Objectives

- Gain a basic understanding of agroforestry
- Become knowledgeable about different types of agroforestry
- Understand how to build a plan to be successful with agroforestry practices
What is Agroforestry?

Agroforestry is an intensively managed farming system that uses productive trees and or shrubs together with crops, livestock or both using an integrated approach.
Benefits of Agroforestry

Diversifies and multiplies income opportunities

- Farming 3-dimensionally increases usable acreage
- By growing more than one crop, farm income is diversified and better able to withstand market fluctuations
  - Wood for energy generation, paper production, landscaping chips, fruits and nuts, wood shavings for animal bedding material, Christmas trees, saw logs for dimension lumber, high value timber such as furniture-quality wood and veneer logs
  - Specialty crops like decorative florals, mushrooms, herbs, medicinal plants and craft materials
Benefits of Agroforestry

**Improves water use efficiency**
- Reduces irrigation costs, reduces evaporation from the soil and plants
- Prevents flood damage

**Improves water quality**
- Trees and shrubs protect water quality by slowing run off and capturing excess nutrients, sediments and biological and chemical contaminants before they get into water ways
- Improves efficiency of fertilization and other treatments
Benefits of Agroforestry

Prevents soil erosion caused by water or wind flow

- Prevents the loss of nutrients and soil from the farm
- Maintains and improves the productivity of the farm
- By growing trees carbon is sequestered and the trees are available to future generations
  - Within 20 years a field windbreak can store over 215 million metric tons of CO₂
Benefits of Agroforestry

- Windbreaks protect crops, livestock and soil and water resources
  - In cold weather, livestock protected by trees exhibit improved weight gains of as much as 10% and require up to 50% less feed
  - Windbreaks can greatly reduce or eliminate losses of newborn lambs and kids from blizzards
    - Act as snowfences for roads, farmstead, animals
  - Trees protect crops from damage caused by wind such as bruising, scarring and premature drop
  - Enhances pollination
Benefits of Agroforestry

Improves wildlife habitat

- Adding trees and/or shrubs to existing farms provides food and shelter for wildlife and allows wild populations to flourish as they can use vegetation corridors to other potential habitats (forests, waterways or adjacent farms)
Benefits of Agroforestry

Increased biodiversity

• Attract and support wildlife
  • Hiking, hunting, bird watching, or other recreational uses

• Trees and shrubs provide homes for birds that can aid in controlling unwanted pests

• Provide habitat for beneficial insects as well
There are multiple programs that provide incentives for agroforestry

**Federal**
- Conservation Reserve Program, Conservation Reserve Enhancement Program, Wetland Reserve Program, Forest Land Enhancement Program, Sustainable Agriculture Research and Education Program

**State**
- Department of Natural Resources

**Private**
- Ducks Unlimited, Pheasants Forever, Quail Unlimited, National Wild Turkey Federation

**Tax incentives**
- Reforestation, conservation, business investment and capital gains
Benefits of Agroforestry

Cost-share programs

• In some cases landowners are reimbursed 40-90% of the implementation costs

IRC incentives

Section 194
Deduction allows landowner to deduct the first $10,000 of reforestation expenses

Section 175
Allows deduction up to 25% of the gross income earned from the farming business

Section 126
Exclude cost-share payments received from approved federal or state conservation programs
Benefits of Agroforestry

- Agroforestry improves quality of life of farmers and their communities
- Trees reduce noise, dust, odors
- Green spaces are among one of the top 5 things people seek when choosing a place to live
- Promotes outdoor activities
What is Agroforestry

There are four “I’s” that characterize Agroforestry

**Intentional**

Planned system of trees, crops and/or livestock intentionally established and managed together to yield multiple products.

**Intensive**

Created and intensively managed in order to maintain productivity (soil testing, fertilization, controlled grazing, weeding, thinning, pruning).

**Integrated**

Agroforestry combines different types of crops into a single integrated managed system (e.g. trees, livestock and row crops).

**Interactive**

Interactions among the different components of the system are managed to yield multiple products, while providing benefits to conservation and ecology.
Some of the most common types of agroforestry are:

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

Silvopasture is the integration of trees, forage and grazing livestock in a managed system

- Livestock are used to graze the forage that is grown under the trees
  - It is not just allowing livestock to graze unmanaged wood lots
Examples of opportunities for income from the silvopasture practice:

- Meat and dairy goats
- Sheep
- Poultry
- Pigs
- Forage and hay
- Wood products
- Nut, fruit and berry crops
- Improved wildlife habitat/lease hunting
Silvopasture

Silvopastures can be established by:

- Planting selected trees into an established pasture
- By planting selected forages among trees that have been selectively thinned so that forages will be able to grow under them
Riparian Buffers

Before and after adequate agroforestry management
Riparian Buffers

Planned combinations of trees, shrubs, grasses, forbs and bioengineered structures close or within, a stream designed to mitigate the impact of land use on the stream.
Riparian Buffers

- Protect water quality
- Stabilize stream banks and prevent erosion
- Increase wildlife habitat
- Improve aquatic habitat
- Increase the income potential and diversity of the farm
Forest Farming
Forest Farming

Forest farming is defined as:

“the intentional manipulation, integration, and intensive management of forested lands that capitalize on specific plant interactions to produce specific non-timber products”

Berries

Shiitake mushrooms
Forest Farming

Forest farming is different from other types of agroforestry in that crops are introduced into an area that is already forested instead of trees being introduced to crops.

Medicinal herbs can be easily grown in forested areas.

American Ginseng
Forest Farming

Forest farming crops can be divided into four categories:

- Medicinal and botanicals
- Forest-based food production
- Woody decorative florals
- Handicraft and specialty woods
Forest Farming

- Forest farming can diversify farm income while at the same time improving the health of the forest

- By understanding the interaction of the trees and the understory environment shade-loving crops can be profitably grown
### Some Market Opportunities from Forest Farming

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Floral and craft products</strong></td>
<td>Grape vine wreaths, colorful and twisted stems, twigs and branches, small wood products for carving burls, carving bark, dried and mounted fall color leaves, ferns and cuttings from conifers</td>
</tr>
<tr>
<td><strong>Food products: mushrooms, berries and nuts</strong></td>
<td>Pecans, black walnuts, gooseberries, blackberries, mushrooms (shiitake and oyster mushrooms), fiddlehead ferns, persimmons, elderberries</td>
</tr>
<tr>
<td><strong>Landscape plants</strong></td>
<td>Ferns, jack-in-the-pulpit, hostas, dogwood and azaleas; pine straw</td>
</tr>
<tr>
<td><strong>Herbal plants</strong></td>
<td>Ginseng, goldenseal and block cohosh</td>
</tr>
<tr>
<td><strong>Biomass and small wood</strong></td>
<td>Thinned smaller sized trees, used as chip wood, fire wood, craft wood and fence post</td>
</tr>
<tr>
<td><strong>Timber trees</strong></td>
<td>High quality timber, veneer and saw log or other mature tree products</td>
</tr>
</tbody>
</table>
Example of forest farming

Mushrooms are grown on fresh cut pole-sized logs which may be obtained from thinning as part of sustainable forest management. Shiitake mushrooms start producing after one year and continue producing for up to 5 years.
Alley cropping
Alley Cropping

Planting rows of trees at wide spaces and leaving “alleyways” where other crops are grown protected by the trees

- Trees can produce high value timber, nuts or fruit
- Trees provide a microclimate to grow horticultural or agricultural crops
- Crops or forages are grown in the alley to provide an annual income while the trees mature
- Crops can provide nitrogen and protect moisture for the tree crop
Alley Cropping

- Can be used in areas that are susceptible to erosion
- Helps to control erosion and prevent run-off of nutrients, sediments, chemicals resulting in improved water quality

Trees can be planted in rows on the contour of the slope
- Slows runoff water
- Root network helps stabilize the soil
Alley Cropping

Alley cropping creates a protected environment for the crops

Promotes ideal temperature and moisture conditions for the crop
Alley Cropping

<table>
<thead>
<tr>
<th>Plants for Alley Cropping</th>
<th>Main Markets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black walnut</td>
<td>Wood, sometimes nuts</td>
</tr>
<tr>
<td>Pecan</td>
<td>Wood, nuts</td>
</tr>
<tr>
<td>Oaks</td>
<td>Wood, acorns for wildlife</td>
</tr>
<tr>
<td>Chestnuts</td>
<td>Nuts, blight resistant</td>
</tr>
<tr>
<td>Ash</td>
<td>Wood</td>
</tr>
<tr>
<td>Nut or fruit bearing shrubs</td>
<td>Hazelnut, pawpaw, blueberries</td>
</tr>
</tbody>
</table>
Selecting an agroforestry strategy

- Determine objectives and priorities
- Evaluate existing resources
- Identify current land uses
- Map area(s) for agroforestry development
- Climate assessment
- Soil assessment
- Explore markets
- Inventory of existing trees
- Topography
Planning

- Before starting an agroforestry project it is important to have a plan
- Start small don’t try and do everything at once

Trees are a long term project so plan accordingly

- What are the long-term farm goals?
  - Some crops will be ready within a year, 5 years or 20 years
- What are the farm resources?
- What type of agroforestry will work best for the farm?
- Ability to market products
Planning

- Are there areas on your farm that would benefit more from trees than others?
- Is short or long term income more important?
- How much management are you willing to put into it?
- Are there tax benefits?
- Is there help in startup costs?
Planning

- Resources, Resources, Resources!

- Use a map, soil assessments and climate assessment to determine the type of plants that will grow on the farm

- Then use plant guides to determine which plants to grow based on the farm goals
Designing the Layout

- In designing the layout of the farm several issues need to be considered:
  - Number of trees species
  - Plant trees in single or multiple rows
  - Alley width
  - Distance between trees in a row
Planting more than one species of trees allows for:

- Greater diversity of income
  - For example, planting fruiting trees with fruit producing shrubs lengthens the time that you have fruit for market
- Greater biodiversity
- Better habitat for wildlife

Considerations:

- Requires more management
- Competition for light and nutrients between trees (root competition)
- Also some trees produce compounds that inhibit the growth of others (allelopathy)
A BIG THANK YOU TO:
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For more information on Agroforestry and research driven practices, visit: http://www.centerforagroforestry.org/
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This presentation is part of an educational modular program designed to provide new and beginning farmers and ranchers with relevant information to initiate, improve and run their agricultural operations.