Presentation Objective

- Define Alley Cropping
- Describe the Benefits
- Explain the Basic Design Considerations
- Identify Potential Crops and Species
Alley Cropping –

The planting of two or more sets of single or multiple rows of trees or shrubs at wide spacings, creating alleys within which agricultural, horticultural, or forage crops are cultivated.
Benefits

• Diversify Farm Enterprise
• Reduce Erosion*
• Improve Water Quality*
• Protect Crops
• Enhance Wildlife
• Improve Aesthetics
Benefits—Crop Diversity

- Allows production of annual crops for needed cash flow while at the same time growing longer term woody investments.
- Allows two annual crops to be grown on the same acreage such as a forage or row crop and nuts, fruits or wood.
- Allows crop diversity which reduces risk.
Benefits - Microclimate Effect

• Improves the microenvironment to increase crop yields
• Protects alleyway crops from physical damage from winds or from soil particles blown into the plant tissue which bruises or degrades quality
• Reduces Evapo-transpiration
Benefits—Improve Water Quality

- Tree roots are generally deeper than crop roots
- Nutrients and chemicals that pass through crop root zone are intercepted by trees
- Nutrients are utilized by the trees and recycled back to the soil surface by leaf drop
Benefits—Reduce Erosion & Improve Water Quality

- Trees planted on contour trap sediment and residue along with attached nutrients and chemicals
- Infiltration increases in tree rows decreasing overland flow and associated movement of soluble nutrients and chemicals off site
- Tree roots are generally deeper than crop roots
- Nutrients and chemicals that pass through crop root zone are intercepted by the woody plants
- Nutrients are utilized by the woody plants and recycled back to the soil surface
Some Limitations

• Specialized equipment and skills for tree management
• Land removed from annual cropping
• Marketing infrastructure for tree product(s)
• Trees may be an obstacle to crop cultivation
• Trees may compete with crops
• Herbicide drift from crops to trees
Functions

• Water Management
• Nutrient Cycling
• Soil Quality
• Microclimate Modification
• Pest Management
Design Considerations

- Light requirement for the crop or forage to be grown in the alley way
- Root Competition between crops
- Type and size of the equipment being used
- Allelopathy

<table>
<thead>
<tr>
<th>Tree Species</th>
<th>Shade Produced</th>
<th>Root Competition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black walnut</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Pecan</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Oak</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td>Pine</td>
<td>High</td>
<td>Medium-high</td>
</tr>
</tbody>
</table>
Plant Selection

• Marketable
• Yields annual or periodic commercial product (wood, nuts or fruit)
• Appropriate shade for the alley crop
• Minimal roots at soil surface
• Adapted to site and soils
• Foliage residue does not interfere with alley crop
• Growth requirements complement alley crop
Plant Selection - Trees

- Walnut
- Pecan
- Chestnut
- Pine
- Poplar
- Hazelnut/Filbert
Plant Selection – Shrubs

- Willow, dogwood (decorative florals)
- Chokecherry, highbush cranberry, currant, elderberry, saskatoon, gooseberry, sugar apple, pomegranate (fruits)
Plant Selection – Alley Crops

- Row/cereal crops (corn, soybeans, milo, wheat)
- Forage crops (legumes, grasses)
- Specialty crops (vegetables, fruits, flowers, Oregon grape, medicinals)
- Biomass (energy, feedstock)
Operation & Maintenance

- Pest Management
- Nutrient Management
- Tree Canopy Management
- Periodic Tree Root Pruning
- Weed Control
Economic Incentives

Hal Gordon will discuss this topic in detail

- NRCS financial assistance programs
- USFS programs
- SARE program
Success Stories

http://www.youtube.com/watch?v=b8Kwb5yInPM
Summary

• Alley Cropping needs to be part of an overall management system that may include one or more of the following:
  – Crop Rotation
  – Residue & Tillage Management
  – Integrated Pest Management
  – Nutrient Management
  – Buffer Practice(s)

Coconuts and beans
Summary

• Alley Cropping can help diversify the farm enterprise and beautify the landscape along with:
  – Protect the Soil Resource
  – Improve Air Quality
  – Improve/Protect Water Quality
  – Enhance Fish & Wildlife Habitat
  – Converse biodiversity
Additional Resources

National Agroforestry Center:
http://nac.unl.edu/alleycropping.htm

The Center for Agroforestry at the University of Missouri:
http://www.centerforagroforestry.org
Alley Cropping: http://www.centerforagroforestry.org/practices/ac.php

Alley Cropping video:
http://www.youtube.com/watch?v=b8KwbSyInPM

Association for Temperate Agroforestry:
http://www.aftaweb.org/about/what-is-agroforestry/alley-croping.html

Journal - The Overstory:
http://agroforestry.net/the-overstory

In Print:

From the United Kingdom:
http://www.agroforestry.co.uk/silvoar.html

For additional information on the characteristics of individual forage species:
Forages Vol. 1: An Introduction to Grassland Agriculture by Barnes, Miller, & Nelson, 1995, Iowa State University Press