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Agricultural Extension Service
The University of Tennessee
PB1463

Tree Crops For Marginal Farmland

Christmas Trees

With a Financial Analysis

Tree Crops For Marginal Farmland

Christmas Trees

With a Financial Analysis

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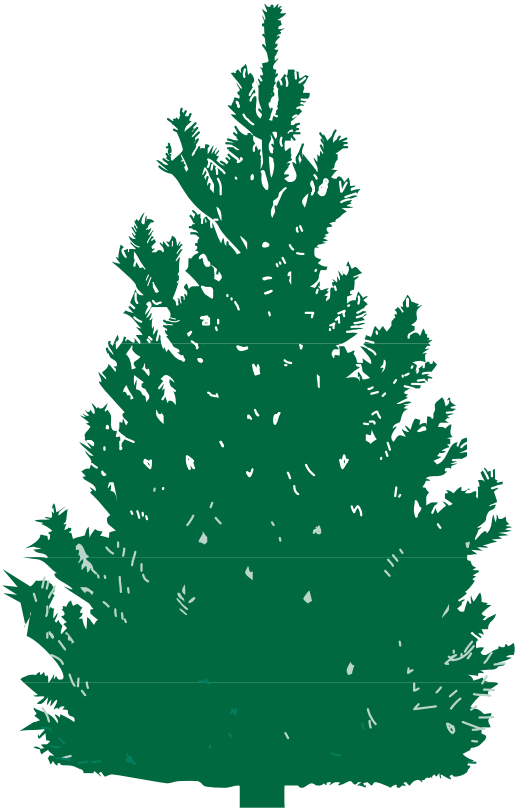

Tree Crops for Marginal Farmland

Many producers would like to increase farm income and decrease income variability. A growing number of farmers are investigating new and diversified sources of income. A resource that has not been tapped to its full potential is marginal farmland, specifically its use for growing tree crops. More than 30 million acres of woodland, idle pasture and cropland exist on Southeast farms, and much of this land could be producing valuable tree crops.

The Tree Crops for Marginal Farmland Project seeks to provide farmers with basic information about growing and marketing tree crops. Tree crops have many advantages for farmers with marginal or unused land. The cost of inputs is relatively low, and economic returns may be quite competitive with alternatives. Marginal lands converted from annual rowcrop and pasture production to tree crops can reduce soil erosion, improve water quality, reduce total pesticide and fertilizer applications and produce more profitable returns for the landowner.

Five introductory guides are available in this series. They provide information on a specific tree crop that can be grown on small or medium-sized tracts of marginal or unused farmland. All these crops are common to areas of the southeastern United States, but their economic potential should be evaluated. The tree crops chosen for this series are:

White Pine for Timber
Black Walnut for Timber and Nuts
Loblolly Pine for Timber
Royal Paulownia for Timber
White and Virginia Pine for Christmas Trees

Your decision to grow a tree crop should be made only after careful consideration of the growing time, expense requirements, market conditions, expected returns and your personal objectives. These guides will help you make your decision. In addition, you should seek information from representatives of organizations such as your state Forestry Service, your local Agricultural Extension Service office and private consultants.

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How to Use This Guide

This publication describes the most effective practices used to grow Christmas trees in the southern United States and the cost of those practices. It includes a financial analysis with typical costs and expected returns.

Only Eastern white pine and Virginia pine trees are discussed in this guide. But other species, such as Scotch pine, Arizona and Leyland Cypress and fir, also can be grown profitably in some locations in the South.

To use this publication to best advantage, read it straight through. Take special note of the cultural practices described and their estimated costs. Think about potential markets for the harvest. Read how to evaluate your potential investment, and think about the other benefits of tree crops. Read the case studies to get a better idea of how these investments can be evaluated. To conduct a financial analysis of your own situation, carefully estimate all the production costs, then take your estimates to your local Extension agent or farm management agent for assistance.

Christmas trees can be a good alternative for marginal farmland.

Christmas Trees for Profit

Growing Christmas trees can be a profitable use for marginally productive farmland. Though more labor-intensive than other tree crops, a Christmas tree crop can return a profit in as little as five to seven years. In addition, Christmas tree production requires little up-front capital investment. Most production operations require only hand tools or common farm machinery.

Most industry experts predict that Christmas tree markets will remain stable. However, there is a surplus of Christmas trees in many regions of the United States. To be competitive, growers must efficiently produce high-quality trees of the species that consumers demand.

Artificial Christmas trees will continue to remain popular, particularly given their convenience, cleanliness and improved design (making them appear natural). Growers of natural Christmas trees must capitalize on tradition, freshness, aroma, and in the case of choose-and-cut operations, the family experience of *bringing one home*.

Production Management

Site Selection

Not all marginal or abandoned farmland is suitable for Christmas trees. It is important that the site is not too steep or rocky, because you must have easy access for activities such as mowing and shearing. Cut-over forest land is generally not suitable for Christmas trees, because brush and tree sprouts generate too much competition. Plus, stumps will create difficulty in plantation maintenance.

Other soil and site factors such as drainage, fertility, pH and ground cover are important. Suitable farmland for growing quality trees generally requires a level to gentle slope of not more than 10 percent, well-drained soil with no major nutrient deficiencies, no major surface rocks, and no woody vegetation.

Site Preparation

Proper site preparation can make the planting process much easier and can result in greater tree survival. Also, it can facilitate future cultural operations such as mowing and shearing. To prepare a site for planting, rocks, logs, stumps and brush should be removed. Heavy sod must be eliminated, and all woody brush killed. If the soil has been compacted, it

may need to be tilled or sub-soiled. Remaining vegetation can either be removed, plowed under or treated with herbicides. Often, only tree rows are sprayed with herbicides, and the area between rows is mowed. It is very important to remove competing vegetation at this stage to avoid serious problems later.

Heavy grass sod, such as fescue, is very competitive with young tree seedlings for moisture. Further, in the event of ground fires, dry grass sod can spread rapidly through Christmas tree plantations, causing heavy financial loss. Normally, weeds, clovers and native warm-season grasses are better choices for ground cover between the rows of trees.

Proper planting of tree seedlings is relatively easy. On the average, one person can hand-plant about 500 seedlings per day on a prepared site. A tractor-driven machine planter with two workers can increase that planting rate 20-fold. But before planting, and after you've chosen a species, consider the following:

Source of seedlings. Order seedlings in the summer or fall for spring or winter planting. Seedling sources vary among states, with some species available from public nurseries and others from private nurseries.

Number of seedlings. The required number of seedlings depends on acreage and tree spacing. Most experienced growers adjust tree spacing to accommodate their equipment. For example, if you have a 4-foot-wide mower, the spacing between rows might be 6 feet. The spacing between trees within a row is often less than spacing between rows. Most Christmas tree plantation densities are 900 to 1,200 trees per acre. Take care not to plant trees too close together (typically no closer than 6 feet apart). It is easy to underestimate the space required by mature trees. Lanes for access and fire protection should be left unplanted every six rows.

Plantation layout. Plan a continuous harvest and steady cash flow by planting a portion of your total acreage each year. For example, an eight-acre plantation on a six-year rotation can be divided into eight stands. Plant one acre (1/8 of total) each year for six years. Harvest in years six and seven. Then clear the stand and allow it to remain fallow the 8th year. Replant that stand in year 9.

Table 1. Number of Trees per Acre by Various Methods of Spacing

Spacing (feet)		Trees (number)	Spacing (feet)		Trees (number)
6 x 6	=	1,210	7 x 10	=	622
6 x 7	=	1,037	8 x 8	=	681
6 x 8	=	908	8 x 9	=	605
6 x 9	=	726	8 x 10	=	544
7 x 7	=	889	9 x 9	=	938
7 x 8	=	778	9 x 10	=	484
7 x 9	=	691	10 x 10	=	436

Weed Control

Weed control is critical, especially when trees are young. Weeds compete with Christmas trees for sunlight, moisture and nutrients. They also harbor pests such as mice, and they make movement around the plantation more difficult. The two most common weed control methods are herbicides and mowing. Often growers will use both methods. Herbicide applications are made to control weeds *in the row* and mowing controls weeds *between* rows. Typically, pre-emergent herbicides are applied in late winter to early spring, followed by a full spectrum chemical in the fall.

Herbicides are applied with a backpack sprayer or a tractor-mounted power sprayer. An acre of Christmas trees can be treated with a backpack sprayer in two or three hours.

Two to five mowings are required per summer. Usually, walk-behind rotary or sickle-bar mowers or small tractors are used. It takes one to five hours to mow an acre, depending on the machine, terrain, obstacles and quantity of vegetation.

Shearing

Shearing is another critical operation in producing high-quality trees. The objective is to create a full, well-formed tree with a straight central stem and a conical taper of about 70 percent. Remove any dead or competing top branches, prune the top of the tree to the desired height, and shear the sides of the tree to create the desire shape and density.

Shearing begins in the second or third year after planting and must be done each year thereafter. It is usually done in early summer within a

Hand shearing is very common, but labor intensive.

Larger bar-shearing machines give consistent results.

fairly narrow four- to six-week window, depending on the growth stage of the needles. Most species require one shearing per year.

An exception is Virginia pine, which grows in a multiple-flush pattern. This species requires two to four shearings per year. While more labor-intensive, Virginia pine grows faster and may produce marketable trees two to three years before other species.

The most commonly used shearing tools are hedge trimmers, hand-held knives or rotary cutting heads powered by a small gasoline engine or electric battery. Depending upon tree size, one worker can shear an acre in one or two days. Hedge trimmers are used on trees 2 feet and smaller, knives on 3- to 4-foot trees and power equipment on taller trees. Variations of this sequence are common.

Fertilization

Fertilizer can benefit certain tree species on some sites. However, fertilizer is not typically applied each year to Christmas trees except to Fraser fir in Virginia, North Carolina and Tennessee.

Complete (NPK) fertilizers are sometimes applied if the trees appear deficient or if soil testing indicates a low fertility level. Trees with properly balanced nutrients have longer, greener foliage, better growth rates and more resistance to insects, disease and air pollution.

If needed, fertilizer is usually applied in the spring at about the time of bud break, when trees begin a growth spurt. Granular fertilizer is typically hand-spread in 3-foot wide bands along the planting row. Fertilizer rates must be carefully controlled to prevent injury to the trees.

Pest Control

Like any other crop, Christmas trees are susceptible to a wide variety of insect, disease and animal pests. Some tree species are particularly susceptible to certain pests. Examples include tip moths on Scotch pine, Procerum root disease on white pine and balsam wooly adelgid on Fraser fir. Deer, mice, voles and rabbits can also damage trees.

Pest control should be considered only when the pest population has the potential to build up to a harmful level. Isolated or small outbreaks are best treated by hand removal and burning. When clipping off disease-infected branches, be sure to clean the tools after use with rubbing alcohol, to prevent spreading the disease to healthy trees. Sometimes control methods involve the use of insecticides, fungicides or rodenticides, while at other times a biological control method is better. Always follow the principles of integrated pest management and employ the safest, least-cost, lowest-impact treatment method.

Regularly inspect Christmas trees for pests.

Training Seedlings

At the beginning of each of the first two growing seasons, many trees will need *training* to grow straight. If two terminal leaders are present, the straightest and strongest should be chosen and the other clipped off. Also, study the terminal buds. Five to seven buds should be present (with pine).

A certain percent of the seedlings will display poor vertical development. Three-foot bamboo stakes can be pushed in the ground alongside the seedlings and used as a guide to tape the central branch. Use good-quality tape and attach at several locations to prevent loosening.

Basal Pruning

In most cases, the Christmas tree market is demanding that trees have a 10- to 12-inch trunk handle clear of branches. This makes the tree easier to place in the stand, to water and to place gifts under. Plus, it simplifies the job of harvesting the trees at maturity.

Just prior to third growing season, basal pruning is recommended. Using limb loppers or handheld shearers, trim the base of the tree up to the desired height.

Coloring

Many growers apply a colorant to trees during the year of harvest to enhance their appearance. Tree color often fades naturally after the first fall frost. Colorant, sprayed on the foliage with a backpack or power sprayer, imparts the deep green color that customers associate with healthy conifers. This practice is particularly common with white pine, Virginia pine and some Scotch pine varieties.

One worker using power equipment can spray an acre in approximately two days. Coloring is usually done in September and October, before the first frost. Only trees that are to be harvested should be colored, because new growth will require recoloring the follow the year.

Harvesting

You may harvest and market your trees in several ways. If you market trees on a choose-and-cut basis, you may need to hire on-farm sales personnel. With choose-and-cut operations, location and service to the customer are critical. The opportunity for value-added products, such as wreaths and crafts, also exits. If you sell trees wholesale, you probably will be responsible for cutting, baling, moving trees to a roadside loading facility and perhaps loading the truck. All these tasks are very labor-intensive and must be done during a short period in November.

A variety of tools is necessary to maintain Christmas trees.

Not all trees planted will be harvestable in the same year. Clearcutting an entire field is convenient, but not always practical. It may take two to three years to completely harvest a field, because some trees grow faster than others.

You may also sell balled trees as live Christmas trees or nursery stock. With this option, smaller trees can be harvested. Also the cost of shearing is less for trees sold as nursery stock. However, your field must have good, friable soil for digging and you'll lose a small amount of valuable topsoil with every tree sent to market. In addition, trees to be sold for the nursery trade are not sheared as heavily as Christmas trees.

Calendar of Silvicultural Practices

Common silvicultural practices for Christmas trees and the approximate time to perform them are listed here. Not all the practices are necessary to establish and maintain a healthy stand of trees for every situation.

Calendar of Christmas Tree Production Activities

What	When
Site preparation Apply pre-emergent herbicides Plant seedlings Fertilize established trees Stake and tape seedlings Apply insecticide to cut stump for weevil	Early spring
Mow & post-emerge herbicides Monitor for insects and diseases	Late spring
Shear trees Mow Monitor for insects and diseases Control grasses, weeds and brush	Early summer
Inventory saleable trees Order seedlings for next spring's planting Plan advertising, order signs Purchase liability insurance Attend growers association meetings	Mid-to-late summer

Monitor insects and diseases	
Apply colorant	
Confirm harvesting labor availability	
Repair and maintain harvesting equipment	Fall
Measure and tag trees for harvesting	
Begin to advertise	
Put up signs	
Purchase merchandising supplies	
Advertise	
Harvest trees	November
Market trees	December
Pay bills	
Watch for poachers	
Review records and adjust for next year	
Do taxes, accounts	
Order fertilizer, pesticides, tools, etc.	
Update mailing list for customers and vendors	
Clear brush, cut high stumps, culls	Winter
Attend winter association meetings	
Apply pre-emergent herbicides	
Plant seedlings	

Financial Analysis

Production Costs

Christmas tree production costs vary according to labor costs, equipment needs, tree species and regional growing conditions. This section presents representative production costs and returns.

Site Preparation

Site preparation costs depend upon the amount of preparation needed and the equipment used. Site preparation will require labor, herbicides, a chainsaw and spraying equipment. Costs range from $50 to $200 per acre. For very rough sites where a bulldozer is needed to remove rocks or stumps, costs could exceed $300 per acre.

Tree Planting

Tree planting costs include the cost of seedlings, labor and machinery (if a tractor is used). The cost of seedlings varies widely, depending upon whether seedlings are purchased from private or public nurseries. For example, commercially produced Fraser fir seedlings may cost $1,200 per thousand, while white pine seedlings produced at a state nursery cost less than $200 per thousand. Overall, total planting costs range from $200 to $300 per acre.

It is often necessary to replant some areas where seedlings from the previous year's planting have died. Replanting costs are often somewhat higher per seedling than initial planting costs. Assuming a 10 percent morality rate, replanting costs may range from $40 to $60 per acre.

Weed Control

Controlling weeds usually includes both mowing and herbicide application. Costs vary widely according to the number of mowings per year and the type of herbicide application used. Mowing costs range from $25 to $35 per acre per mowing (estimated three times per year) and herbicide applications range from $40 to $60 per acre.

Shearing

Shearing costs occur to some degree each year and will increase as the trees mature. For very young trees, shearing costs may be as low as $50

Small gasoline-powered shearing machine.

per acre, but this cost may increase significantly by the time trees are harvested. For Virginia pine, which requires multiple shearings per year, the cost will be much higher than for other species.

Fertilization

Fertilizer applications each year are not common, although some growers with low productivity sites fertilize routinely. A complete fertilizer such as 10-10-10 is most often used. Fertilizer and labor costs range from $40 to $60 per acre per application.

Pest Control

Insecticide applications my range from $50 to $250 per acre, depending upon the type of chemical and the number of applications needed. Costs for control of animal pests also vary widely. Fencing for deer may cost $300 per acre.

Coloring

Coloring trees is common, because consumers demand attractive trees. Costs include colorant, labor and spraying equipment. On average, coloring costs about $400 per acre. Costs for large trees may approach $1,500 per acre.

Advertising

Placing ads in local newspaper or trade journals is necessary in harvest years. Costs for these activities are quite variable. Generally, about 3 percent of gross sales is reinvested into advertising.

Harvesting

The harvesting process involves selecting and tagging marketable trees, cutting, transportation to roadside, baling, stacking and loading. If you sell wholesale trees, your obligations end at this point. If you wish to run your own retail operations, the cost of hauling the trees to a retail lot will be added. Harvesting can cost from $0.75 to $3.00 per tree. For an acre with 1,000 saleable trees, the cost ranges from $750 to $3,000. In choose-and-cut operations, the client normally cuts the tree, minimizing the grower’s expense.

Returns

Christmas trees can be marketed in a number of ways. The three most common are wholesale, retail and choose-and-cut. There are distinct advantages and disadvantages to each method. With the wholesale

method, the grower only needs to deliver harvested trees to a roadside location. The retail method involves set-up and maintenance of a temporary lot, usually in a town or city. The higher retail price must cover all additional costs, plus generate additional profit. Choose-and-cut sales operations allow customers to come to the farm, select their own tree and cut it down. This method does not require a retail lot, but does require sales people and much customer assistance. Table 2 provides a general comparison of the three selling methods. Within a given region, the information in Table 2 may not be exactly accurate. For example, competition may vary greatly depending upon the number of growers in an area and their marketing methods.

Table 2. Comparison of wholesale, choose-and-cut and retail selling methods.

	Selling Method		
	Wholesale	Retail	Choose-and-cut
Price of tree	low	higher	highest
Revenue	low	higher	highest
Production Cost	low	high	high
Marketing area	large	limited	limited

Prices paid for Christmas trees sold by these different methods depend upon tree species, size and location. White pine and Virginia pine tend to be comparably priced for equal quality trees, but species such as Fraser fir and spruce usually bring higher prices. Wholesale prices for pines often range between $7 and $14 for 7-foot trees. Choose-and-cut prices are higher, ranging from $20 to $40 per tree. Prices for tall trees can be significantly higher. Depending upon location, such trees on a retail lot may sell for $15 to $40 per tree. As a rule of thumb, trees sell highest in urban areas.

Evaluating the Investment

Tree crops are different from most agricultural crops, due to the long growing time needed to return profits. Many factors, such as inflation and interest rates, will have very important effects on profitability. For ex-

ample, inflation may result in future returns that appear large in today's dollars, but have low future purchasing power. Also, since interest rates are closely related to inflation, interest cost incurred or interest income foregone will vary with inflation rates. This is an important concern when considering investments that do not generate returns for many years.

Deciding whether Christmas tree production is a good investment will require careful consideration of production costs, expected returns and how much your time is worth. After all, trees take much longer to grow than traditional crops, and your money will be invested for many years. You must be committed to many years of hard work before you earn any money, and put up with risks from insects, diseases, fire and uncertain markets.

Returns must be discounted, because a dollar to be received tomorrow is not worth the same as a dollar received today. Whether a bird in the hand today is worth more than two (or even three) in the bush tomorrow depends upon your time preference for dollars today rather than dollars in the future. With an annual discount rate of 10 percent, you should be as satisfied to receive one dollar today as one dollar and ten cents next year.

Here are three measures to analyze an investment:

(1) Present Net Worth (PNW) is similar to the term "profit." The effects of inflation on expected returns over costs are removed, and returns are discounted to the present. An investment with PNW greater than zero is profitable.
(2) Annual Equivalent Value (AEV) is the Present Net Worth expressed as a constant annual return throughout the investment period. The AEV can be used to compare a tree-crop enterprise with field-crop returns on the same site.
(3) Internal Rate of Return (IRR) is the rate at which discounted revenues just equal discounted costs. An investment has good potential if the IRR exceeds rates from alternative investments with similar risk, timing and capital outlay.

What Happened to Virginia Ham and Louis Gumbo

Here are the stories of Virginia Ham and Louis Gumbo, two farmers who planted Christmas trees on marginal farmland. You can use their experience as a reference for estimating the cost of managing your plantation, but remember that no situation is ever "typical." Their costs are only estimates and will probably be different from your costs. See the Appendix for a detailed description of our assumptions. Also, note that equipment

costs were omitted from these examples. Equipment is often used for multiple purposes around a farm, other than for Christmas tree production.

Virginia Ham and Her White Pine Christmas Trees

Virginia Ham owned a 200-acre farm in Southwest Virginia. Beef cattle did not provide enough income or employment for her large family, so she decided to grow white pine Christmas trees on 20 acres of marginal cropland.

The site selected for the plantation was overgrown, but otherwise in good condition for tree planting. It cost Virginia $80 per acre to kill brush and weeds with an herbicide application.

Seedlings cost 18 cents each. She chose to plant the trees at a 6 foot by 7 foot spacing, or about 1,000 per acre. Between labor and seedlings, tree planting cost $220 per acre. Twenty percent of Virginia's seedlings died during the first year, so she had to incur replanting costs totaling $55 per acre. She controlled weeds both with herbicides and mowing. In each of the first six years, she spent $40 per acre on herbicide application. In years one, three and five, she also hit the weeds hard with a broad-spectrum herbicide, which cost an additional $60 per acre to purchase and apply. In years one through four, the cost of mowing each year was $100 per acre, while in years five through eight she cut back to a cost of $60 per acre.

Shearing was carried out in years two through nine. Shearing costs varied by the size and number of trees, varying from $13 per acre in year three to $200 per acre in year seven.

Virginia felt that fertilizer would be necessary for the trees to grow well in her poor-quality soil, so she applied a complete fertilizer in years three, five and seven. Each fertilizer application cost $55 per acre.

Pest control was harder than Virginia had expected. She had to apply insecticides for white pine weevils in years three through nine and for aphids in years five, seven and nine. In addition, all cut stumps were treated for weevils. Between the third and ninth years of her plantation, her pest control costs ranged from $50 to $250 per acre.

Virginia wanted her trees to look attractive to customers, so she applied colorant in the harvest years six through nine. Purchase and application of colorant cost $118 to $354 per acre. She opted not to stake and tape the seedlings, nor to basal prune.

The most desirable sales channel for Virginia was wholesale marketing, so she only spent a total of $1000 over years six through nine in harvesting, baling and transporting marketed trees. She was able to sell 75 percent of the trees in her plantation at an average wholesale price of $12 per tree.

Once her trees had been sold, Virginia wanted to see whether all her time and effort had been worthwhile. Was the Christmas tree plantation a good investment?

Over the growing period of Virginia's trees, inflation averaged 3 percent per year. Her marginal income tax bracket was 28 percent. She decided that 10 percent discount rate was a good estimate of her expected rate of return. Table 3 shows that her investment generated a profit after expenses and income taxes of $1,755 per acre. Considering her average cash expenditures of about $600 per acre per year, she felt that this was a good return over expenses. Even if she had expected a higher rate of return on her investment, the Present Net Worth looks very favorable. The Internal Rate of Return of 35 percent shows that she would break even if she demanded a very high rate of return.

Table 3. Financial Analysis of White Pine Christmas Trees

	Discount Rate (%)				
	6	8	10	12	14
Present net worth ($/acre)	$2,369	$2,042	$1,755	$1,501	$1,277
Annual equivalent value ($/acre)	$323	$297	$272	$247	$222
Internal rate of return	35%				

Comparing the average annual discounted return with row crops that could have been planted on the site, Virginia found that her investment returned $272 per acre per year. Although her time and expenses were high compared to row crops, she felt this proved the shrewdness of her investment decision.

Louis Gumbo and His Virginia Pine Christmas Trees

Louis Gumbo was a farmer in central Louisiana who wanted a profitable alternative crop for his 400-acre farm. He decided to plant 1000 Virginia pine Christmas trees per acre on some cropland that was not productive for field crops.

The site selected was overgrown, but otherwise in good condition. Louis spent $80 per acre to control weeds with a herbicide. Seedlings cost 11 cents each, and all planting costs totaled about $136 per acre. He lost 20 percent of his trees during the first year and replanted replacement seedlings at a cost of $35 per acre.

Since Virginia pine trees reach marketable size in only five years, Louis concentrated on weed control with herbicides in the first two years after planting. He spent $85 per acre per year on purchase and application of herbicides. Because Louisiana weeds grow fast, he mowed the plantation seven times per year at a cost of $233 per acre per year.

Shearing was a major task for Louis. Virginia pine trees require multiple shearings each year. Louis's shearing costs ranged from $35 per acre to $200 per acre.

Louis felt that his trees needed fertilizer every year, so he applied a complete fertilizer. His annual expenses for purchase and application ranged from $25 per acre to $55 per acre.

In Louisiana, major Christmas tree pests include pine tip moths and needlecast disease. Louis had some trouble with both of these pests, spending $50 to $280 per acre on pest control.

Some of Louis's trees reached marketable size in year four, so Louis applied colorant at a cost of $350 per acre. He applied colorant to the remaining trees before they were harvested in year five, at $250/acre.

Harvest expenses delivering trees to the wholesale delivery point were $466 per acre per year. Louis was able to market 75 percent of his trees at $10.50 per tree. Total returns for tree sales were $7,000.

Like Virginia, Louis wondered whether his investment had paid off. He also considered that inflation had averaged 3 percent per year, that his income tax bracket was 28 percent and that 10 percent was a good estimate of his expected rate of return on investments.

Table 4 shows that Louis's investment paid a healthy return. With a 10 percent discount rate, the Present Net Worth of his investment was $1,296. He had spent just over $4,600 and had received almost $7,000 in returns. The breakeven rate of return, represented by the Internal Rate of Return, reflects his profitability.

Table 4. Financial Analysis of Virginia Pine Christmas Trees

	Discount Rate (%)				
	6	8	10	12	14
Present net worth ($/acre)	$1,574	$1,429	$1,296	$1,172	$1,059
Annual equivalent value ($/acre)	$357	$337	$318	$299	$280
Internal rate of return	50%				

Assumptions in Analyses

1. Discount rates in tables represent before-tax rates, but calculations are based on after-tax. Therefore, an after-tax discount rate was used.
2. All costs except site prep, planting and replanting were expensed in the year that they occurred. The establishment costs (site prep, planting and replanting) were capitalized and recovered when trees were sold.

As a word of caution, it is not valid to directly compare the investments of Louis and Virginia. Each had different costs and growing conditions. An important differences is the length of their investment. Because of favorable growing conditions, and the multiple-flush habit of Virginia pine, Louis could market trees in only five years. Thus, he could turn his money over faster. Market conditions, the cost of production practices, and growing conditions should be considered carefully when selecting a tree species.

Note: the purchase and depreciation of equipment as well as land prices, property taxes, advertising costs, training seedlings and basal pruning were omitted from this analysis.

Evaluating Alternative Tree Crops on Your Farm

Dollar returns and rates of returns are important. However, they are not the sole criteria in deciding whether to invest in a tree crop. Your decision will be based on many factors. These include market conditions in your area, how quickly you need a return on investment and how much time and effort you wish to put into managing a crop that will take five to eight years to mature. You'll need to consider farm resources such as growing conditions, investment capital, labor costs and your own management ability. Only you know how your money and time are best spent.

The choice between tree crops also depends on the farm's resource base. For example, a particular species may offer a relatively high return per acre but requires a sizeable amount of up-front investment capital to establish the stand. If investment capital is a major concern, then a tree crop such as loblolly or white pine for timber production may be the best alternative.

Finally, risk should be considered. Numerous production problems such as weather, disease and insects can reduce the productivity of a stand. Also, costs vary widely. While the trees are less risky than many agricultural crops, lost income can be considerable if a total disaster occurs. You may want to work through a few examples yourself, varying price and production levels, to get a feel for this risk inherent in the tree crop.

Use Table 5 for information regarding the many factors that should be considered in the decision to grow a particular tree crop.

Table 5. Information Sources for Tree Crops Selection

Factor	Information Source
Geographic range of the tree crop	County forester
Site conditions – suitability for tree crop	County forester, Extension agent
Local market conditions	County forester, Extension agent
Initial investment cost	County forester, Extension agent
Time and effort required to grow the crop	County forester Extension agent
Soil conservation, wildlife and other benefits desired	County conservationist (NRCS) Extension agent
Insect and disease problems	County forester, Extension agent
Cost-share programs	County forester, FSA office
Harvesting and marketing	Private forestry consultants State growers association

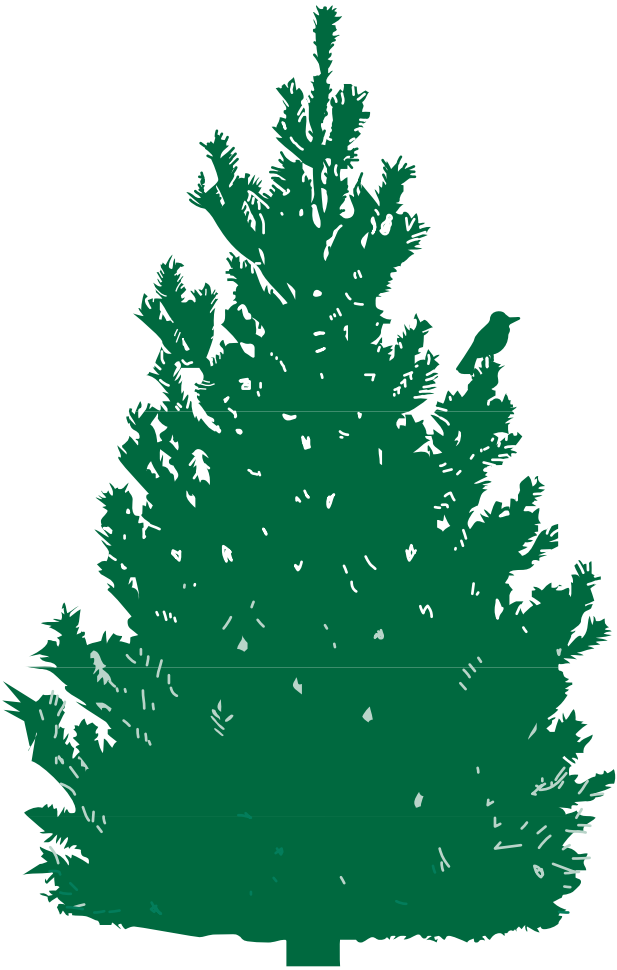
Other Benefits of Tree Crops

This guide has emphasized only the financial returns of tree crops. There are additional benefits and intrinsic values that result from planting trees. For example, wildlife are attracted to trees of all ages. Both game and non-game species of animals use plantations. A planting arrangement that increases habitat for wildlife can increase animal populations without a sacrifice of production.

Trees also prevent soil erosion. Eliminating soil loss enhances land productivity and water quality. By stopping sediment from entering streams, your water resources will be cleaner and therefore more suitable for fish and other aquatic species. Finally, tree crops screen the air and serve as a noise barrier. Again, proper design can maximize these benefits from your tree crop.

Moreover, most people enjoy the natural beauty only a tree or a forest can provide. The Chinese say, “Keep a green tree in your heart and perhaps the singing bird will come.”

Plant a tree crop today – and enjoy the many benefits for years to come.



Appendix
Assumptions Used for Financial Analysis

	Virginia Ham White Pine ($/acre)	Louis Gumbo Virginia Pine ($/acre)
Site preparation	$80 Hand-sprayed herbicide: $40 labor, $40 herbicides.	$80 (same as white pine)
Tree planting	$220, 6ft. by 7 ft. spacing, or 1,037 trees per acre. Labor costs: $40 seedling costs: $180	$136, 7 ft. by 7 ft. spacing or 889 trees per acre. Labor costs $38; seedling costs $98.
Replanting	$55 80% survival rate in first year Replacement of 208 trees/acre. Labor costs: $18; seedling costs: $37.	$35 80% survival rate in first year. Replacement of 178 trees/acre. Labor costs: $15; seedling costs: $20.
Weed control herbicides	Pre-emergent application in years 1-6 and broad spectrum application in years 1, 3 and 5. Year — Cost 1,3,5 — $100 2,4,6 — $ 40	Pre-emergent and broad-spectrum application in years 1 and 2 only, for a cost of $85 ea.
Mowing	3 mowings per year in years 1-4, and 2 mowings per year in years 5-9. Year — Cost 1-4 — $100 5-9 — $60	7 mowings each year. Annual cost of $175.

Shearing	Depends upon labor, size of trees, and number of trees. Year — Cost 2 — $25 3 — $60 4 — $90 5 — $150 6 — $175 7 — $200 8 — $175 9 — $ 90	Depends upon labor, size of trees and number of shearings. Year — Cost 1 — $50 2 — $150 3 — $200 4 — $150 5 — $75
Fertilizing	Application of 200 lb./acre of 10-10-10 in years 3, 5 and 7 at a cost of $55.	300 lbs./acre of 8-24-24 applied in year 1, followed by annual applications of complete fertilizer. Year — Cost 1 — $55 2 — $30 3 — $25 4 — $25 5 — $25
Pest control	Application of insecticides for aphids in years 5, 7 and 9 at a cost of $.24 per tree; applications for white pine weevils in years 3-9 at a cost of $0.06 per tree; and applications to all cut stumps for pales weevils at a cost of $0.06 per tree. Year — Cost 3 — $54 4 — $54 5 — $249 6 — $54 7 — $228 8 — $ 48 9 — $ 62	Application of insecticides for pine tip moth and fungicides for needlecast disease. Year — Cost 1 — $50 2 — $100 3 — $280 4 — $280 5 — $280

Coloring	$0.75 per tree Year Cost 6 $118 7 $296 8 $354 9 $75	$0.75 per tree Year Cost 4 $350 5 $250
Harvesting	Trees are harvested in years 6-9, with costs incurred for cutting ($0.20/tree), baling ($0.50/tree) and transporting to loading areas ($0.25/tree). Year Cost 6 $133 7 $333 8 $400 9 $134	Trees are harvested in years 4 and 5, with same costs as for white pine. Year Cost 4 $466 5 $460
Returns	Trees are sold wholesale at a price of $12 per tree; 75% of trees are saleable. Year Cost 6 $1200 7 $3000 8 $3600 9 $1200	Same conditions as white pine. Year Cost 4 $3,497 5 $3,497

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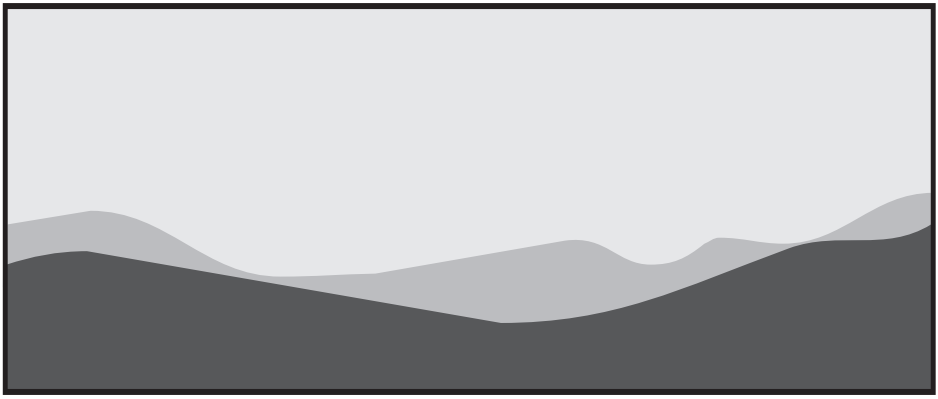

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