



Small Scale Solutions for your Farm

Alley Cropping



Do You Have Problems with:

- Lack of annual income while forest stands or fruit and nut trees are maturing
- Lack of crop diversity
- Income risk in your farming operation
- Lack of wildlife

Benefits of Alley Cropping

Alley cropping is the planting of rows of trees and/or shrubs to create alleys. These alleys can be used for crop production.

Principles of Soil Health

- Trees provide long term returns, while other crops generate an annual income.
- Lower economic risk due to system producing multiple products (trees, fruits and nuts, forage and/or row crops) sold on different markets.
- Trees provide shade and protection from wind for sensitive crops.
- Tree thinning, spacing and a more open canopy could result in high-value timber.
- Plant diversity improves wildlife habitat and increases recreational opportunities.
- The system produces annual income while long-term forest stands are maturing.



Forage crop between rows of trees.



Agroforestry practices will maximize your goals.

Spacing and Orientation of Rows to Maximize Sunlight

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 crops, and a possible need to change crops over the years.

In most cases, a spacing of 40 feet between rows will permit crop production for about five 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. 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.

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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.

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.

Cost to Establish Alley Cropping

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

- Cost of trees
- Site preparation
- Planting Cost
- Weed Control (first couple years)

- Future costs may include pruning of limbs to reduce shading and allow for operation of farm equipment.

Installing the Practice

Seek professional assistance from your NRCS office or professional forester. Trees or shrubs are generally planted in single or multiple-rows. The spacing between row is determined by the primary purpose of the tree crop and the other crop grown, as well as the size of equipment used in the system.

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. Crops grown in the alleys may change over time as the trees grow and the amount of shade changes.

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

- Row/cereal crops (corn, soybeans, wheat, barley, oats, 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), vegetables, melons.



Various practices in agroforestry will help you achieve your goals.

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.
- Because the understory environment changes over time, some farmers may choose to cultivate a series of different understory crops over time.
- Producers can also design systems based on the labor and maintenance they are willing to perform.
- 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 damage from livestock and wildlife.

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Technical and Financial Assistance

Whether you measure your farm in terms of feet or acres, your local Natural Resources Conservation Service (NRCS) office has experienced conservationists that can help you develop a Conservation Plan to conserve, maintain, and restore the natural resources on your land and improve the long-term health of your operation.

There is no charge for our assistance. Simply contact your local office to set up an appointment. You may also be eligible to receive financial assistance. 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.

For More Information

Visit the Natural Resources Conservation Service or visit farmers.gov/service-locator to find your local NRCS office. You can also check with your local USDA Service Center, then make an appointment to determine next steps for your conservation goals.



NRCS partner assisting small scale farmer with developing a customized conservation plan. Photo by Erica Quinlan.

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