Introduction to Agroforestry and the USDA Agroforestry Strategic Framework
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

... 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

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- Silvopasture
- Windbreaks
- Riparian buffers
- Alley cropping
- Forest farming
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

- Carbon sequestration
  - wood
  - soils

- Harvested woody stems for floral industry
  - willow sp
  - dogwood sp

- Edible fruits for consumption & sale
  - raspberry
  - juneberry
  - aronia

- Primary microclimate benefits to 6-10 times tree height
  - reduced evaporation
  - reduced wind speed

- Prevailing wind

- Winter wheat

- Wheat yield increased by 15%

- Snow drift accumulation zone to recharge soil moisture and protect crop

- Habitat for wildlife watching & hunting
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

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
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...
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

Conservation Buffer Plant Database

For the Northern Plains

Select Desired Buffer Function or Characteristics

- Sediment Trapping
- Groundwater Filtration
- Wind Protection

- Stem Density
- Rooting Mass
- Rooting Depth
- Force
- Growing Season
- Plant Type
- Plant Height
- Plant Form

Modify Site Characteristics

Additional Functions

Run Query

National Agroforestry Center
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

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United States Department of Agriculture

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Outreach and Education Activities – “Reach Out”

**Demonstration Sites**

**Agroforestry Training**

**Webinars**

**Workshops**

**Projects with Partners**

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**NFWF & National CIG**
Conservation Credit for Agroforestry Production (C-CAP)

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Great Plains Windbreak/Crop Yields Study
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

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