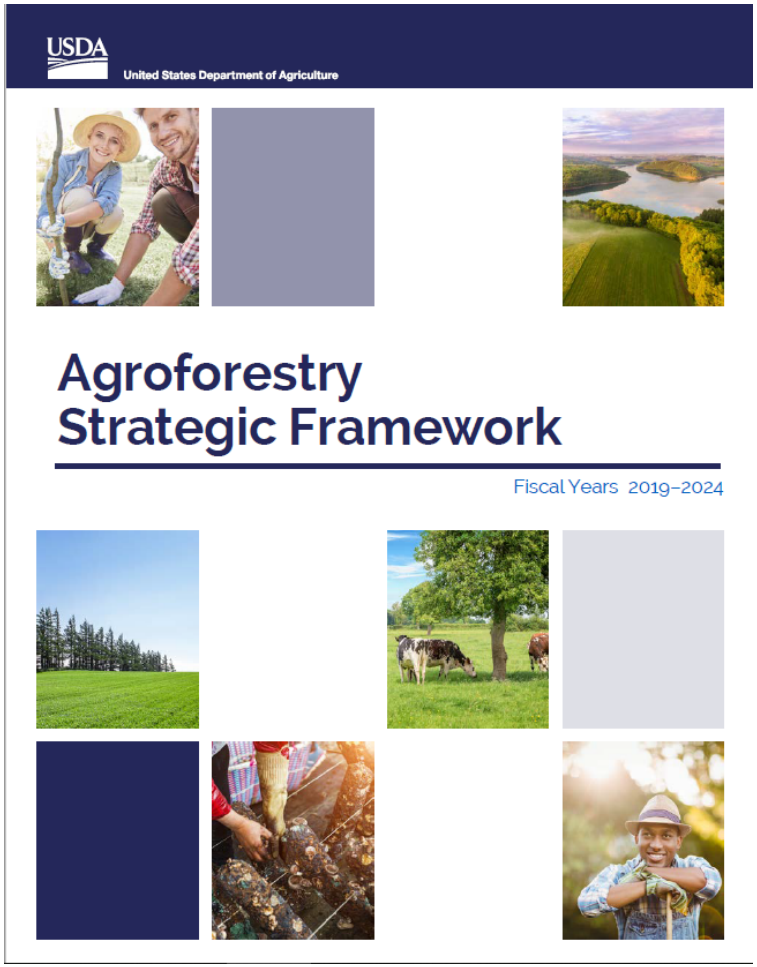
USDA Support for Agroforestry



www.usda.gov/agroforestry

USDA Agroforestry Strategic Framework 2019-2024

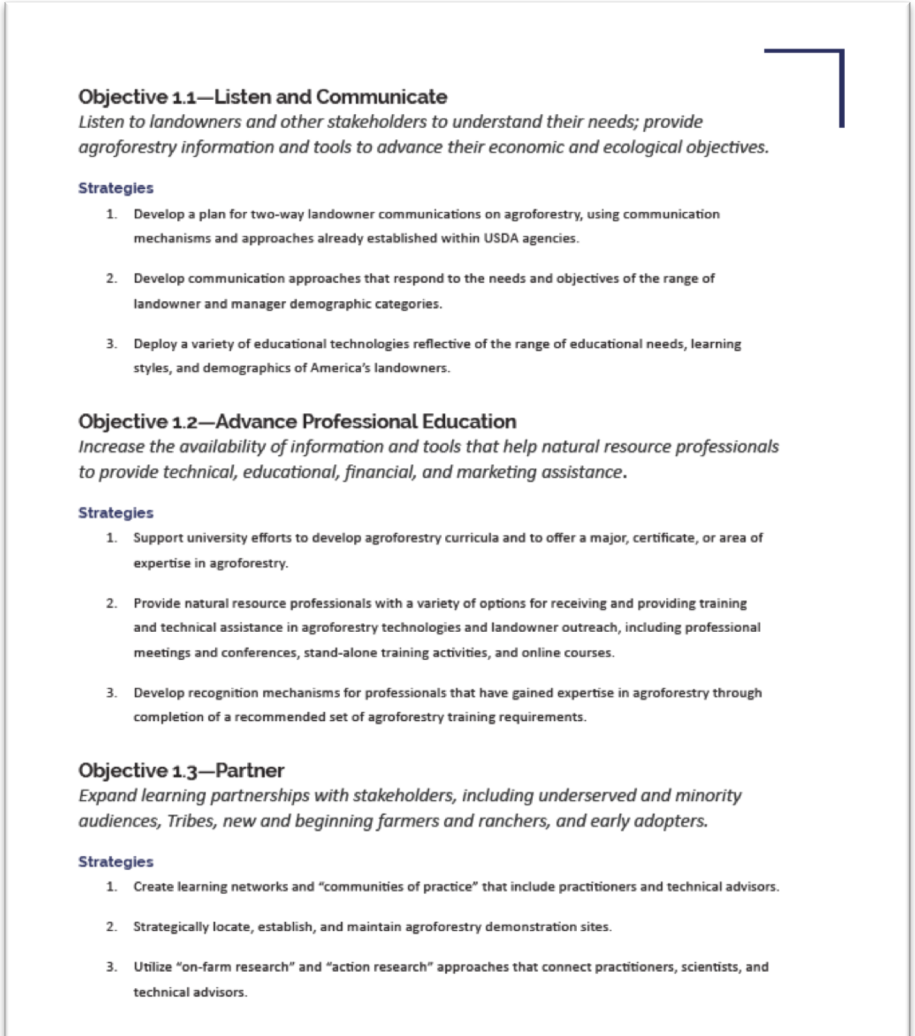
- Second strategic framework
- Tied to the USDA Strategic Framework
- Goals:
  - **Reach out**: assisting producers
  - **Investigate**: supporting research
  - **Integrate**: into policies and programs



USDA Agroforestry Strategic Framework

"What Resource Managers Should Know"

- Grant writing
- Legitimizing agroforestry
- Resource for research basis



Objective 1.1—Listen and Communicate

Listen to landowners and other stakeholders to understand their needs; provide agroforestry information and tools to advance their economic and ecological objectives.

Strategies

1. Develop a plan for two-way landowner communications on agroforestry, using communication mechanisms and approaches already established within USDA agencies.
2. Develop communication approaches that respond to the needs and objectives of the range of landowner and manager demographic categories.
3. Deploy a variety of educational technologies reflective of the range of educational needs, learning styles, and demographics of America's landowners.

Objective 1.2—Advance Professional Education

Increase the availability of information and tools that help natural resource professionals to provide technical, educational, financial, and marketing assistance.

Strategies

1. Support university efforts to develop agroforestry curricula and to offer a major, certificate, or area of expertise in agroforestry.
2. Provide natural resource professionals with a variety of options for receiving and providing training and technical assistance in agroforestry technologies and landowner outreach, including professional meetings and conferences, stand-alone training activities, and online courses.
3. Develop recognition mechanisms for professionals that have gained expertise in agroforestry through completion of a recommended set of agroforestry training requirements.

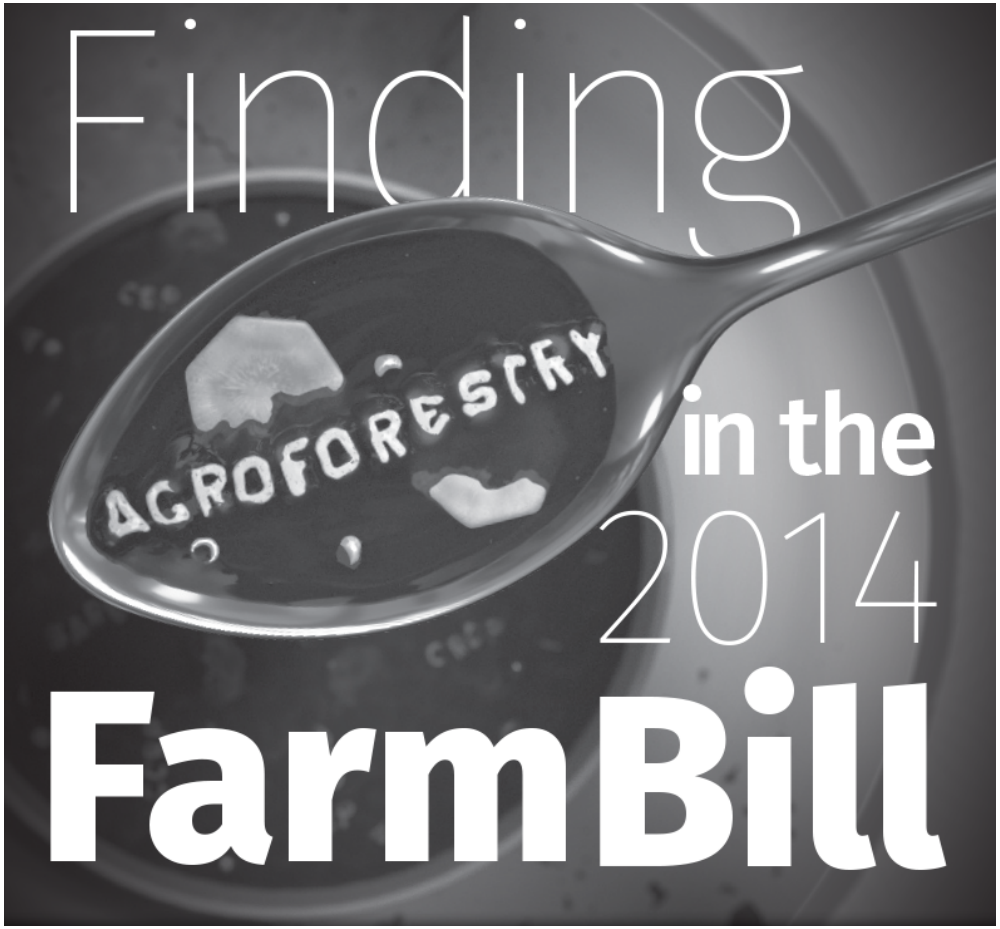
Objective 1.3—Partner

Expand learning partnerships with stakeholders, including underserved and minority audiences, Tribes, new and beginning farmers and ranchers, and early adopters.

Strategies

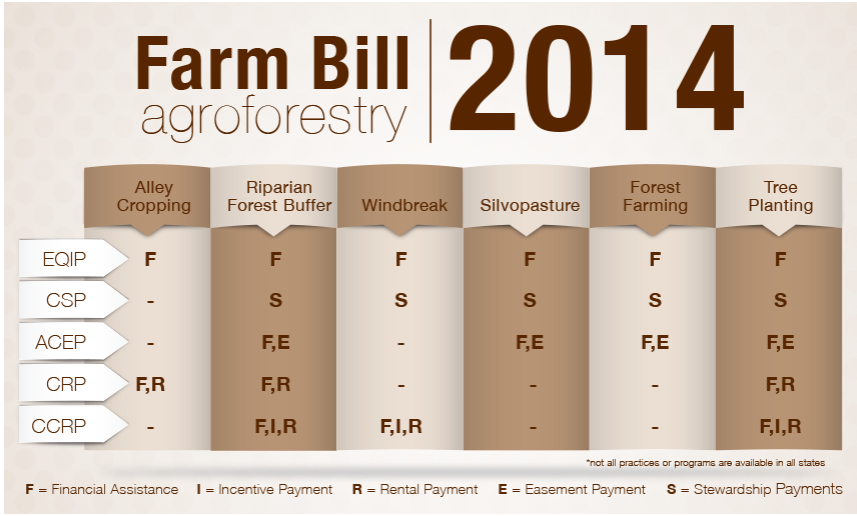
1. Create learning networks and "communities of practice" that include practitioners and technical advisors.
2. Strategically locate, establish, and maintain agroforestry demonstration sites.
3. Utilize "on-farm research" and "action research" approaches that connect practitioners, scientists, and technical advisors.

How does USDA support agroforestry?



USDA Support for Producers

"Integrate"



- Technical assistance
- Financial assistance
- Incentive payments
- Rental payments
- Easement payments
- Stewardship payments
- Support for other parts of the farm operation
- Support for other parts of the supply chain

USDA Support for Research

"Investigate"

Sources:

- National Agroforestry Center
- Agriculture Research Service (ARS)
- NRCS CIGs
- More…

USDA National Agroforestry Center

Current NAC staff:

Susan Stein
Director

Matthew Smith
Research Lead

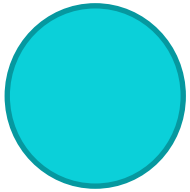
Gary Bentrup
Research Landscape Planner

Todd Kellerman
GIS Specialist

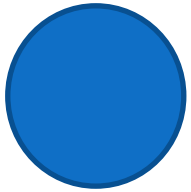
Kirsten Stuart
Business Manager

Rich Straight
USFS Lead Agroforester

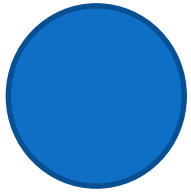
Kate MacFarland
USFS Assistant Agroforester



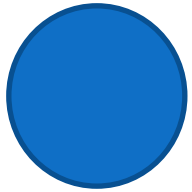
Lord Ameyaw
NRCS Agroforester



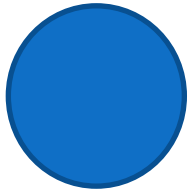
Vacant
Researcher



Vacant
Research Technician



Vacant
Information Assistant



Vacant
Secretary/Project Manager

USDA Forest Service
Research & Development
State & Private Forestry

Natural Resources Conservation Service

Areas of Focus

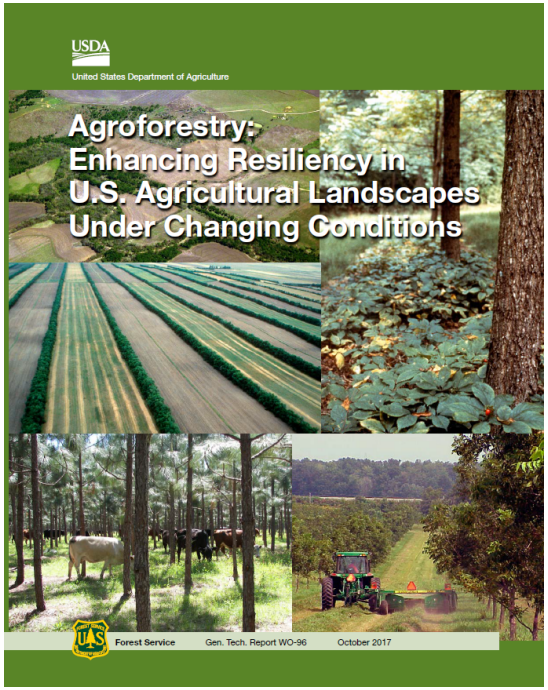
Ecosystem Services Provided by Agroforestry

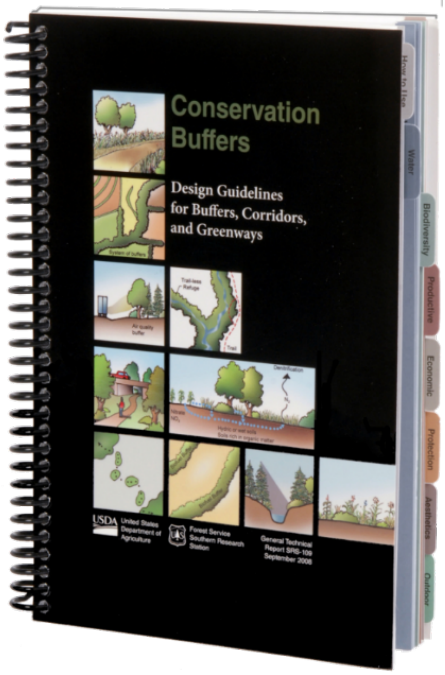
Understanding Human Dimensions of Agroforestry

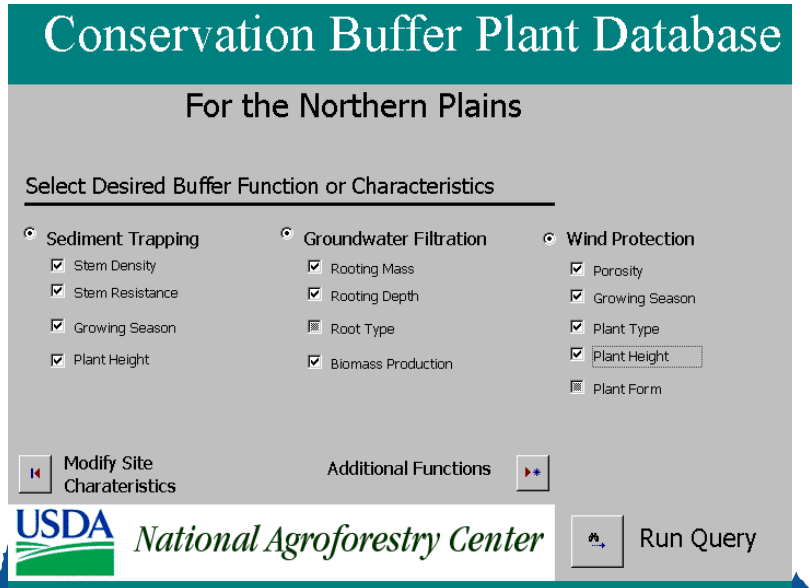
Promoting Agroforestry Education, Networks, and Support

Research Approach – "Investigate"

- Scientific understanding of agroforestry
- Research syntheses
- Models & tools for effective design

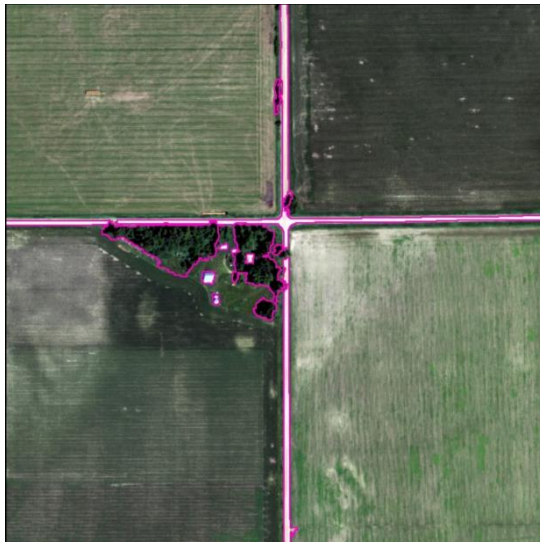


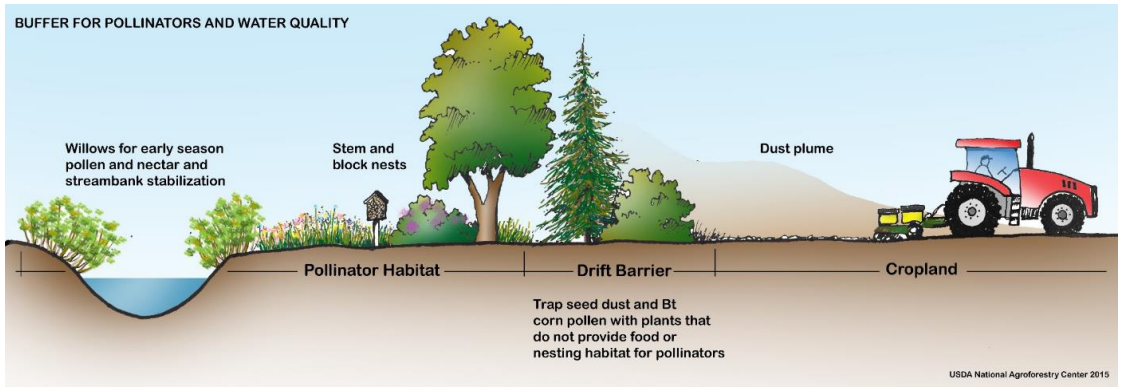




Research Topics – "Investigate"

- Ecosystem services
  - Enhancing production
  - Protecting water quality
  - Establishing habitat
  - Inventory
- Human dimensions
  - Economics
  - Planning
  - Decision making

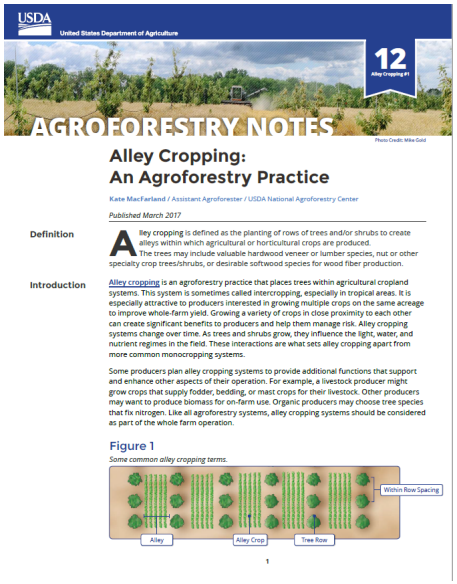




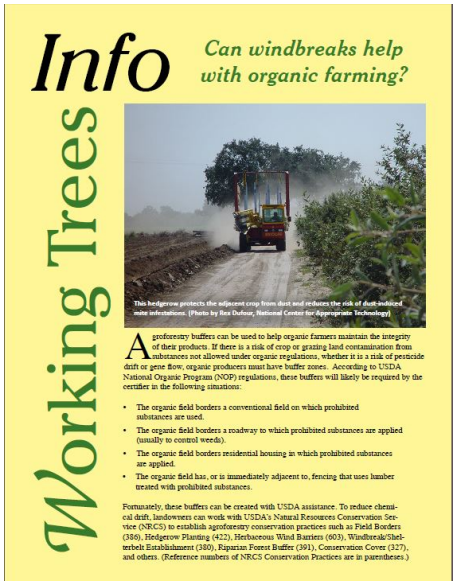
Outreach and Education Products – "Reach Out"

Brochures

Technical Notes

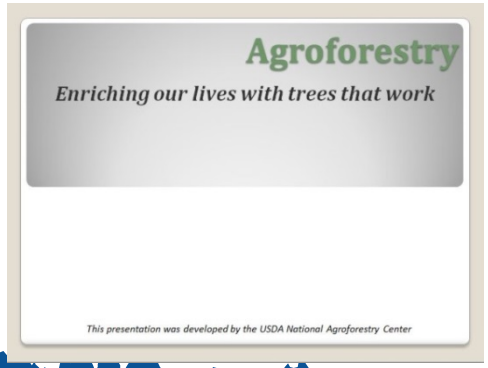


Information Sheets



Newsletters

Sample Presentations



Tools

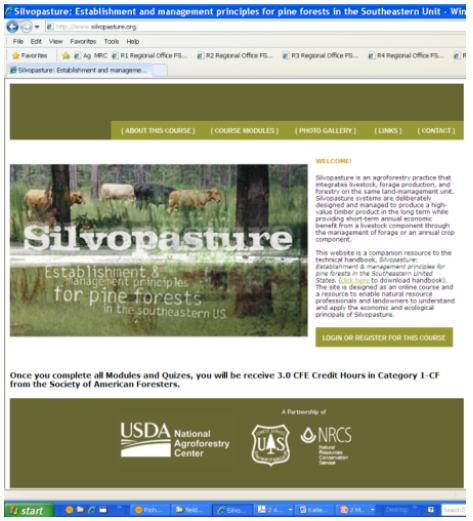
Displays

Outreach and Education Activities – "Reach Out"

Demonstration Sites

Agroforestry Training

Webinars



Workshops

Projects with Partners

Northeast/Mid Atlantic AGROFORESTRY

Great Plains Windbreak/Crop Yields Study

NFWF & National CIG

Conservation Credit for Agroforestry Production (C-CAP)

APPALACHIAN BEGINNING FOREST FARMER COALITION

Questions?

https://www.fs.usda.gov/nac/

To receive quarterly email updates: bit.ly/NACsignup
To join our (paper) mailing list: email
katherine.macfarland@usda.gov

Kate MacFarland
USDA National Agroforestry Center
katherine.macfarland@usda.gov