

Do You Have Problems With:

- Lack of annual income while long-term timber stands or fruit and nut trees are maturing
- Lack of crop diversity
- Income risk in your farming operation
- Sun or wind damage on sensitive crops
- Lack of wildlife



Forage crop between rows of trees.

Alley Cropping Can Help These Problems

Purposes and Benefits of Alley Cropping:

- Alley cropping means the production of trees, and other crops on the same acreage at the same time.
- Trees provide long-term returns, while other crops generate an annual income.
- Economic risk is reduced because the system produces multiple products (trees, fruits and nuts, forage and row crops), which have an established market.
- Trees provide shade and protection from wind for sensitive crops.
- Tree thinning, spacing and a more open canopy results in high-value saw timber.
- Plant diversity improves wildlife habitat and increases recreational opportunities.
- Produces annual income while long-term timber stands or fruit and nut trees are maturing.

Costs to Establish Alley Cropping:

If an alley cropping system is installed in an existing field, the only cost will be for planting the trees. Some of the costs for alley cropping include:

- Cost of trees
- Site preparation
- Planting cost
- Weed control (first couple years)
- Future cost may include pruning of limbs to reduce shading and allow for operation of farm equipment

Alley Cropping

How to Install the Practice:

Trees or shrubs are generally planted in single or multiple-row sets. The spacing between sets is determined by the primary purpose of the tree crop and the other crop grown.

Woody plants are usually selected for their value as timber, nut, or fruit crops and/or the benefits they can provide to the crops grown between the trees.

Companion Crops

The primary factor for selecting the crops within an alley is their sunlight requirement compared to the shade created by the trees or shrubs in the rows.

Alley cropping generally utilizes four basic groups of companion crops between tree rows. Examples include:

- Row/cereal crops (corn, soybeans, wheat, barley, oats, potatoes, peas, beans)
- Forage crops (fescue, orchard grass, bluegrass, ryegrass, brome, timothy, clover, alfalfa).
- Specialty crops (landscape plants like blue spruce, dogwood, redbud; Christmas trees; small fruit trees; or crops like goldenseal or ginseng)



Courtesy USDA National Agroforestry Center

Desirable Characteristics of Trees

The desirable characteristics of trees will vary depending on your goals and objectives. Generally, trees should:

- Produce a high value product
- Produce appropriate shade for the companion crop
- Have minimal roots at the soil surface
- Produce wildlife benefits



*Rows of soybeans grown between hardwood trees.
Courtesy USDA National Agroforestry Center*

Spacing

Spacing between rows and between individual trees is critical in designing an alley cropping system. Spacing varies with the intent of the alley cropping program. For nut tree production, plant trees on a wider spacing to fully develop their crowns.

The yield of the agricultural crop is not affected by the presence of trees during the first few years of establishment.

As trees mature, however, significant competition between the tree and crop can be expected for light, water and nutrients. This may lead to reduced yields of the crop.

Alley Cropping

In most cases, a spacing of 40 feet between rows will permit crop production for about five to ten years before the shade of trees begins to overlap. An 80 foot row spacing should permit production of row crops for up to 20 years.

Utilizing the shady portion of the alley for one crop and the central portion for another, less shade-tolerant crop, could allow for simultaneous production of two or more crops.

If a crop is more shade tolerant, closer row spacing can be used. Although understory crops can tolerate shade, some light must penetrate the canopy to ensure their productivity. The amount of light necessary depends on the crop. Some crops tolerate only light shade while others can thrive in heavy shade.



Fruit trees between rows of larger trees that provide wind protection. Courtesy USDA National Agroforestry Center

Because the understory environment changes over time, some farmers may choose to cultivate a series of different understory crops over time.

Landowners can also design systems based on the labor and maintenance they are willing to perform.

Alley cropping designs should be spaced widely enough to allow for farm equipment (e.g., tractor, planter, sprayer, picker), to avoid damage to equipment or trees.

Other Benefits:

Alley cropping is a means to diversify and intensify production. By intercropping, a landowner can more effectively use land and resources.

Wildlife

Alley cropping provides excellent opportunities to improve wildlife habitat for some species by creating travel lanes connecting important habitat areas, providing cover, and increasing edge effect.

How to Maintain the Practice:

Control weeds during initial years until trees reach adequate size to survive on their own. Replace dead and dying trees in newly established plantings.

As overstory trees continue to mature, the understory conditions can be maintained by pruning or thinning the overstory trees. Root pruning may be necessary to maintain adequate growth in adjacent agronomic, forage, or horticultural crops.

Inspect periodically and control insects, diseases and competing vegetation. Protect trees from fire and damage from livestock and wildlife.

SMALL SCALE SOLUTIONS FOR YOUR FARM

Technical Help Is Available

Your local Natural Resources Conservation Service (NRCS) office has experienced conservationists that can assist you with alley cropping. They can also help you develop a Conservation Plan to solve other problems you have identified on your farm.

There is no charge for our assistance. Simply call your local office at the number listed below to set up an appointment and we will come to your farm.

You may also be eligible to receive financial assistance, through a state or federal program. Your NRCS office will explain any programs that are available so you can make the best decision for your operation. All NRCS programs and services are voluntary.



Helping People Help the Land

For More Information Contact the:

Natural Resources Conservation Service

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