An Introduction to Agroforestry
A sustainable solution with broad applications and implications?
What is agroforestry?

- Agro
- Forestry
Definitions - Agroforestry

A narrow definition of agroforestry is "trees on farms." (Google)

Agriculture incorporating the cultivation and conservation of trees. (Wikipedia)

A more formal definition:

**Intentional integration** of trees and crops/livestock where **interactions** are **intensively** managed

Dr. Shibe Jose, Center of Agriculture, U. of Missouri
Some potential benefits from well-designed AF systems:

- Less soil erosion
- Protection of waterways and watersheds
- Increased biodiversity
  - Within system
  - As another mosaic to connect with other sustainable systems
- Carbon sequestration
- Diversified portfolio of products for farmer
- Fewer petrochemicals?
  - Definitely better efficiency of uptake of nutrients
- Use trees as fertilizer
- Improved aesthetics
- Better animal health (e.g., silvopasture)
What’s wrong with this picture?
Quiz time: Is it Agroforestry?

Intentional integration of trees and crops/livestock where interactions are intensively managed
Black Walnut-Corn: Is this Agroforestry?
Woodlot next to pasture: Is this Agroforestry?
Riparian plantings: Is this Agroforestry?
Grazing in a Forest: Is this Agroforestry?
How about this one?
Answers

- Yes, these *are* agroforestry:
  - Black walnut corn
  - Alley cropping
  - Riparian plantings
  - Riparian buffers

- These are *not* agroforestry:
  - Woodlot next to pasture
  - Grazing in a forest

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Why not?
Characteristics of Agroforestry

1. Land-use practices tailored to particular environments and human needs
2. Deliberate integration
3. Practices involve multiple components and processes in which the dynamics change over time.
4. Competition and its management are critical.
5. Normally has two or more outputs
6. The "Cycle" of an AF practice is always more than one year
7. Even the simplest AF system is more complex, ecologically (in terms of structure and function) and economically than a monocropping system.
8. May be judged successful or not by the bottom line "does it pay".
Historical Origins of Agroforestry (AF)

• Once western scientists "discovered" AF in the late 1970’s, they "found" AF systems all over the world, with systems of similar character in similar ecosystems on different continents (e.g., home gardens in high rainfall tropics in areas with fertile soil, ex. Java, Sri Lanka, Highland of Tanzania...)

• Many examples of traditional tropical AF systems and multipurpose trees (e.g., multistrata coffee, Faidherbia albida intercropping, living fences) have been documented (review back issues of the Agroforestry Systems Journal going back to early 1980’s)
Historical Origins of Agroforestry (AF)

• Roman agroforestry systems produced diverse outputs, reduced risks, increased economic feasibility, and which was ecologically sustainable (see supplemental reading for details).

**Specific agroforestry techniques included:**
- Trees as living trellises (arbustra);
- Intercropping woody perennials and food crops;
- Woody perennials as living fences;
- Trees and tree products as protection and fuel;
- Woody perennials in livestock systems;
- Woody perennials for bees.
Goal/Objective of AF Systems

- To optimize (not necessarily maximize) the positive interactions between the woody and non-woody components
- in order to achieve a more productive, (ecologically and socially) sustainable and/or diversified output from the land than is possible with other conventional approaches to land use management
- in any given agro-ecological and socio-economic set of circumstances.
Is there anything in the previous slide (goals/objectives of AF) that would be objectionable to most in our culture(s)?
Think-Pair-Share:
Agroforestry in the U.S.?

- Where do we stand today? After the “discovery” of agroforestry by scientists in the 1970s, has there been broad acceptance and incorporation of AF systems and technologies?
  - Why or why not?
- What would prevent more widespread application of AF systems?
U.S. Industrial Agriculture – 20th Century, Post WWII

- Cheap fossil fuels and advancements in technology support massive increase in food and fiber production (pioneer ethic)
- Food becomes “cheap”
- Environmental costs of cheap food and industrial manufacturing recognized later on (1960’s onward)
- Externalities (all social and environmental costs associated with production agriculture) point to need for long-term “sustainability” (stewardship ethic)
- Agroforestry systems enter sustainability conversation (1990s onward)
- 21st Century – US shares global concerns: carbon sequestration, global warming, end of cheap (foreign sourced) fossil fuels, search for alternative energy sources intensifies
Promising Trends for Agroforestry

- Consumer, market driven demand for healthier food and a healthier environment
- Nationwide efforts to reduce nonpoint source pollution and increase wildlife habitat
- Climate change, cost and insecurity due to dependence on fossil fuels
What stands in the way?

- **Economics** – availability of specific financial information, access to credit, known returns
- **Culture** - Beliefs, values, attitudes, perceptions, knowledge
- **Policy** - impacts incentives, limits research
  - Lack of incentives, lack of promotion of incentive opportunities, rigidity of incentives, DCP restrictions
- **Lack of access to technical assistance (training, disciplines, familiarity, mistaken perceptions)**
Main Types of Agroforestry

- Silvopasture
  - Trees and pastured animals
- Alley Cropping
  - Trees and agronomic crops
- Windbreaks
  - Trees as, well, windbreaks
- Riparian Buffers
  - Trees, shrubs, forbs, to protect waterways
- Forest farming
  - Growing food and/or medicinal crops under shade
- Multistrata Homegardens (a.k.a. Forest Gardens)
  - Diverse plants, sometimes animals, grown in intensely managed systems; use vertical strata (multiple layers)
  - Widespread practices in the tropics
Agroforestry Video: Alley Cropping

- University of Missouri Center for Agroforestry

Questions to consider:
- Advantages of alley cropping?
- Physical structure?
- Role of trees?
- Cultural bias against?
- Ecological/Environmental advantages?
Assignment

- Watch one of these videos about one of the AF systems; prepare a 5-minute presentation summarizing the practice.
  - Riparian Forest Buffers
  - Silvopasture
  - Forest Farming
  - Windbreaks
  - Multistrata Homegardens (a.k.a. Forest Gardening)
What to address in your presentation:

- Handout given to each team/person