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**A LOOK AT ECONOMICS IN THE PRODUCTION OF
CHRISTMAS TREES
IN NEW YORK STATE**



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UNITED STATES PRODUCTION OF CHRISTMAS TREES

One Christmas tree for about every five members of the population is used annually in the United States. About one-fourth of these trees are imported (mostly from Canada). Another one-fourth are produced in the lake states of Michigan, Wisconsin and Minnesota (Table 1). The next important source is the Pacific Coast and Northwest region. The Northeast and Mid-Atlantic States region is fourth in importance with 16 per cent of the trees sold in the country.

Table 1. UNITED STATES PRODUCTION AND IMPORTS OF CHRISTMAS TREES
By Regions, 1962

Region	Number of trees (millions)	Per cent
Lake States (3)	11.4	26
Pacific Coast and Northwest States (5)	8.2	19
Northeast and Mid-Atlantic States (11)	6.8	16
Southern States (14)	3.7	8
All Other States (14)	3.3	8
Imported (mostly from Canada)	<u>10.1</u>	<u>23</u>
Total	43.5	100

SOURCE: Journal of Forestry, Vol. 61, No. 11, November 1963.

Over one-half of the United States 1962 crop came from land owned privately by farmers. Federal, state and county-owned land produced 15 per cent of the crop, and the remainder came from land owned privately by non-farmers (Table 2).

Table 2. UNITED STATES PRODUCTION OF CHRISTMAS TREES
By Type of Land Ownership
1962

Ownership of land from which trees were produced	Number of trees (millions)	Per cent
Private farm	18.0	54
Private non-farm	10.4	31
Public: state and county	4.0	12
federal (national forests)	<u>1.0</u>	<u>3</u>
Total	33.4	100

SOURCE: Same as Table 1.

In recent years production of Christmas trees from managed plantations has increased more than that from wild or natural stands. However, the latter remains the dominant type of operation in the industry (Table 3).

Table 3. UNITED STATES PRODUCTION OF CHRISTMAS TREES
By Type of Operation, 1955 and 1962

Type of operation	1955 Production		1962 Production	
	Per cent	Number trees (millions)	Per cent	Number trees (millions)
Wild or natural stands	87	22.1	62	20.7
Plantation	<u>13</u>	<u>3.3</u>	<u>38</u>	<u>12.7</u>
Total	100	25.4	100	33.4

SOURCE: Same as Table 1.

As more of the Christmas trees come from plantings, a larger proportion are species especially suited to plantation production. For example, in 1948 Scotch pine was sixth in importance and accounted for four per cent of United States production of Christmas trees. In 1962 this species was in first place and accounted for 21 per cent of national production (Table 4). A large portion of these trees came from plantings in the Lake States region.

Table 4. UNITED STATES PRODUCTION OF CHRISTMAS TREES
By Species, 1962

Species	Number trees (millions)	Per cent
Scotch pine	7.1	21
Douglas fir	6.9	20
Balsam fir	5.1	15
White and black spruce	3.2	10
Norway or red pine	3.5	10
Eastern red cedar	2.2	7
All others	<u>5.4</u>	<u>17</u>
Total	33.4	100

SOURCE: Same as Table 1.

Douglas and balsam fir together made up about 35 per cent of Christmas tree production in the United States in 1962. A large portion of these trees came from the Pacific Coast and Northwestern region. Fir and Scotch pine together accounted for over half of the total production.

CHRISTMAS TREES IN NEW YORK STATE

Large acreages of land in New York State have gone and continue to go out of use by farmers for the production of crops. This land is not sufficiently responsive to modern agricultural techniques, and farmers are not able to make typical enterprises pay. As this land becomes idle, farmers are often joined by a wide variety of non-farm people in the search for alternative paying uses. Growing Christmas trees on a commercial basis is a popular use being tried at the present time. Although a considerable industry has been built around this enterprise, little is known about the actual degree of success of individuals in Christmas tree production.

The purpose of this report is to provide information which will help answer such questions as:

- (1) What can one expect in the way of long-run return from Christmas trees on land which is no longer suited to more common types of farming enterprises?
- (2) What kind of work is involved and how much time and money must one spend to get a plantation into production? How large a plantation is necessary for an efficient enterprise?
- (3) Over the years what will be the natural hazards or risks of such an investment?
- (4) How long after starting can one expect to have some income from the operation?

DESCRIPTION OF THE STUDY

The remainder of this report is based on a study initiated in the spring of 1963. Thirty-five Christmas tree growers were interviewed and answered questions concerning their experience with Christmas trees. Twenty-two of these growers had sold at least 1,000 trees in 1961 or 1962 and were able to give specific cost and return information from their records and experience.

The specific objective of this study was to determine the economic feasibility of producing Christmas trees commercially on land in New York State which could be considered obsolete for more typical agricultural uses. Certain aesthetic, recreational and other similar values may be derived from rural land ownership and operation of a Christmas tree plantation. These were not considered; instead it is left to the individual to consider what part of the costs should be offset by such values. In this analysis all costs directly related to the operation of a plantation were charged against the sale or potential sale value of Christmas trees.

It was not a purpose of this study to consider the proper soils, site, species, etc., nor the best production, harvesting and selling practices to employ in a Christmas tree operation. However, an attempt was made to observe the economic effect of grower-experienced variation in some of these practices. Further, no consideration was given to the tax advantage through capital gains treatment of tree sales.

Some cautions with respect to drawing conclusions from the results of this study should be observed. The growers who reported the information summarized here can be considered as a group to be more interested and successful in the business than the average of all those who have made an attempt at growing trees in New York State in the past ten to fifteen years. The study does not include information from plantings that failed to produce any income because of low survival, poor seedling stock, neglect until the trees "got away" or any one of many other reasons. Because it was desirable to study plantings made about ten years ago in order to get a complete cost and return cycle, many of the costs experienced would be different than the costs likely to be experienced on more recent plantings. For example, more costly seedlings and pruning methods have been used in recent years. On the other hand, better survival rates can be obtained now because of improved techniques. Although the demand for high-quality trees has remained strong, sales of lower quality trees at good prices have become harder to make in recent years. Thus, the average returns may be lower now than in the past unless more effort is made to produce a high yield of good-quality trees.

DESCRIPTION OF THE OPERATIONS STUDIED

For the twenty-two Christmas tree operations which were studied no one grower could be singled out as devoting his full time to growing Christmas trees. However, there were plantations which produced a net income sufficient to be considered a living for one operator. These plantations were owned by a group of people or as a subsidiary of some other business.

Seven of the growers interviewed were retired from non-farm occupations and spent the majority of their active time with Christmas trees. A few worked with trees on a full-time basis but had nursery or timber operations in addition to Christmas trees. One grower was a full-time farmer with Christmas trees as one of his cash crops. Other occupations were professional forester, lawyer, laborer, school teacher, engineer and contractor.

The twenty-two growers combined owned approximately 3,407,000 living Christmas tree stems at the beginning of 1963. This is an average of about 155,000 stems per operation. The range was 17,000 to about one million. The average grower sold about two per cent of 3,000 of his stems for Christmas trees each of the years 1961 and 1962.

The average grower had his operation on about 300 acres of what was generally considered marginal farm land. Of this 300 acres about one-third or 100 acres was used for Christmas tree production and another one-third was considered waste land. Of the rest about 75 acres was either planted to other trees or considered timberland of some sort. The remaining 25 acres was open land to be planted to trees.

On each grower's plantation one block of trees where at least some Christmas tree harvesting had been done was selected for study. These blocks ranged in size from one to 52 acres and averaged 13 acres. In some cases the block studied was the entire plantation; in others it was a small part of the overall operation. On blocks where underplanting toward the end of the production cycle was practiced, the costs and returns on the new growth were not included. On the average, growers estimated that slightly less than one-half of the trees originally planted in these blocks would be harvested (Table 5). The rest had been or would be lost because of non-survival and culling. Of the trees sold or saleable from the blocks studied, about 40 per cent had been sold and 60 per cent remained on inventory as saleable trees at the time the study was made. The average age of the blocks at the time of the study was ten and one-half years. These growers were taking on the average considerably more than ten years to complete a production cycle. However, some using Scotch pine and others practicing underplanting had completed production cycles in six to eight years.

Table 5. USE OF TREES PLANTED IN NEW YORK PLANTATIONS
22 Operations, New York State, 1963

Trees	Number of trees per acre
Trees sold	287
Saleable trees left	<u>409</u>
Total trees salvaged	696
Trees lost (culls and dead trees)	<u>854</u>
Trees originally set	1,550

Several growers reported sales of boughs and nursery stock as by-products of Christmas tree production. Others had sold timber that was on the land purchased for planting trees. This enabled them to recover part of their investment, and in some cases all of it, before selling any Christmas trees. Many felt that the increase in land values had been an important part of the return on their investment. All growers reported the per-acre cost or value of the land in the block studied at the beginning and the end of the period studied. This value averaged \$16 at the beginning and \$38 at the end, both values being for land free of trees. This represents an average increase in value of \$22 per acre or \$2.10 per acre per year for the period studied. This increase is about equal to the taxes and interest on the beginning land value calculated and shown in the next section under growing costs.

In some cases the land involved had been purchased for speculative purposes and used for growing trees as the investment matured. In other cases Christmas tree plantings were a sideline to large plantings of trees for timber or as ground cover or other conservational or recreational purposes. In the majority of cases the primary purpose of the operations studied was to produce plantation Christmas trees on a commercial basis.

GROWING COSTS

The costs in developing a block of Christmas trees for market occur over a much longer period of time than most crops. These costs are demanding in that if the trees are neglected for a year or two, practically all of the investment is lost. Failure to observe this demand for continuous investment 8 to 10 or even 15 years before a return is realized, has caused the abandonment of many plantations at considerable expense to over-enthusiastic growers.

For the purpose of illustrating the growing costs, two main categories were used. The first was called variable costs and included the annual improvement costs such as materials (mostly seedlings), labor (including the operator's time), tractor and car or truck mileage. These vary according to the decisions of the operator. The second was called fixed costs and included the cost for land, equipment and small tools, buildings and improvements such as roadways, ditches, bridges, etc., as well as miscellaneous overhead. These costs would continue regardless of the wishes of the farmer. Interest was compounded annually on all of these costs and charged as a growing cost.

Since this study was made on blocks planted when free trees were available from state nurseries, materials were a small part of the costs. Labor for planting, pruning, brush control, etc., made up the largest part of the annual costs with car or truck mileage to and from the plantation representing a considerable share also.

As was mentioned, the average grower had about 13 acres in the block studied and reported costs over an average period of about ten and one-half years. The growing costs for seedlings, pruning and other labor, etc., averaged \$278 per acre, or about \$26 per acre per year.

The growing costs for land, buildings and roads, etc., came to \$46 per acre, or about \$4 per acre per year (Table 6).

Compound interest on all growing costs for the entire period averaged \$73 per acre, or \$7 per acre per year.

Table 6.

AVERAGE GROWING COSTS
IN THE PRODUCTION OF PLANTATION CHRISTMAS TREES
22 Operations, New York State, 1963

Items	Per acre total for 10.5 years	Per cent	Per acre per year
Variable costs:			
Materials (mostly trees)	\$ 9	2	\$ 0.89
Labor	222	56	21.16
Truck or car	35	9	3.30
Other	<u>12</u>	<u>3</u>	<u>1.03</u>
Total seasonal	\$278	70	\$26.38
Fixed costs:			
Land	\$ 8	2	\$ 0.63
Taxes	11	3	1.04
Equipment and small tools	17	4	1.62
Overhead	<u>10</u>	<u>3</u>	<u>0.97</u>
Total fixed	\$ 46	12	\$ 4.26
Compound interest on all costs	<u>\$ 73</u>	<u>18</u>	<u>\$ 7.00</u>
Total growing costs	\$397	100	\$37.64

The variable costs were a little higher in the early and later years. Labor and materials for planting caused the high cost in the early years, and high labor requirements for final pruning on marketable trees was the cause of the higher cost in the later years (Table 7).

Fixed costs increased every year throughout the period. This was caused by the increased use of equipment, tools and overhead items as the block of trees became older.

Although taxes generally increased over this period, it was difficult to get the data, and the latest annual tax bill reported by the farmers was used. The land cost in total only amounted to five per cent of the total growing costs.

Interest on investment increased from \$2 to \$13 per acre in the first eight years as the investment in the plantation increased over the years. As early returns from boughs and the like reduced the investment in the plantation, the annual interest charge declined. Although interest was not a cash or out-of-pocket cost, it represented a return which could have been received if the investment of time and capital had been in other productive endeavors. It was second to labor in its importance as an item of cost.

Man hours for growing the trees, including that of the operator, his family and hired labor, totaled 119 hours per acre over the 10.5 year period (Table 7). The first year's work, including planting, took 13 hours per acre. Few hours were required thereafter until the trees reached a stage where trimming was needed. The amount of growing labor needed each year decreased as the harvest commenced and the number of trees to trim was reduced.

Table 7.

COSTS AND RETURNS PER ACRE BY YEARS
IN THE PRODUCTION OF PLANTATION CHRISTMAS TREES
22 Operations, New York State, 1963

Costs	First year	Second year	Third year	Fourth year	Fifth year	Sixth year	Seventh year	Eight year	Subsequent years	Average total for 10.5 yrs.
Number of blocks	22	22	22	22	22	22	22	21	20	-
Average acres per block	12.9	12.9	12.9	12.9	12.9	12.9	12.9	12.6	11.9	-
Man labor per acre:										
Hours to grow	13	9	9	9	11	12	13	16	27	11.9
Variable costs:										
Materials (trees)	3.40	3.87	0.52	-	0.09	-	0.22	0.35	0.63	9.08
Labor (includes owner)	22.67	18.26	17.60	17.21	20.47	21.73	22.67	26.74	55.17	222.52
Truck or car	3.22	3.22	3.39	3.39	3.39	3.39	3.39	3.64	8.01	35.04
All other	0.88	0.76	1.10	1.08	1.18	1.21	1.28	1.46	2.83	11.78
Total	30.17	26.11	22.61	21.68	25.13	26.33	27.56	32.19	66.64	278.42
Fixed costs:										
Land (taxes, interest, etc.)	1.86	1.86	1.86	1.86	1.86	1.86	1.86	2.04	3.36	18.42
Equipment and tools	1.50	1.53	1.64	1.59	1.66	1.67	1.98	2.33	3.26	17.16
Overhead	0.80	0.80	0.82	0.82	0.82	0.98	1.16	1.73	2.38	10.31
Total	4.16	4.19	4.32	4.27	4.34	4.51	5.00	6.10	9.00	45.89
Interest	-	2.06	4.00	5.86	7.77	9.85	11.95	13.03	18.95	73.47
Total grow cost per acre	34.33	32.36	30.93	31.81	37.24	40.69	44.51	51.32	94.59	397.78
Gross returns:										
Sales	-	-	-	-	3.51	6.58	30.68	87.36	236.87	365.00
Value saleable trees	-	-	-	-	-	-	31.70	30.25	224.05	286.00
Total	-	-	-	-	3.51	6.58	62.38	117.61	460.92	651.00

Because the growing costs were distributed over the entire block, it was impossible to separate the cost per tree sold from the cost per tree remaining in the block to be sold. To get a per-tree figure the costs were divided by the total of trees sold and trees remaining to be sold. The variable growing costs amounted to \$0.40 per tree and the fixed growing costs \$0.065 per tree. Compound interest on all growing costs came to \$0.105 per tree making the average production cost \$0.57 per tree sold or saleable at the end of the period studied. On this basis a per-tree figure may be of limited use since the growing and development costs reported were concentrated on the trees actually sold, particularly in the later years studied. Therefore, the average growing cost per tree actually sold would be somewhat greater than \$0.57.

HARVESTING AND SELLING COSTS

Harvesting and selling costs must be added to get the total cost involved in producing a tree. It should be emphasized here again that these costs are the average for a group and were experienced over a ten-year period in the past. They should be adjusted for specific situations and unusual circumstances for the increase in costs which have taken place in recent years, particularly the cost of seedlings and pruning. On the other hand, investment in better seedlings and more intensive production techniques should increase the yield and quality of saleable trees.

Harvesting costs were calculated on the trees actually harvested of which most were sold. Eight of the twenty-two growers sold their trees on the stump and had no harvesting costs. The other fourteen had an average harvesting cost of \$59 per acre on the blocks studied or \$0.20 per tree harvested and sold. Several growers contracted their trees harvested for \$0.20 to \$0.25 per tree. Others who baled and loaded and hauled their trees had harvest costs up to \$0.50 per tree. Still others did only the cutting and some assembling for as little as \$0.05 per tree. These costs include making buyer contacts and other selling expenses.

RETURNS

Two categories of returns were made, one being the actual cash received from the sale of trees and boughs and the other being the value of saleable trees left at the end of the period studied.

Many different types of sales were represented in the returns reported; the most common being sales on the stump, wholesale at roadside or delivered. There were some retail sales at the farm or at retail lots.

Prices ranged from \$0.63 to \$2.00 per tree and averaged \$1.27.

The on-stump value of saleable trees remaining in the block at the end of the period studied was estimated by each grower and ranged from \$0.33 to \$1.55 per tree depending on stage of development and averaged \$0.70 per tree. The average value of the trees produced during the period studied whether sold or still standing was \$0.94 per tree.

The gross and net returns obtained per acre and per acre per year by the average grower are summarized in Table 8 along with the growing costs. Harvesting and selling costs are on trees actually harvested but are divided by total acres and total years studied to show net returns.

Table 8. GROSS AND NET RETURNS IN THE PRODUCTION OF CHRISTMAS TREES
22 Operations, New York State, 1963

Average 13-acre block	Per acre for 10.5 year period	Per cent	Per acre per year
Returns:			
Cash from trees sold	\$365	56	\$34.76
Value trees left	284	44	27.14
Other	<u>2</u>	<u>-</u>	<u>0.17</u>
Total	\$651	100	\$62.07
Growing cost	397		37.81
Harvesting cost (for trees sold)	<u>59</u>		<u>5.62</u>
Total	<u>456</u>		<u>43.43</u>
Net returns	\$195		\$18.64

Allowing for the value on the stump of the trees not harvested, the average grower made a net return from his plantations of about \$195 per acre or about \$19 per acre per year.

The net gain per saleable tree averaged \$0.13 with a \$0.70 per-tree value of saleable trees and a growing cost per tree of \$0.57. The net gain per tree sold was \$0.50. This was with a \$0.57 growing cost, a \$0.20 harvesting cost and a \$1.27 gross return per tree sold. The average net return per tree sold and saleable was \$0.28.

RELATIONSHIPS NOTED

There are a number of factors that affect the profitableness of a Christmas tree enterprise. These are generally based on the quality of the resources used and the management of the use of the resources. To study these relationships the 22 growers were divided into three groups representing the high, medium and low number or value.

Total Living Stems, 1963

Some farmers had fairly large Christmas tree businesses, while others were small. The range in total number of trees on the plantations studied was from 17 thousand to one million.

Table 9. NUMBER OF LIVING STEMS
22 Operations, New York State, 1963

Number of stems	Number of growers	Average number of stems per grower	Net returns per acre per year
High	7	359,571	\$36
Medium	8	85,000	22
Low	7	30,071	16

Generally those with large enterprises were more successful than their smaller competitors. Growers with plantings averaging 360 thousand trees at the time of the study made a gain of \$36 per acre. The eight farmers who had an average of 85,000 trees in their plantations made a gain of \$22 per acre per year. The smaller enterprises, averaging 30 thousand trees, made a gain of \$16 per acre. There was, of course, variation within each group. Some growers with large enterprises were much more successful than others.

Value of Land

Although Christmas trees can be grown on land that because of topography or location is not well suited for other agricultural enterprises, the quality of the land as measured by the value at the time of starting the plantations had an important bearing on the results.

Land that had a value averaging \$20 per acre at the outset produced trees well enough to give the farmers a gain of \$55 per acre for each year that the land was devoted to trees. Five-dollar-an-acre land did not do so well. Growers on that kind of land did not recover all costs. If they had had to pay the market price for all of the inputs, they would have lost an average of \$14 per acre for each year the crop was planted.

Table 10. BEGINNING VALUE OF LAND
22 Operations, New York State, 1963

Value per acre	Number of growers	Average value per acre	Net returns per acre per year
High	7	\$20	\$55
Medium	8	11	32
Low	7	5	-14

Trees Set per Acre

There was a wide variation in the number of trees planted per acre. The lowest was just under 1,000 while the highest was 2,400.

Table 11. TREES SET PER ACRE
22 Operations, New York State, 1963

Number of trees	Number of growers	Net returns per acre per year
High	7	\$80
Medium	8	- 9
Low	7	8

Farmers with medium to low numbers of trees grown per acre of plantations made little or no profits. On the other hand, growers with high tree populations made returns comparable with some of the better agricultural crops in the State. The seven growers with the largest number of trees per acre of plantation had a gain over costs of growing and harvesting that amounted to \$80 per acre for each year the plantation was growing.

Per Cent of Trees Set That Were Marketed or Marketable

It is one thing to plant trees and another to get them to marketable age in a saleable condition. Some plantations are well tended while others are "let go". Whatever the cause for "letting the plantings go" it was costly.

The range in marketable trees which had been harvested or could be harvested per acre was wide. The lowest percentage was 15. The highest was 90.

The farmers who harvested 77 per cent of the trees they planted made a gain of \$41 per acre per year. Even with only half of the trees saved the gain was \$34. Those growers who lost all but about 20 per cent of their trees could expect little or no gain from planting trees.

Table 12. PER CENT OF TREES SOLD
OR TO BE SOLD
22 Operations, New York State, 1963

Per-centage	Number of growers	Per cent of trees salvaged	Net returns per acre per year
High	7	77	\$41
Medium	8	47	34
Low	7	22	- 2

Value per Tree Sold

One would expect price to be related to profits and the experience of these growers bore that out. The seven growers who sold their trees "well", averaging \$1.74 per tree, made a gain per acre of \$49 for each year that the land was in trees. With a low price of \$0.85 per tree the gain per acre per year was only \$7 or one-seventh as much.

Table 13. VALUE PER TREE SOLD
22 Operations, New York State, 1963

Value	Number of growers	Average value per tree	Net returns per acre per year
High	7	\$1.74	\$49
Medium	8	1.24	18
Low	7	0.85	7

The lowest price for which trees were sold was \$0.75; the highest was \$2.00. The quality of the tree, the location of the plantation, the type of buyer and the place of sale all had a bearing on the price received.

GROWER OPINIONS ABOUT THE INDUSTRY

All growers interviewed were asked several specific opinion questions in hopes of getting the general opinion of experienced producers on points that might help new and established growers with production decisions.

All twenty-two growers were asked if they had purchased land specifically for planting trees. Nineteen answered yes and three said no. The latter three already owned the land before the idea of planting Christmas trees came to them.

When growers were asked if profit was the primary motive for growing Christmas trees, again nineteen answered yes and three answered no. These three gave hobby or recreation as their primary motive. Hobby or recreation was also the most common secondary motive of the other nineteen growers.

When asked if Christmas tree farming had measured up to original expectations, there were thirteen no answers and nine yes answers. The most common reason for dissatisfaction was the lack of sufficient net return. This in turn was blamed on the lack of information on production techniques at the start of their venture. Further evidence of this reason was the seventeen yes to five no answers when they were asked if they had encountered growing difficulties greater than expected.

Only six of the twenty-two growers said they had marketing difficulties. These problems were mostly with uncouth buyers or low quality trees.

Most growers were satisfied with their Christmas tree operations in spite of their problems and unfulfilled expectations. Eighteen said they would grow trees again if they had the decision to make over. Also, eighteen out of the twenty-two said no when asked if they wished to sell out at a reasonable price. But, as evidence that optimism was not extremely high, only three said they intended to expand their present operations. The other nineteen intended to maintain present size.

When asked if all the trees could be sold if their operation was greatly expanded, fifteen said yes and seven said no. However, both answers were often qualified in that the trees produced would have to be high in quality. The same qualification came with answers to the question of whether the plantation Christmas tree industry is presently over-producing. Only three said yes, two did not know. Seventeen said no, and sixteen of these said there was room for expansion by present growers or entry of new growers.

When asked their opinion about New York State's regional advantage over other Christmas tree producing areas in the United States and Canada, fourteen felt New York had the advantage of being close to large population centers. Six felt that other areas could produce cheaper or were closer to markets than the tree producing areas of New York State. The other two did not offer an opinion.