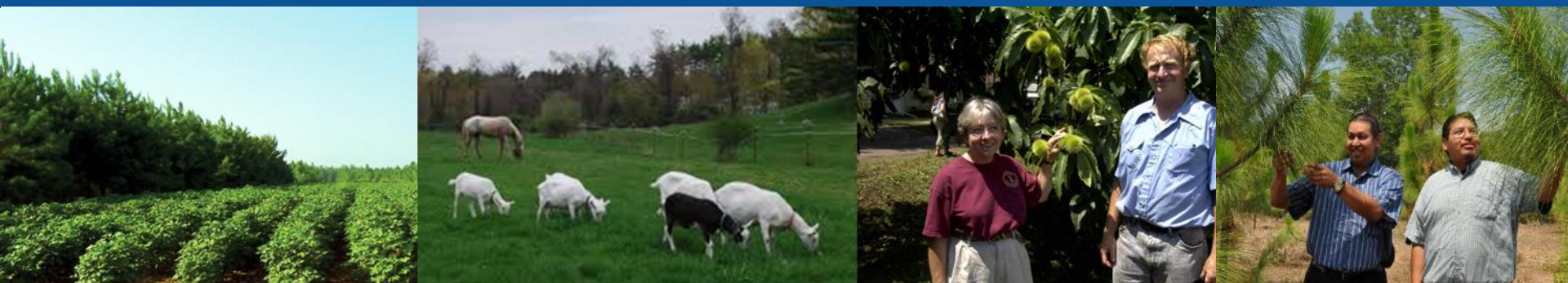


Urban Agroforestry:

How can agroforestry support urban agriculture?



NACD Urban and Community Webinar
June 21, 2018

Presentation Outline



What is agroforestry?



What can urban agroforestry look like?



Resources

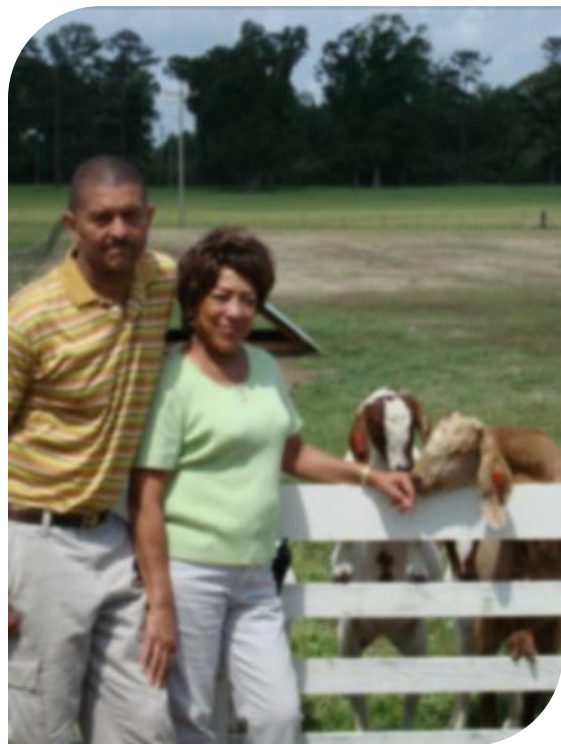
What is Agroforestry?

The *intentional* integration of agriculture and forestry to create productive and sustainable farms, ranches, and woodlands.



Ecological benefits

- Improve soil health
- Improve water quality
- Improve air quality
- Provide wildlife habitat
- Support pollinators
- Grow renewable energy sources



Economic benefits

- Mitigates risk
- Increases crop yields & livestock production
- “Stacks” income: vertically and over time
- Produces salable products
- Provides value-added opportunities
- Increases property values

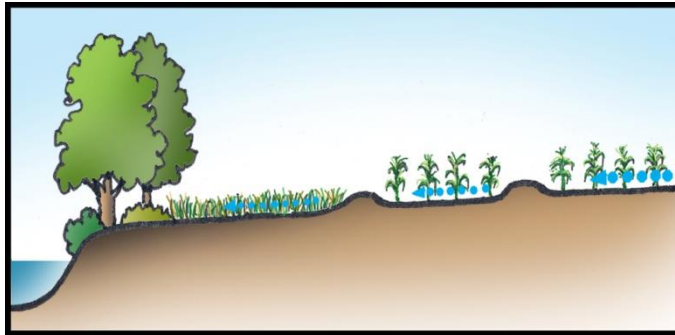


Social benefits

- Creates jobs and supports local communities
- Opportunities for learning and teaching
- Development of cooperatives for value added processing



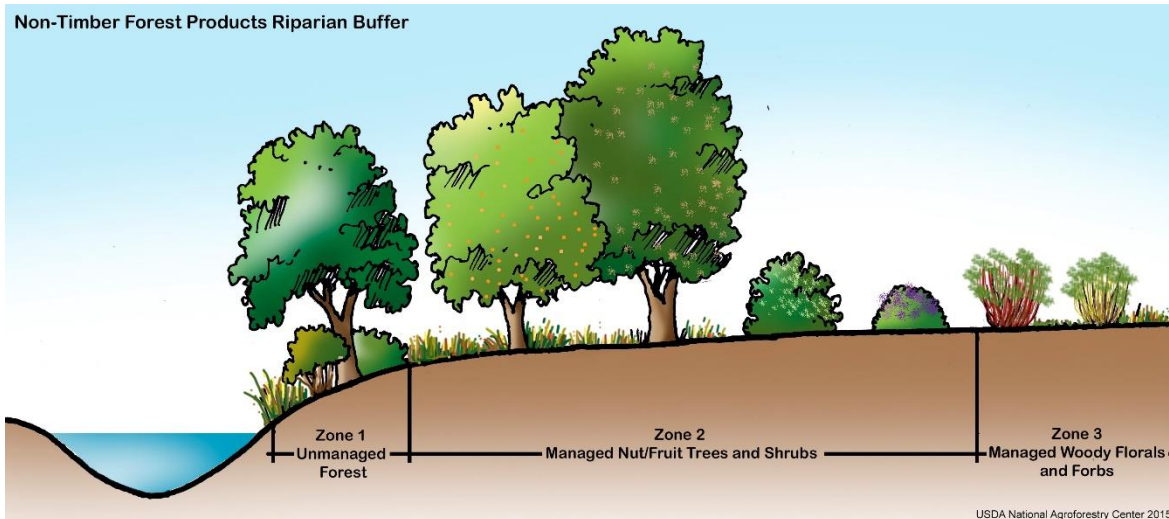
Riparian Forest Buffers



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 Buffers for Urban Ag

- *Filter runoff & stabilize streambanks*
- *Provide landscape and habitat connectivity*
- *Riparian forest buffers that produce something that can be harvested*



Information Sheet: Why add edible and floral plants to riparian forest buffers?

<https://www.fs.usda.gov/nac/documents/workingtrees/infosheets/WTInfoSheet-MultiFunctionalBuffer.pdf>



Sprouting Hope Community Garden in Marion, VA

<https://www.youtube.com/watch?v=NqO-xA2tt8E>

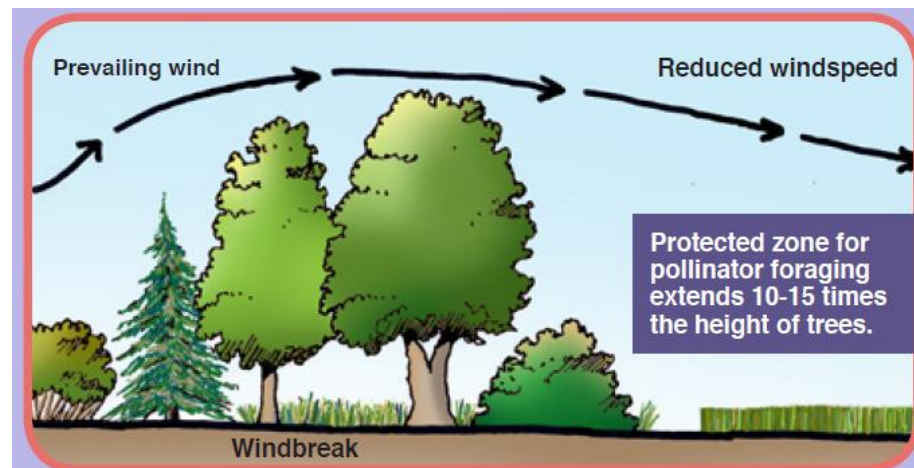
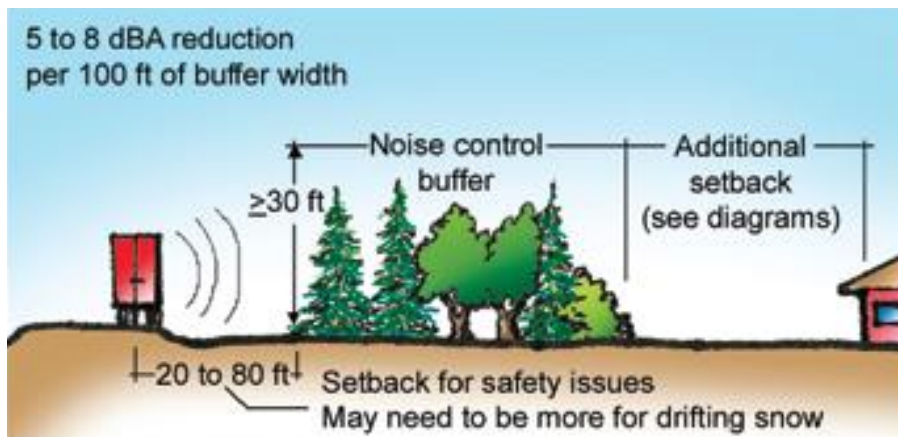
Windbreaks and Hedgerows



Plantings of single or multiple rows of trees or shrubs that redirect or modify the wind and are established for one or more environmental purposes.

Windbreaks and Hedgerows for Urban Ag

- *Provide visual screen or noise buffer*
- *Create a Vegetative Environmental Barrier (VEB) to reduce dust, odor from adjacent land uses*
- *Minimize herbicide or pesticide drift*
- *Provide pollinator habitat to enhance pollination services*



Windbreaks and Hedgerows for Urban Ag

- *Enhance crop yield and/or quality*

Crop	Field Years	Percent Yield Increase
Winter Wheat	131	23
Barley	30	25
Rye	39	19
Millet	18	44
Corn	209	12
Alfalfa	3	99
Hay (mixed grass & legumes)	14	20
Soybeans	17	15
Spring Wheat	190	8



Crop	Response
Broccoli	Increased leaf area
Pepper	Reduced bacterial spot; Improved yield in dry years; Larger plants; Earlier flowers; Greater yields
Potato	Earlier sprouting and ripening; Increased yield and quality
Snap bean	Reduced disease; Earlier ripening; Larger leaf area; Increased yield of marketable beans
Tomato	Reduced sandblast injury; less flower abortion; greater fruit set; Increased yield of high quality fruit
Cabbage	Greater yield and improved tenderness
Melon	Longer vines; Earlier flowering and fruit maturity; Increased yield
Carrot	Improved germination; Reduced sandblasting
Cucumber	Reduced vine damage; Increased yield
Lettuce	Reduced sandblast injury; Increased yield
Raspberry	Reduced desiccation of canes; Improved yields and fruit quality
Strawberry	Increased yields and fruit quality
Plum	Increased yield and more marketable fruit
Anjou pear	Improved quality of fruit
Grape	Reduced desiccation of young vines; Improved growth rates and yields; Reduced leaf damage and rubbing of grape bunches; Improved quality

Silvopasture



Managing trees, livestock, and forage production on the same acreage.

Silvopasture for Urban Agriculture

- *Provide shade to reduce heat stress*
- *Protect livestock from winter winds*



Photos by Reginaldo Haslett-Marroquin

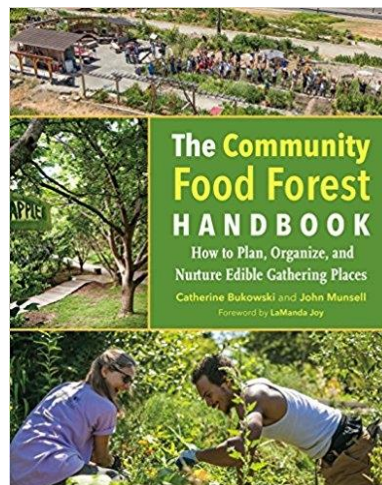
Forest Farming – Multistory Cropping



The intentional management of woodlands to produce non-timber products under a managed forest canopy.

Forest Farming for Urban Agriculture

- *Use a wooded portion of land for production: fruit trees & shrubs, mushrooms, decorative woody florals, herbs*
- *Create a food forest: food production systems that use perennial plants combined with annuals in a multi-story cropping design*



Alley Cropping



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

Alley Cropping for Urban Agriculture

- *Enhance use of small land areas, using space both horizontally and vertically*
- *Add fruit and nut tree or shrub rows, with annual production in the alley*
- *Provide pollinator habitat among the rows of trees*



Photo by Tracey Coulter

Agroforestry Can Enhance Urban Ag

Benefits of trees & shrubs:

- Fruit and nut products
- Food production services
- Air quality
- Extreme weather adaptation



Adapt to Extreme Weather



Image by the Denver Post

Adapt to Extreme Weather

- Deep rooted trees and shrubs offer resilience to droughts and floods.
Garrett 2009



Image by City Fruit

Mitigate Urban Heat Islands

- Peak air temperatures in tree groves are 9°F (5°C) cooler *EPA 2013*

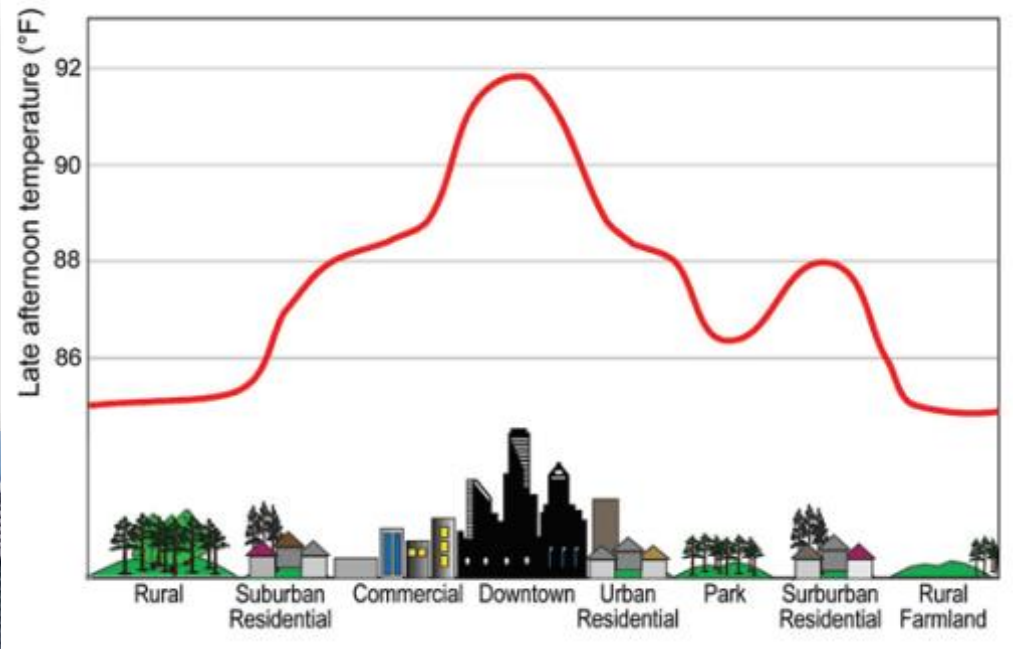


Image by Lemmen and Warren 2004

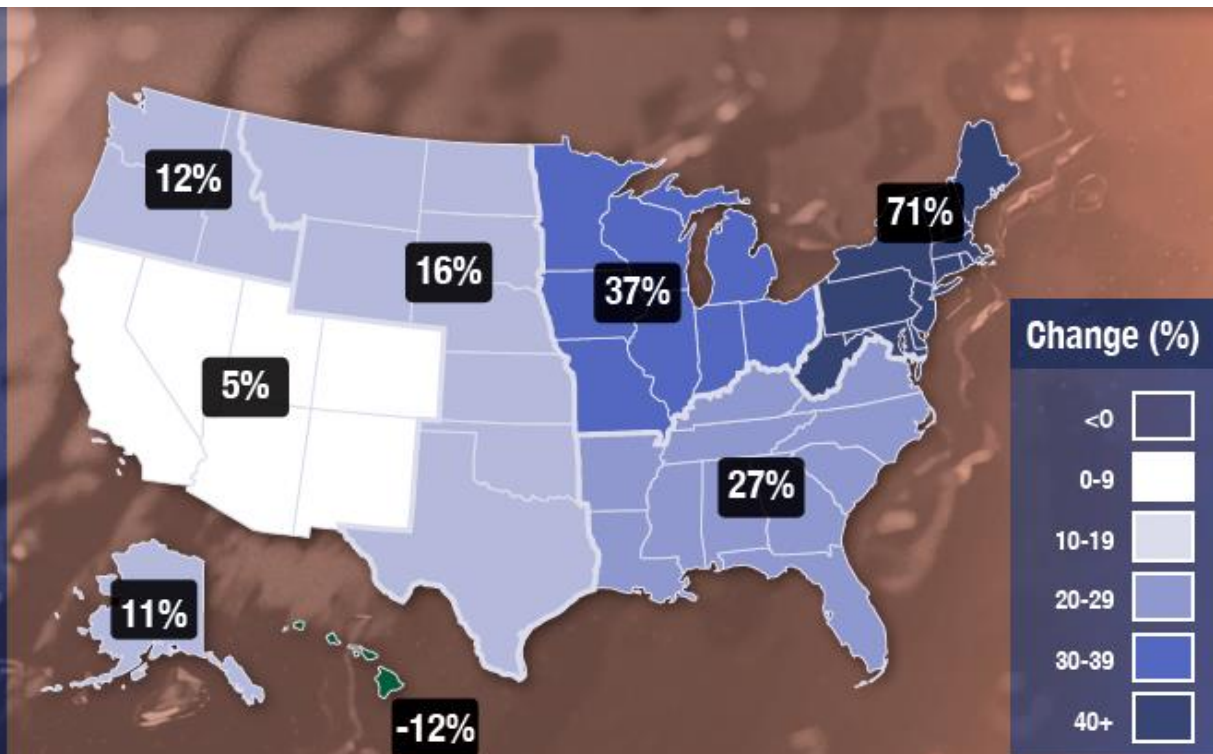
- A 1% increase in urban forest canopy can reduce max temps down .07-.36° F
Nowak et al. 1996

Mitigate Flooding

- Forest and tree cover can intercept rainfall, increase the amount of that rain that filters into the ground, and reduce the quantity, speed, and peak flows of runoff.
- Tree plantings can have positive effects at a watershed scale, even if trees are established in narrow strips along uplands or riparian areas.

The map shows percent increases in the amount of precipitation falling in very heavy events (defined as the heaviest 1% of all daily events) from 1958 to 2012 for each region of the continental United States.

Source: National Climate Assessment 2014
<http://1.usa.gov/20J0adv>



Resources

- More information on agroforestry
- Free publications for use in workshops
- Webinar library

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Climate Change Communities New Farmers Pollinators Wildlife Water

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Info
How can agroforestry practices and approaches support green infrastructure?

CURRENT INFO SHEET

How can agroforestry practices and approaches support green infrastructure?

Communities

Communities have long recognized the need to invest in infrastructure. Roads, power lines, storm drains, and sewers all provide a foundation for continuance and growth. Similarly, communities have recently begun to acknowledge the need for "green infrastructure." They see that trees can be put to work to meet their environmental, social, and economic goals.

Agroforestry helps connect the urban community to the surrounding rural landscape. This connectivity helps filter stormwater runoff, provides travel corridors for **wildlife**, creates recreational space, and improves air and **water quality** for the whole watershed. Cumulatively, these functions contribute to the overall health and sustainability of a community and its neighbors.

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Related Publications

- ▶ [Agroforestry Notes](#)
- ▶ [Inside Agroforestry](#)
- ▶ [Working Trees](#)
- ▶ [Working Trees Info Sheets](#)
- ▼ [Additional Brochures](#)

Info
How can agroforestry practices and approaches support green infrastructure?

Working Trees

Green infrastructure is an approach to conservation intended to create a network of "green" space to benefit people and wildlife. Such networks can include protected lands such as national parks, working lands such as farms, forests, rangelands, and pastures or other green with trees and grasses in native areas and communities. From small patches of land, such as a city garden to national forest land, can contribute to the effectiveness of green infrastructure.

Green infrastructure networks can include lands with agroforestry: the intentional integration of trees and/or shrubs with agriculture (e.g., crops and/or livestock). Whether targeted for agricultural lands or forest lands, agroforestry practices can provide environmental and economic benefits which protect food and enhance landscape resilience.

The design and analysis and to plan and manage agroforestry systems can be adapted and applied to a community green infrastructure plan. For example, agroforestry practices are an additional benefit to urban planning, including food production, water conservation, and energy conservation, water quality improvement, and social, safety, and disaster relief. The integrated approach of management can enhance the benefits of green infrastructure. The increasing popularity of urban agriculture and food forests provides new opportunities to incorporate trees and perennial plants into our communities and landscapes. This can happen in a variety of ways, ranging from the design of green infrastructure on a street to larger landscapes, such as a park or urban forest. Agroforestry practices have potential across the "food-forest interface" where they can provide significant environmental benefits while allowing the land to remain economically and socially productive.

Conservation Buffers

Design Guidelines for Buffers, Corridors, and Greenways

These planning aids create "habitat" for your family by surrounding your home with plants that produce delicious fruits and nuts that you and your children can enjoy together. The "Forest of Edible Landscapes" also can provide opportunities for wildlife to find food. These planning aids provide guidelines for wildlife-friendly, water-wise and drought-tolerant landscaping that attracts many species of animals (especially birds).

Yet we can strengthen our connection to the outdoors and bring that wilderness back into our lives. A beautiful and low way to do this is through "edible landscaping", using selected varieties of trees and shrubs in our yards and acreages to produce high quality fruits and nuts for our own use, as well as food and habitat for a wide variety of wildlife.

Agroforestry

Working Trees for Communities

Working Trees are the adaptation of agroforestry technologies to assist communities of all sizes achieve environmental, social and economic goals, especially at the rural-urban interface.

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EDIBLE WOODY LANDSCAPES FOR PEOPLE AND WILDLIFE

Nearly all of us live in an increasingly urbanized environment. Closely spaced city lots, expanding suburbs, and sprawling, low-density ranchettes or acreages encroach upon and divide up the countryside. Our connections to the outdoors, to wildlife, and to sources of food that sustain us grow ever more distant...

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Why Install an Edible Woody Landscape?

Edible landscapes are an opportunity to connect typical landscape planning that are of little use to wildlife or people who benefit from the products of the land. They provide opportunities for wildlife to find food. These planning aids provide guidelines for wildlife-friendly, water-wise and drought-tolerant landscaping that attracts many species of animals (especially birds).

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<https://www.fs.usda.gov/nac/issues/communities.shtml>



Questions?

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

To receive quarterly email updates: <http://eepurl.com/4HKB1>

To join our (paper) mailing list: email kdmacfarland@fs.fed.us

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