ECONOMIC COSTS, RETURNS, CASH FLOW, AND

INVESTMENT DECISIONS FOR ESTABLISHING

AN IMPROVED VARIETY PECAN ORCHARD

IN OKLAHOMA

By

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Stillwater, Oklahoma

1984

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CHAPTER I

PROBLEMATIC SITUATION

Introduction

The farming industry has changed dramatically during the last
decade as cultural and technological innovations have become more
advanced. Technology has been labeled as a major cause of
disequilibrium in agriculture and results in depressed prices and
income for farmers as output expands at a greater rate than demand
(Tweeten, 1979). The depressed agricultural situation has caused many
Oklahoma farmers to diversify their operation by adding an alternative
crop enterprise. One possible alternative to increase farm income is
to add to the farm enterprise an already established industry in
Oklahoma, improved pecans.

There are two broad types of pecans produced in Oklahoma:
improved pecans and native or seedling pecans. Improved pecans are
from seedling pecan trees that have been budded and grafted or top
worked. They are usually characterized by their thinner and softer
shells and are larger in size than seedlings. Native or seedling
pecans are usually thicker shelled and of smaller size than improved
pecans. Complete development of the pecan industry has been delayed
due to the lack of background information, experience, and
understanding of economic analysis regarding the industry and its
potential.

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Detailed economic analysis of pecan production in Oklahoma has not been completed. However, a study by the Noble Foundation, Red River Demonstration and Research Farm examines the costs and returns to a pecan enterprise for one year of production. Also researched by the Noble Foundation, were the per acre costs and returns of a pecan enterprise for 1985 to compare that data with an 8-year average (1977-84). A study by Pena and Trimble (1987) looks at a pecan orchard, in Texas, using a 50 acre model and a 20 year life to identify key economic considerations. Pena and Trimble conclude that a longer than 20 year investment horizon would make pecans a more profitable enterprise. They also state that a larger economic unit would provide economies of scale advantages by increasing the utilization of the equipment.

For farmers to understand the economic implications of pecan production, information is needed in order to assess the economic costs and returns of pecan production. Economic costs are the values of the alternative uses or other opportunities which have to be foregone in order to achieve a particular end. Economic returns can be defined as any return above the economic cost. Information on potential cash flow is an important tool for forward planning activities. A considerable investment is made in machinery and equipment as well as preproductive expenses before a return is realized. A cash flow budget is a way to manage the timing of income and cash outflows and estimate future borrowing needs. Information from the cash flow budget can be used to determine the feasibility of establishing pecan production using capital budgeting techniques. Capital budgeting considers the time value of money or the effects of

time on financial decisions. Enterprise and cash flow budgets can help the producer understand the cost and return likely to be involved in producing and selling pecans.

Objective Statement

This study analyzes the economics of establishing a new improved variety pecan orchard and operating it using intensive pecan management practices to improve farm incomes. The specific objectives are to:

1. Develop budgets of the costs and returns obtained from an improved variety pecan orchard each year from establishment to full production.

2. Determine the potential income that could be received from pecan production by using a forward planning tool.

3. Determine the profitability of developing and operating a pecan orchard through capital budgeting analysis.

4. Determine the sensitivity of the investment decision to changes in pecan prices, interest rates, wage rates, and owner's equity infusions.

Hypothesis

Oklahoma pecan production can realize a return to labor, management, and equity capital comparable to returns elsewhere if recommended marketing and production management practices are followed.

Procedures

Enterprise budgets will be developed for pecans showing annual costs and returns each year from establishment to full production. These budgets showing costs and returns of producing and selling pecans on a monthly basis can help growers to formulate a better management program.

A long-term cash flow statement will be developed from the budgets to show the financial impacts of developing and operating a pecan orchard. The financial feasibility of the representative orchard will be determine by two economic criteria which are net present value - future cash flows discounted at various rates and internal rate of return - equates the present value of the expected future cash flows or receipts to the initial cost outlay. These economic criteria will be used to generate useful information for accepting or rejecting the investment.

Scenario's will be developed, using the cash flow budget of the representative orchard, to determine the sensitivity of the investment decision to changes in pecan prices, interest rates, and wage rates. Four combinations of initial owner's equity and annual inflows of owner's equity will be analyzed to determine the influence of alternative levels of owner's equity contribution.

CHAPTER II

EVALUATING LONG-RUN INVESTMENT DECISIONS

Interest in alternative crop enterprises is increasing in
response to the current agricultural situation. An untapped income
source for many producers is believed to be pecans. In 1985 there
were one million pounds of improved pecans sold at an average price of
85 cents per pound (Texas Agricultural Experiment Station, March
1986).

An improved pecan orchard investment is capital intensive and a
long-term investment. Returns are not realized for seven years after
the establishment year. Depending on the management and cost factors,
several additional years will probably pass before any positive
returns are obtained.

Economic principles and budgeting are the primary tools for
planning and decision making. This study will apply enterprise
budgets, cash flow budgets, and capital budgeting analysis to
determine the feasibility of establishing a position in a capital
intensive industry, improved pecans.

Enterprise Budgets

An enterprise is defined as a single crop or livestock commodity
being produced on a farm. An enterprise budget is a listing of all
expected income and expenses associated with a specific enterprise to

provide an estimate of its profitability (Kay, 1981). Enterprise budgets generally contain three sections: income, variable costs, and fixed costs. Enterprise costs and returns vary from one farm to the next and over time for any particular farm. Variability stems from differences in capital, labor, machinery resources, type and size of machinery complement, cultural practices, size of farm and enterprise, crop and yield, input prices, and commodity prices.

Budgets can be a very useful guide for determining the profitability of producing a certain commodity. But, representative budgets will not be accurate for any particular farm. Two farms with different resources producing the same crop will probably have a different total cost and total return.

In addition to this variability, the annual enterprise budget is difficult to develop for multiyear crops. The enterprise budget is geared for one year of established planning. In this study, an establishment budget plus a planning horizon of forty years is analyzed. Not included in a one-year crop enterprise budget is the annual interest cost on the accumulated previous establishment cost. In this study, the interest cost is calculated for years zero to seven then for years eight to thirty-two the total accumulated establishment cost for years zero to seven is amortized. It is also hard to take into account capital expenditures and associated tax implications in the enterprise budgets, therefore, the budgets may show a dimmer picture than is actually realized. Enterprise budgets can be reasonable guides to planning but are not the total answer for a long-run investment decision.

Cash Flow Budgets

A pecan orchard involves large outlays of capital during its life. A cash flow statement provides the mechanism for continual monitoring of the performance of the firm. It should provide an early warning system concerning the source of potential problems that might result in unacceptable performance (Boehlje and Eidman, 1984). A typical farm cash flow statement includes all sources and uses of cash. The sources are:

Beginning cash

Cash receipts from crops and livestock

Sale of capital items

Nonfarm income

Reduction in savings, stocks, and bonds

New borrowing

Outside equity in the form of gifts, sale of stocks, etc.

The uses of cash are:

Farm operating expenses

Capital purchases

Proprietor withdrawals, including taxes for individuals or cash
    dividends and taxes for corporations

Principal and interest payments on farm debt

Increases in savings, stocks, and bonds

Ending cash.

The cash flow budget is a forward planning tool that attempts to project the future cash flow statement. It can be used to determine the timing and amount of new borrowing the producer will need over the investment's useful life. It is used for analyzing whether or not the

investment will generate an adequate amount of cash to service the debt required for investment. This planning tool can be used to analyze the multiyear crop since the income, expenses, taxes, labor, depreciation, and farm debt are each listed as either a source or use of cash for each year in the planning period. This tool alone will not provide enough information to make a sound investment decision since alternative uses of the resources are not consider. The cash flow budget, however, provides important information to help make the investment decision.

Capital Budgeting

To make a sound investment decision, the capital budgeting approach should be used. This approach generates useful information for ranking, accepting, or rejecting the investment. Two criteria often used are net present value and internal rate of return.

The first criteria, net present value, is generally the most used method because it assumes that positive cash flows will be reinvested at the discount rate and negative cash flows will have a cost equal to the discount rate. Net Present Value is the current value of some future stream of cash expenses and income. It discounts all future cash flows and sums them to give the net value in current dollars for the investment. The net present value investment criteria is to invest if a net present value is greater than zero. The general computation for net present value is as follows:

$$NPV = -I_o + \frac{CF_1}{(1+i)} + \frac{CF_2}{(1+i)^2} + \frac{CF_3}{(1+i)^3} + \ldots + \frac{CF_n}{(1+i)^n} + \frac{V_n}{(1+i)^n}$$

where:

I_o = initial investment of equity capital

CF_n = annual net cash flow attributed to the investment

V_n = any salvage or terminal investment value

n = the length of planning horizon

i = the discount rate or required rate of return

and the conclusion is determined as follows:

if NPV >0 accept the investment,

if NPV =0 indifferent, or

if NPV <0 reject the investment.

The second criteria, internal rate of return, is defined as the interest rate that equates the present value of the expected future cash flows, or receipts, to the initial cost outlay. The investment decision for this method is for the investment to be equal to or greater than the minimum required rate of return (discount rate). The internal rate of return method assumes the cost of negative cash flows and the benefits of positive cash flows are equal to the internal rate of return. This method gives the same ranking of investments as the net present value method under most circumstances, but has been ruled an inferior capital budgeting criterion for three reasons: 1) Makes a bad reinvestment rate assumption -- projects with the same risk are discounted at different rates which yields an incorrect opportunity cost of capital, 2) violates the value additivity principle -- the implication is that all possible combinations of projects would have to be determined in order to find the greatest internal rate of return instead of choosing one project independently of all others to choose the best internal rate of return, and 3) results in multiple internal

rate of returns for the same project -- whenever the sign of cash flows changes more than once there may be an alternative internal rate of return (Weston & Copeland, 1986). The computation for this method is as follows:

$$\frac{CF_1}{(1+IRR)^1} + \frac{CF_2}{(1+IRR)^2} + \ldots + \frac{CF}{(1+IRR)^n} + \frac{V_n}{(1+i)^n} - I_o = 0$$

$$\sum_{t=1}^{n} \frac{CF}{(1+IRR)^t} - I_o = 0$$

where:

IRR = some value of internal rate of return that will cause the sum of the discounted receipts to equal the initial cost of the project, making the equation equal to zero

and the conclusion is determined as follows:

if IRR > Required rate of return: accept the investment,

if IRR = Required rate of return: indifferent, or

if IRR < Required rate of return: reject the investment.

From Figure 1, the internal rate of return is found at the point where the net present value line crosses the horizontal axis. As said earlier, the internal rate of return is the discount rate yielding a zero net present value. The internal rate of return is found by using a systematic search procedure.

The foundation of information has been laid for making a thorough analysis of a sound investment decision. The tools described cover the main facets of investment analysis and an answer to the question, "Is this a good investment?" can be reached.
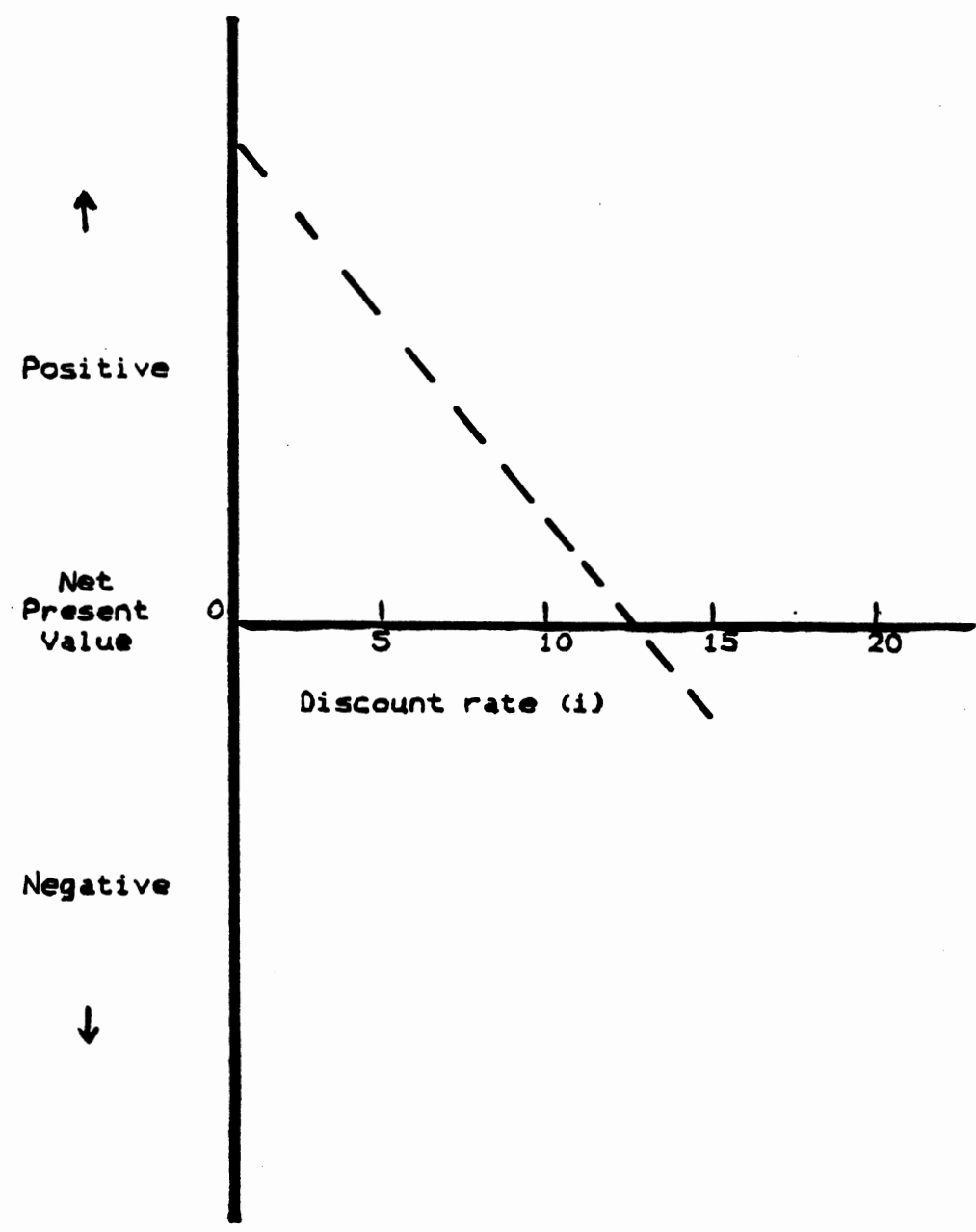
Figure 1. Linkage Between Net Present Value and
Internal Rate of Return

CHAPTER III

DEVELOPMENT OF ENTERPRISE BUDGETS, CASH FLOW

BUDGETS, AND CAPITAL BUDGETING ANALYSIS

To accomplish the first objective, enterprise budgets for improved variety pecans are developed for each year from establishment to full production. Enterprise costs and returns vary from one farm to the next and over time for any particular farm. Although variability exist, the basis for each budget are similar so that costs and returns can be compared. The budgets are developed with the Oklahoma State University Budget Generator (Kletke). Selected budgets are provided in the Appendix.

Enterprise Budget Assumptions

The budgets represent the establishment of a pecan orchard on an area containing no trees and may be pasture or cropland. The assumptions are as follows:

1. The area to be planted is 80 acres.

2. The trees are a grafted improved variety and are five to six feet tall when planted.

3. The planting plan allows for tree removal to prevent over crowding. Tree spacing is initially 35 feet by 35 feet allowing 36 trees per acre in a six by six grid. At about 18-24 years, (year 20 assumed in this study) the trees are

thinned by half diagonally, making the spacing 49 feet by 49 feet and 18 trees per acre. At about 30-40 years, (year 35 assumed in this study) the trees are thinned once again by half diagonally, making the spacing 70 feet by 70 feet and 9 trees per acre.

4. A trickle irrigation system is used.

5. New purchase costs are used for all machinery and equipment.

6. The cost of capital is 12.5 percent annually.

7. The price of pecans averages $85.00 per hundred weight. (cwt.)

8. All negative returns are accumulated and interest charged each year for the first eight years then amortized for 25 years.

9. Marketing of pecans begins the sixth year after the establishment year.

10. All labor is paid $4.65 per hour.

Annual Costs During Establishment

The costs of field operations are divided into two categories. The first is fixed cost of machinery, irrigation, and establishment. The second category, variable cost, is associated with operating machinery, irrigation system, hiring labor, purchasing services and materials, and the cost of annual operating capital. Total cost is the sum of fixed and variable costs.

Machinery and irrigation fixed costs include depreciation, interest, property taxes, and insurance. These costs are incurred whether or not a crop is grown and do not vary with the enterprise,

given ownership of the machinery and irrigation equipment. Total fixed cost also includes interest on establishment costs for the first eight years and amortized establishment cost for the next twenty-five years.

Variable costs depend directly on the number of acres planted. These costs include fuel, oil, repairs, fertilizer, chemicals, overhead, and interest on operating capital. Machinery, irrigation, and hand labor are included as variable costs. The budgets outline the schedule of field operations by calendar month, the type of machinery used, the labor hours used per acre, and the operating inputs used per acre for the pecan orchard for each of the years.

Table I shows the machinery and building complement used in the farm plan described in this study. The machinery used for this study is standard equipment for a pecan orchard. The fixed and variable costs associated with the complement are presented in Table II. Fixed costs are assumed constant regardless of the amount of machine use during the year. Variable costs change with the amount of use. The more the machine is used the higher the total operating cost. Total operating cost often increases at a constant rate per hour.

In addition to machinery costs, there are costs for operating inputs. Table III shows these operating inputs and prices. Prices for these inputs are based on a state average, prices may vary across the state.

The irrigation system is based on the items detailed in Table IV. Annual fixed and variable costs are based on the following assumptions:

1. Interest charge is 12.5 percent of average investment.

TABLE I

MACHINERY AND BUILDING COMPLEMENT FOR AN 80
ACRE IMPROVED PECAN ORCHARD, OKLAHOMA

Machine	Purchase Price	Budget Salvage Value	Cash Difference for Trade	Years Owned	Hours Used per year	Total Hours of Life	Tax Class Life (year property)
40 HP Tractor	15,600	3037	12,600	15	650	10,000	7
60 HP Tractor	22,600	4400	18,200	15	650	10,000	7
.5 Ton Pickup[1]	11,000	1945	9,000	10	400	4,000	5
Herbicide Sprayer	1,000	172	800	10	80	850	7
Hand Gun Sprayer	1,000	290	---	6	80	850	5
Post Hole Digger	500	234	---	2	160	1,000	3
Rotary Mower	1,200	200	1,000	10	100	1,000	7
Building	4,000	0	---	40	---	---	20
Lowboy Trailer 6x8	580	32	550	20	20	850	15
Pecan Shaker	4,200	375	3,800	15	150	2,500	7
Pecan Harvester	11,000	1816	9,200	10	195	2,000	7
Air Blast Sprayer	5,500	973	4,500	10	117	1,100	7
Bulk Bin Trailer	1,300	243	1,000	10	195	2,000	7
Pecan Cleaner	6,300	1040	5,300	10	100	1,000	7
Elevator	2,750	454	2,300	10	100	1,000	7

[1] Only 12 percent of pickup value is used for pecan orchard.

TABLE II

FIXED AND VARIABLE COST FOR MACHINERY
USED FOR AN 80 ACRE IMPROVED PECAN
ORCHARD, OKLAHOMA

Machine	Total Fixed Costs per Year	Repairs Cost per Hour	Fuel Cost per Hour	Var. Cost per Hour
40 HP Tractor	2,210.00	1.38	2.04	3.72
60 HP Tractor	3,211.00	--	3.05	5.51
.5 Ton Pickup	1,864.00	2.20	3.49	6.22[1]
Herbicide Sprayer	169.50	.73	--	.73
Hand Gun Sprayer	213.60	.48	--	.48
Post Hole Digger	185.60	.13	--	.13
Rotary Mower	203.00	2.16	--	2.16
Building	418.70	--	--	--[2]
Lowboy Trailer 6x8	73.20	.27	--	.27
Pecan Shaker	597.00	1.63	--	1.63
Pecan Harvester	1,868.10	4.36	--	4.36
Air Blast Sprayer	932.50	3.05	--	3.05
Bulk Bin Trailer	218.40	.32	--	.32
Pecan Cleaner	1,070.00	3.78	--	3.78
Elevator	467.00	1.65	--	1.65

[1] Only 12 percent of pickup use is charge to the pecan orchard.

[2] Building variable cost is $100 per year.

TABLE III

OPERATING INPUTS AND PRICES

Item	Unit	Price
Fertilizers:		
Phosphate (P205)	lbs.	.15
Potash (K20)	lbs.	.09
Nitrogen (N)	lbs.	.16
10-10-10	lbs.	.09
Herbicides:		
Roundup	gal.	98.59
2,4-D	pt.	5.30
Paraquat	qt.	13.57
Surflan 75W	lbs.	14.59
Ortho X77	pt.	2.04
Solicam	pt.	2.12
Princep 80W	lbs.	3.70
Karmex	lbs.	5.96
Insecticide:		
Zolone	qt.	8.50
Lorsban 4E	pt.	5.12
Benlate 50W	lbs.	14.26
Sevin 80W	lbs.	3.01
Malathion 57EC	qt.	5.38
Fungicides:		
$ZnSO_4$	lbs.	.48
Duter	lbs.	12.32
Other:		
Burlap Sacks	ea.	.03
10% Tree loss	ea.	11.75
Labor	hr.	4.65
Trees	ea.	11.75
Soil Test	acre	.075
Wheat Seed	bu.	4.10

TABLE IV

ITEMS USED TO DEVELOP AN ACRE OF THE IRRIGATION SYSTEM

Quantity	Item	Per Unit Cost	Cost per acre
70 feet	2 inch schedule 40 PVC	$ .35/ft.	$ 24.50
6 feet	1 inch schedule 40 PVC	.18/ft.	1.08
3 pieces	2 inch schedule 40 PVC couplings	.41 ea.	1.23
6 pieces	2 inch slip x 2 inch slip x 1 inch slip schedule 40 T's	.95 ea.	5.70
6 pieces	1 inch slip x 1/2 inch 7 PT schedule 40 L's	.39 ea.	2.34
1260 feet	RB - 600 pipe	.045/ft.	56.70
72 pieces	EM - 510 Emitters	.45 ea.	32.40
3 hours	Installation Cost	4.65/hr.	13.95
2.5 percent	150 feet 8 inch Well	1200.00 ea.	30.00[a]
2.5 percent	Electric pump	500.00 ea.	12.50
2.5 percent	RB 120 x 60 filter	50.00 ea.	1.25
	TOTAL COST PER ACRE		$181.65

[a] It is assumed each well, pump, and filter covers 40 acres.

2. Insurance charge is 1.0 percent of average investment.

3. Tax charge is 1.5 percent of average investment.

4. Electric charge is $0.075 per kilowatt hour. (kwhrs.)

5. Seventy-two emitters are added in year seven.

6. Seventy-two more emitters are added in year 15.

7. One well, pump, and filter covers 40 acres.

8. The well, pump, and filter are depreciated over 40 years and the black plastic pipe, emitters, PVC, etc., are depreciated over 20 years to determine the depreciation cost for the enterprise budgets.

The process used to calculate the kilowatt hours (kwhrs.) of electricity used to irrigate is computed by taking the number of gallons per day times the number of days times the number of trees times kwhrs. per acre foot divided by gallons per acre foot. It is assumed 311 kwhrs. are required per acre foot. For example, electricity used for years 1-3 is figured in the following way:

Kwhrs. used = 3 x 90 x 36 x 311 ÷ 326,700 = 9.25

Electricity is assumed to cost 7.5 cents per Kwhrs.

For years 1-3 the cost of electricity for irrigating is 69 cents per day. The assumed gallons of water used per tree per day in July and August are provided in Table V. One-half of the amount is applied in June and September.

The process used to calculate insurance, interest, and taxes is to divide the total cost of the irrigation system on a per acre basis by two (assuming a zero salvage value) and multiplying by the assumed rate. Insurance per acre is calculated as (181.65 x .01)/2 or 91 cents per acre.

TABLE V

THE ASSUMED GALLONS OF WATER USED PER TREE PER DAY
IN JULY AND AUGUST. ONE-HALF THE AMOUNT
IS APPLIED IN JUNE AND SEPTEMBER.

Year	Gal./Day/Tree	No. of Trees
1-3	3	36
4-6	6	36
7-10	10	36
11-15	20	36
16-17	35	36
18-22	50	18
23-24	60	18
25-29	75	18
30-34	100	18
35-40	100	9

Depreciation has been figured on a straight line basis. The well, pump, and filter is depreciated over 40 years and the pipe, emitters, and installation is depreciated over 20 years.

The amount of interest, insurance, taxes, repairs, and depreciation allocated to each year is shown in Table VI.

Preplant Year

It is assumed the land is currently in grass. On that basis, pre-plant operations begin in May with a one time spraying of 2,4-D. The herbicide is applied at a rate of one pint to the acre. No work is done to the land until September, when a soil sample is taken to determine the nutrient contents of the soil. Next, a one time spraying of Roundup is applied at a rate of one gallon per acre. Also in the month of September custom plowing, disking, and harrowing of one time over the acre is done to prepare the ground for planting wheat. The wheat is also custom drilled. After the wheat is planted, 100 pounds of Phosphate and Potash, and 50 pounds of Nitrogen is applied to the acre by a custom operator. The custom rates assumed per acre are as follows:

Custom Spread Fertilizer	$2.00
Custom Plow	9.00
Custom Disk	6.00
Custom Harrow	3.00
Custom Drill Grain	5.00

The machinery requirements are a 40 horsepower tractor, a herbicide sprayer, and a half-ton pickup. The pickup is used each month throughout the life of the orchard.

TABLE VI

ANNUAL FIXED AND VARIABLE COST FOR THE IRRIGATION SYSTEM

			Cost per acre of Use			
		Fixed Cost				Variable Cost
Year	Deprec.	Interest	Ins.	Taxes	Total	Repair
1 - 6	$ 7.99	$11.35	$ .91	$1.36	$21.61	$0.00
7 -14	$ 9.61	$13.38	$1.07	$1.60	$25.66	$3.24
15 -40	$11.23	$15.40	$1.23	$1.85	$29.71	$3.24

The total operating cost in the year before establishment is $199.16 and the fixed cost is $14.55 making total cost $213.71.

Establishment Year:

During the first year, the planting process begins in February. The trees are planted with a tree spacing of 35 feet by 35 feet allowing 36 trees per acre. The herbicides Paraquat and Surflan 75W, with the surfactant Ortho X77, are applied at a rate of one-third quart, .83 pounds, and .08 pints per acre, respectively. These sprays can be mixed together for the one time spraying. Also in February, one pound of 10-10-10 fertilizer is applied by hand, per tree. In May, the plant nutrient $ZnSO_4$ is applied at a rate of two pounds per acre. In June and July, the $ZnSO_4$ is mixed (at the same rate as in May) with the insecticide Zolone. The requirement for Zolone is two quarts per acre in June and the same amount in July. In addition, a trickle irrigation system is established at an approximate cost of $181.65 per acre. Water is applied from June through September. A 40 feet by 40 feet metal building is constructed. The grass between the rows of the trees are mowed in June, July, September, and October. This mowing schedule is followed through year six.

The machinery used in the establishment year is as follows: 40 horsepower tractor, herbicide sprayer, post-hole digger, rotary mower, and a 1/2 ton pickup.

Total operating cost for the establishment year is $648.40, with fixed cost being $58.46. Therefore, total cost is $706.86 per acre.

Second Year

A ten percent tree loss is assumed during the year after initial planting. Therefore, 1.8 trees per acre are assumed to be replanted in February and March. The replanting time is approximately 24 minutes per acre in each month. The fertilizer rate increases to two pounds of 10-10-10 per tree, applied by hand. The time for fertilizing is approximately 45 minutes per acre. Pruning and training of the trees begins in February, taking two minutes per tree. All labor is paid $4.65 per hour. Also in February, the herbicides Paraquat and Solicam with the surfactant Ortho X77, are sprayed at a rate of .17 quart, .5 pound, and .08 pint per acre, respectively. This year and each year for the life of the orchard the plant nutrient and insecticide, $ZNSO_4$ and Zolone, are applied at the same rates and months as in the establishment year.

The machinery requirements in the second year are the same as the establishment year.

Total operating cost for the second year is $279.68, and the fixed cost is $49.64. So, total cost per acre is $329.32.

Third Year

The third year is similar to the second year. In February the fertilizer rate is increased to three pounds per tree of 10-10-10. This fertilizer is applied by hand and takes approximately 45 minutes per acre. The herbicide Solicam used in the second year is switched to Surflan 75W in the third year. The rate of Surflan 75W applied is one-half pound per acre. Paraquat and Ortho X77 are used the same as

in the second year in the month of February. The rest of the third year operations are the same as the second year, except no trees are replanted.

The machinery requirements used in the third year are the same as the second year, with the exception of the post hole diggers, which are no longer used. The machinery requirements will remain the same through year six.

The total operating cost is $274.19 and the fixed cost for the third year is $48.66. The total cost then is $322.85 per acre.

Fourth, Fifth, and Sixth Year

Starting in the fourth year, a fertilization program consisting of 100 pounds of actual nitrogen per acre is custom spread each February for the life of the orchard. Due to the larger trees, the pruning time in February increases to five minutes per tree. Herbicides are sprayed in February. The herbicides used are Paraquat, Ortho X77, and one of two other combinations. Combination one is Solicam and Princep 80W, and combination two is Surflan 75W and Karmex. Combination one is used in even years, and combination two is used in odd years for the life of the orchard.

The cost for the fourth, fifth, and sixth year are as follows:

Year	Total Operating Cost	Total Fixed Cost	Total Cost
4	$331.38	$48.66	$380.04
5	$379.70	$48.66	$428.36
6	$432.43	$48.66	$481.09

Seventh Year

Pecan growers expect a harvest from the new orchard by the seventh year after the pre-plant year. The yield assumed is 300 pounds per acre and it is assumed to be marketed at a price of $85.00/cwt.

The mowing schedule changes to April, May, June, and July and remains the same for the life of the orchard. As the trees start fruit production, an insecticide and fungicide program is implemented. The insecticide/fungicide spray program begins around the 15th of April, with a spraying of the fungicide Duter at a rate of one pound per acre. Two weeks later, another spraying of Duter is required. About the 15th of May, the insecticide Lorsban 4E is sprayed at a rate of four and one-half pints per acre along with the fungicide Benlate 50W at a rate of one and one-half pounds per acre. These chemicals can be sprayed together using the air blast sprayer. At the beginning of June and July, a spraying of Benlate 50W is required. During August, four and one-half pounds of Sevin 80W and two and one-fourth quarts of Malathion 57EC per acre are sprayed to kill insects. A repeat spraying of Sevin 80W comes in September. A three cent use fee is charged for each burlap sack used. Harvest starts in November, assuming half of the pecans are harvested in November and half in December.

More machinery is purchased when production begins. This additional machinery includes a pecan shaker, pecan harvester, pecan cleaner, elevator, air blast sprayer, and a low-boy trailer. The hand gun sprayer is no longer used. The low-boy trailer is used in November and December during harvest.

Total operating cost for year seven is $675.54 and fixed cost is $119.07, making total cost $794.61. A gross return of $255.00 is obtained from the sale of pecans which makes the return above all cost except land, risk, and overhead -$539.61 per acre.

Eighth Year and Beyond

The yields increase from year to year until year twelve then stabilizes. The assumed yields are shown in Table VII. Also, with fruit production, the level of irrigation increases. The operating inputs for the remaining years do not vary, with the exception of the alternating herbicide program and the 250 pounds of Potash (K20) applied in year ten and every five years thereafter. A bulk bin trailer is also added in year ten, to be used for the life of the orchard in the harvest months.

In year twenty, the trees are thinned by half diagonally, taking approximately 10 hours of labor per acre. By thinning the trees, the yields are cut in half. By year twenty-two yields are back up to their maximum. Again, in year thirty-five the trees are thinned by half diagonally, cutting the yields in half. Maximum production is regained by year thirty-seven. The trees are assumed to have no value when cut.

A summary of the costs and returns for the first forty-one years of the orchard's life are provided in Table VIII. Three cost numbers are provided. Budget variable cost includes the costs of chemicals, labor, machinery operating costs, irrigation operating costs, trees, interest on operating cost, etc. Most of these costs will be a cash cost each year. The exceptions are interest and labor if they are

TABLE VII

ASSUMED MARKETED YIELD OF PECANS

Year	Yield Pounds/acre
7	300
8	500
9	600
10	800
11	900
12-19	1000
20	500
21	800
22-34	1000
35	500
36	800
37-40	1000

TABLE VIII

ANNUAL COSTS AND RETURNS FOR FORTY-ONE YEARS
FOR AN IMPROVED PECAN ORCHARD, WITH $4.65
PER HOUR WAGE, 12.5 PERCENT INTEREST,
AND $85 PER CWT. PECANS

Year	Budget Variable Cost	Budget Fixed Cost	Prorated Establishment Cost	Budget Total Cost	Gross Income	Returns above Specified Cost — Variable	Var.+Mach.	Total
0	$199.16	$14.55	$0.00	$213.71	$0.00	($199.16)	($213.71)	($213.71)
1	$621.69	$58.46	$26.71	$706.86	$0.00	($621.69)	($680.15)	($706.86)
2	$164.61	$49.64	$115.07	$329.32	$0.00	($164.61)	($214.25)	($329.32)
3	$117.95	$48.66	$156.24	$322.85	$0.00	($117.95)	($166.61)	($322.85)
4	$134.79	$48.66	$196.59	$380.04	$0.00	($134.79)	($183.45)	($380.04)
5	$135.60	$48.66	$244.10	$428.36	$0.00	($135.60)	($184.26)	($428.36)
6	$134.79	$48.66	$297.64	$481.09	$0.00	($134.79)	($183.45)	($481.09)
7	$317.76	$119.07	$357.78	$794.61	$255.00	($62.76)	($181.83)	($539.61)
8	$319.46	$120.49	$448.85	$888.80	$425.00	$105.54	($14.95)	($463.80)
9	$322.35	$121.43	$448.85	$892.63	$510.00	$187.65	$66.22	($382.63)
10	$350.32	$125.55	$448.85	$924.72	$680.00	$329.68	$204.13	($244.72)
11	$331.16	$126.49	$448.85	$906.50	$765.00	$433.84	$307.35	($141.50)
12	$332.06	$127.20	$448.85	$908.11	$850.00	$517.94	$390.74	($58.11)
13	$332.36	$127.20	$448.85	$908.91	$850.00	$517.14	$389.94	($58.91)
14	$332.06	$127.20	$448.85	$908.11	$850.00	$517.94	$390.74	($58.11)
15	$357.46	$131.25	$448.85	$937.56	$850.00	$492.54	$361.29	($87.56)
16	$335.65	$131.25	$448.85	$915.75	$850.00	$514.35	$383.10	($65.75)
17	$336.45	$131.25	$448.85	$916.55	$850.00	$513.55	$382.30	($66.55)
18	$333.25	$131.25	$448.85	$913.35	$850.00	$516.75	$385.50	($63.35)
19	$323.07	$131.25	$448.85	$903.17	$850.00	$526.93	$395.68	($53.17)
20	$395.22	$127.24	$448.85	$971.31	$425.00	$29.78	($97.46)	($546.31)
21	$330.11	$129.60	$448.85	$908.56	$680.00	$349.89	$220.29	($228.56)
22	$333.25	$131.25	$448.85	$913.35	$850.00	$516.75	$385.50	($63.35)
23	$335.25	$131.25	$448.85	$915.35	$850.00	$514.75	$383.50	($65.35)
24	$334.45	$131.25	$448.85	$914.55	$850.00	$515.55	$384.30	($64.55)
25	$361.66	$131.25	$448.85	$941.76	$850.00	$488.34	$357.09	($91.76)
26	$336.25	$131.25	$448.85	$916.35	$850.00	$513.75	$382.50	($66.35)
27	$337.05	$131.25	$448.85	$917.15	$850.00	$512.95	$381.70	($67.15)
28	$336.25	$131.25	$448.85	$916.35	$850.00	$513.75	$382.50	($66.35)
29	$337.05	$131.25	$448.85	$917.15	$850.00	$512.95	$381.70	($67.15)
30	$363.36	$131.25	$448.85	$943.96	$850.00	$486.14	$354.89	($93.96)
31	$340.05	$131.25	$448.85	$920.15	$850.00	$509.95	$378.70	($70.15)
32	$339.25	$131.25	$448.85	$919.35	$850.00	$510.75	$379.50	($69.35)
33	$340.05	$131.25	$0.00	$471.30	$850.00	$509.95	$378.70	$378.70
34	$339.25	$131.25	$0.00	$470.50	$850.00	$510.75	$379.50	$379.50
35	$396.00	$127.24	$0.00	$523.24	$425.00	$29.00	($98.24)	($98.24)
36	$329.32	$129.60	$0.00	$458.92	$680.00	$350.68	$221.08	$221.08
37	$334.06	$131.25	$0.00	$465.31	$850.00	$515.94	$384.69	$384.69
38	$333.25	$131.25	$0.00	$464.50	$850.00	$516.75	$385.50	$385.50
39	$334.06	$131.25	$0.00	$465.31	$850.00	$515.94	$384.69	$384.69
40	$357.87	$131.25	$0.00	$489.12	$850.00	$492.13	$360.88	$360.88

provided by the owner.

Budget fixed cost includes the interest, depreciation, taxes, and insurance on the machinery assumed owned and the irrigation system. The machinery fixed costs are allocated based on an average cost per hour while owned. Therefore, these cost may under or over estimate the true cash cost depending upon the age of the machinery.

Prorated establishment cost for the first seven years is the annual interest cost on the accumulated previous establishment cost. For years eight to thirty-two the total accumulated establishment cost for years zero to seven are amortized over the twenty-five years. After year thirty-two it is assumed no costs are deducted for establishment. The costs could be spread over more years, but the reduction in the annual charge decreases slowly.

Three measures of return are also provided in addition to gross income. The first measure is gross income minus variable costs. The second measure is gross income minus variable costs minus machinery fixed costs. The last measure is gross income minus all three cost numbers.

Under the assumed pecan price, yield pattern, wage rate, and interest rate, the orchard does not show a positive return above all cost until year thirty-two. The negative returns through year seven are covered by the prorated establishment costs. The negative returns for the rest of the years would have to be covered from some other source. Since some of these costs are labor and interest on establishment costs, these negative returns may not result in negative cash flows for all these years. Also tax savings due to the losses may offset part of the negative returns. In the case of preproductive

expenses, part of these expenses may be capitalized and others deducted in the same year for tax purposes.

Cash Flow Budget Assumptions

A cash flow budget is constructed to achieve the second objective. The budget is developed to determine feasibility of the investment based on yearly cash flows for forty-one years. The budget is based on the following assumptions:

1. The cash flow budget presented in this study uses the simplified case of a single line of credit for operating and capital purchase needs.

2. Land is owned and debt free.

3. The beginning cash balance is zero.

4. The tax bracket is 35.0 percent.

5. The operating (preproductive expenses) are expensed up to $10,000 each year for years 0 to 6.

6. Expenditures that increase operating efficiency for the remaining useful life of an investment are capital expenditures. These expenditures must be capitalized -- no deductions can be taken before beginning production, then when production begins the expenditures are depreciated. The capital expenditures are: irrigation system, irrigation installation labor, well, electric pump, filter, trees, and planting labor.

7. Depreciation is begun on machinery, equipment, and the building when purchased. The Tax Reform Act of 1986 provided a modified accelerated cost recovery system (MACRS) which

generally applies to all property placed in service after December 31, 1986. This study assumes the establishment of the orchard is after December 31, 1986. The class lives available using MACRS are 1) 3-year property, 2) 5-year property, 3) 7-year property, 4) 10-year property, 5) 15-year property, and 6) 20-year property.

8. The depreciation method used is the double (200%) declining balance method over 3, 5, 7, or 10 years and a half-year convention. For property in the 15 or 20 year class, the 150 percent declining balance method over 15 or 20 years and half-year convention is used. A change is made from the declining balance method to the straight line method for the first tax year, when the straight line method applied to the adjusted basis at the beginning of such year, will yield a larger deduction. For all classes, depreciation is adjusted for the salvage value.

9. Property taxes on equipment, implements, machinery, and tractors are figured as follows:

   a) Property values (depreciated) x assessment rate = assessed value.

   b) Assessed value x millage rate = TAXES.

   Current policy of the Oklahoma State Board of Equalization as upheld by the Oklahoma Supreme Court, is that all real and personal property must be assessed between nine and fifteen percent of appraised value (Willett, Nelson, Burns, and Hartman). An eleven percent assessment rate is used for this study. A mill is a tax of $1 per $1,000 of assessed value.

The county excise board sets millage rates. In this study, a millage rate of 80 is assumed. That is, taxpayers pay $80 for each $1,000 of assessed value on the assessment rolls. This rate is different for each county and subject to change from year to year. For this study the millage rate will remain at 80 throughout the life of the orchard.

10. Real property tax is paid on land and the well used for irrigation. The computation for the land tax is as follows:

   a) Productivity Index x acres = Total Productivity Points.

   b) Total productivity points x assessment rate = Assessed Value.

   c) Assessed value x millage rate x dollars per acre per point = LAND TAX.

An average productivity index of 54 for the 80 acre orchard is assumed and a five dollar per acre per point charge is assumed. The land tax plus well tax (computed the same as assumption nine) equals total real property tax. This amount is taxed each year.

11. Personal property is property that is not real estate. A personal property tax on pecans begins when the pecans become productive. This tax is based on average pecan production and price. The irrigation system, pump, and filter is also taxed when the pecans become productive. The calculation is the same as the property taxes. For the pecans, the calculation is:

a) Average pecan production x average pecan price x assessment rate = Assessed Value.

b) Assessed value x millage rate = Pecan Tax per acre.

The millage rate, assessment rate, pecan price, and pecan production used for the computation will generally change depending on the circumstances, but for this study the prices will remain constant. This personal property tax will be taxed each year beginning in year seven.

12) The assumption for income taxes is that the operator has a positive taxable income from some other source other than pecans, and is able to deduct the years of negative taxes from the inflows, in essence adding to the income amount.

13) Income taxes are paid in the same year the income is received.

Most of the information required to build the cash flow budget can be taken from the enterprise budgets. The makeup of the cash flow budget, for this study, consist of inflows, operating expenses, capital expenses, labor charges, and the debt schedule. The cash flow budget is for 80 acres of pecan establishment on a yearly basis with a planning horizon of forty-one years. A summary of the representative orchard's cash flow budget is presented in Table IX. Selected categories from the cash flow budget will be defined in the following paragraphs.

Taxable income is considered inflows minus the operating expenses, labor, depreciation, and interest payments on the loan. An alternative source of income is assumed thus allowing for the years of negative taxes on the pecan orchard to be deducted from the taxes paid

	YEAR 0	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Total Cash Inflows	$0	$0	$0	$0	$0	$0
Operating Expenses	$15,053	$7,831	$6,317	$7,080	$7,754	$7,794
Capital Expenses	$17,920	$56,858	$3,563	$0	$0	$0
Labor Charges	$1,170	$6,571	$3,029	$2,584	$3,161	$3,161
Depreciation	$2,952	$5,370	$4,112	$2,912	$2,127	$1,991
Taxable Income	($19,175)	($19,772)	($13,458)	($12,576)	($13,042)	($12,946)
Income Taxes	($6,711)	($6,920)	($4,710)	($4,402)	($4,565)	($4,531)
Loan Interest	$0	$4,268	$12,870	$15,227	$17,750	$20,783
Gross Cash Position	($34,143)	($68,816)	($18,858)	($20,181)	($24,263)	($27,173)
Loan Interest Payment	$0	$0	$0	$0	$0	$0
Loan Principal Payment	$0	$0	$0	$0	$0	$0
Net Cash Position	($34,143)	($68,816)	($18,858)	($20,181)	($24,263)	($27,173)
New Equity	$0	$0	$0	$0	$0	$0
New Borrowing	$34,143	$68,816	$18,858	$20,191	$24,263	$27,173
Loan Balance	$34,143	$102,959	$121,817	$141,998	$166,260	$193,433
Total Cash Outflows	$34,143	$64,548	$5,989	$4,954	$6,513	$6,390
Net Cash Flow to Owner	($34,143)	($64,548)	($5,989)	($4,954)	($6,513)	($6,390)
Ending Cash Balance	$0	$0	$0	$0	$0	$0
Owner Contribution	$0	$0	$0	$0	$0	$0

	YEAR 14	YEAR 15	YEAR 16	YEAR 17	YEAR 18	YEAR 19
Total Cash Inflows	$68,000	$68,000	$68,000	$68,000	$68,000	$68,000
Operating Expenses	$21,501	$23,278	$21,673	$21,893	$21,559	$21,595
Capital Expenses	$0	$12,600	$0	$21,300	$0	$0
Labor Charges	$5,488	$5,488	$5,488	$5,488	$5,488	$4,609
Depreciation	$5,690	$3,018	$4,505	$6,573	$7,978	$5,993
Taxable Income	($9,053)	$6,414	($2,260)	$13,936	($3,101)	($7,079)
Income Taxes	($3,168)	$2,245	($791)	$4,878	($1,085)	($2,477)
Loan Interest	$44,373	$44,190	$45,988	$46,912	$50,263	$52,041
Gross Cash Position	$1,471	($14,387)	($7,394)	($26,802)	($14,226)	($9,160)
Loan Interest Payment	$44,373	$29,802	$38,594	$20,110	$36,036	$42,880
Loan Principal Payment	$1,471	$0	$0	$0	$0	$0
Net Cash Position	$0	($14,387)	($7,394)	($26,802)	($14,226)	($9,160)
New Equity	$0	$0	$0	$0	$0	$0
New Borrowing	$0	$14,387	$7,394	$26,802	$14,226	$9,160
Loan Balance	$353,517	$367,904	$375,298	$402,100	$416,326	$425,487
Total Cash Outflows	$68,000	$68,000	$68,000	$68,000	$68,000	$68,000
Net Cash Flow to Owner	$0	$0	$0	$0	$0	$0
Ending Cash Balance	$0	$0	$0	$0	$0	$0
Owner Contribution	$0	$0	$0	$0	$0	$0

	YEAR 28	YEAR 29	YEAR 30	YEAR 31	YEAR 32	YEAR 33
Total Cash Inflows	$68,000	$68,000	$68,000	$68,000	$68,000	$68,000
Operating Expenses	$21,831	$21,836	$23,864	$22,084	$21,968	$22,001
Capital Expenses	$0	$0	$15,480	$1,000	$0	$0
Labor Charges	$5,488	$5,488	$5,488	$5,488	$5,488	$5,488
Depreciation	$7,964	$5,374	$5,534	$6,455	$5,601	$4,725
Taxable Income	($3,008)	($6,426)	$7,697	($2,761)	($5,567)	($7,023)
Income Taxes	($1,053)	($2,249)	$2,694	($966)	($2,298)	($2,458)
Loan Interest	$97,299	$104,996	$112,904	$123,840	$134,738	$146,380
Gross Cash Position	($61,574)	($63,267)	($87,497)	($87,106)	($93,218)	($103,571)
Loan Interest Payment	$35,725	$41,729	$25,417	$36,734	$41,510	$42,810
Loan Principal Payment	$0	$0	$0	$0	$0	$0
Net Cash Position	($61,574)	($63,267)	($87,497)	($87,106)	($93,218)	($103,571)
New Equity	$0	$0	$0	$0	$0	$0
New Borrowing	$61,574	$63,267	$87,497	$87,106	$93,218	$103,571
Loan Balance	$839,966	$903,233	$990,720	$1,077,825	$1,171,043	$1,274,614
Total Cash Outflows	$68,000	$68,000	$68,000	$68,000	$68,000	$68,000
Net Cash Flow to Owner	$0	$0	$0	$0	$0	$0
Ending Cash Balance	$0	$0	$0	$0	$0	$0
Owner Contribution	$0	$0	$0	$0	$0	$0

TABLE IX

CASH FLOW SUMMARY FOR FORTY-ONE YEARS FOR
AN IMPROVED PECAN ORCHARD, WITH $4.65 PER
HOUR WAGE, 12.5 PERCENT INTEREST, AND $85
PER CWT. PECANS

YEAR 6	YEAR 7	YEAR 8	YEAR 9	YEAR 10	YEAR 11	YEAR 12	YEAR 13
$0	$20,400	$34,000	$40,800	$54,400	$61,200	$68,000	$68,000
$7,729	$21,871	$21,697	$21,568	$23,287	$21,653	$21,525	$21,571
$0	$52,530	$0	$0	$3,180	$1,000	$0	$0
$3,161	$4,621	$4,847	$4,998	$5,224	$5,375	$5,488	$5,488
$1,842	$15,544	$25,245	$18,296	$13,857	$10,778	$10,550	$10,198
($12,731)	($21,636)	($32,818)	($29,782)	($21,101)	($17,164)	($14,386)	($13,809)
($4,456)	($7,573)	($11,486)	($10,424)	($7,385)	($6,007)	($5,035)	($4,833)
$24,179	$27,996	$38,267	$41,171	$43,103	$44,349	$44,823	$44,551
($30,538)	($82,162)	($23,238)	($15,450)	($9,970)	($3,791)	$2,171	$1,425
$0	$0	$15,028	$25,721	$33,132	$40,557	$44,823	$44,551
$0	$0	$0	$0	$0	$0	$2,171	$1,425
($30,538)	($82,162)	($23,238)	($15,450)	($9,970)	($3,791)	$0	$0
$0	$0	$0	$0	$0	$0	$0	$0
$30,538	$82,162	$23,238	$15,450	$9,970	$3,771	$0	$0
$223,971	$306,133	$329,371	$344,821	$354,791	$358,583	$356,412	$354,987
$6,358	$74,565	$34,000	$40,800	$54,400	$61,200	$68,000	$68,000
($6,358)	($54,165)	$0	$0	$0	$0	$0	$0
$0	$0	$0	$0	$0	$0	$0	$0
$0	$0	$0	$0	$0	$0	$0	$0

YEAR 20	YEAR 21	YEAR 22	YEAR 23	YEAR 24	YEAR 25	YEAR 26	YEAR 27
$34,000	$54,400	$68,000	$68,000	$68,000	$68,000	$68,000	$68,000
$23,193	$21,493	$21,654	$21,797	$21,691	$23,592	$21,699	$21,926
$2,880	$1,000	$22,000	$11,032	$0	$0	$0	$21,850
$8,567	$5,224	$5,488	$5,488	$5,488	$5,488	$5,488	$5,488
$5,306	$4,906	$6,849	$8,365	$6,257	$4,004	$3,052	$5,967
($4,903)	($5,622)	$13,184	$7,282	($3,708)	($5,302)	($4,919)	$14,161
($1,716)	($1,968)	$4,614	$2,549	($1,298)	($1,856)	($1,721)	$4,956
$53,186	$59,604	$63,505	$68,840	$74,311	$78,815	$93,640	$98,761
($51,348)	($31,205)	($42,680)	($43,771)	($36,029)	($38,597)	($40,971)	($68,304)
$1,838	$28,399	$20,825	$25,069	$38,282	$40,218	$42,669	$20,457
$0	$0	$0	$0	$0	$0	$0	$0
($51,348)	($31,205)	($42,680)	($43,771)	($36,029)	($38,597)	($40,971)	($68,304)
$0	$0	$0	$0	$0	$0	$0	$0
$51,348	$31,205	$42,680	$43,771	$36,029	$39,597	$40,971	$68,304
$476,835	$509,040	$550,720	$594,490	$630,520	$669,117	$710,098	$778,392
$34,000	$54,400	$68,000	$68,000	$68,000	$68,000	$69,000	$68,000
$0	$0	$0	$0	$0	$0	$0	$0
$0	$0	$0	$0	$0	$0	$0	$0
$0	$0	$0	$0	$0	$0	$0	$0

YEAR 34	YEAR 35	YEAR 36	YEAR 37	YEAR 38	YEAR 39	YEAR 40
$68,000	$34,000	$54,400	$68,000	$68,000	$68,000	$68,000
$21,923	$23,139	$21,350	$21,843	$21,701	$21,625	$23,318
$0	$0	$0	$43,300	$0	$0	$2,880
$5,488	$8,567	$5,224	$5,488	$5,488	$5,488	$5,488
$3,207	$2,156	$2,103	$7,646	$11,030	$7,609	$5,804
($5,665)	($4,138)	($3,552)	$33,023	$528	($7,424)	($5,522)
($1,983)	($1,448)	($1,243)	$11,558	$185	($2,598)	($1,933)
$159,327	$173,862	$195,060	$215,783	$242,929	$269,639	$299,256
($116,280)	($169,584)	($165,786)	($217,171)	($213,676)	($228,937)	($259,343)
$43,047	$4,277	$29,274	$0	$29,253	$40,702	$38,713
$0	$0	$0	$0	$0	$0	$0
($116,280)	($169,584)	($165,786)	$217,171	$213,676	($228,937)	($259,343)
$0	$0	$0	$0	$0	$0	$0
$116,280	$169,584	$165,786	$217,171	$213,676	$228,937	$259,343
$1,390,893	$1,560,478	$1,726,263	$1,943,434	$2,386,047	$2,386,047	$2,645,390
$68,000	$34,000	$54,400	$69,388	$68,000	$68,000	$68,000
$0	$0	$0	($1,388)	$0	$0	$0
$0	$0	$0	$0	$0	$0	$0
$0	$0	$0	$0	$0	$0	$0

on the alternative source of income.

The gross cash position includes any amount of equity that is invested plus inflows from the operation minus operating and capital expenses, labor charges, income taxes (when applicable), and any loan interest due.

The net cash position is the gross cash position minus the loan principal payment. This amount will be the same as the gross cash position unless a principal payment is made.

New Equity is the amount of annual inflows of owner's equity that is infused into the investment when the gross cash position is negative.

New Borrowing is the amount of capital that is borrowed. Capital will be borrowed as long as the net cash position is negative.

Net Cash Flow to the owner is the total cash inflows minus the total cash outflows which consist of operating expenses, capital expenses, labor charges, loan interest payments, loan principal payments, and the previous years income taxes.

Net Cash Flow to the owner is the net cash position plus new equity plus new borrowings accumulated each year.

As can be seen from Table IX there are no inflows until year seven and no beginning cash balance. All money needed for the operation is borrowed at 12.5% annual interest. Until the cash position figure becomes positive, money will be borrowed to operate. The total amount of money borrowed by year seven is $82,162 with an amount of $27,996 due in interest. By year eight, enough capital is generated to cover operating and capital expenses, labor, and partial interest payments. A principal payment is never made and an ending

cash balance is never realized.

The pecan orchard investment is capital intensive and a long-term investment. The cash flow budget presented for the representative orchard does not show a promising outlook for investing in an improved pecan orchard, but each farmer has a different set of assumptions that can change the outlook of the situation.

Some suggestions for improving financial feasibility include 1) improving cost controls by conserving fuel and utilizing labor to a greater extent, 2) consider leasing instead of purchasing new capital items, 3) introducing new equity into the business to finance expansion or retire existing debt, and 4) liquidating assets for partial or total debt repayment (Barry, Hopkin, and Baker).

Capital Budgeting Analysis

The third objective is to determine profitability of establishing a pecan orchard. This is done through capital budgeting analysis. The two criteria used are net present value and internal rate of return. The criteria with the most significance is net present value, which reflects the time value of money.

Financial feasibility and profitability have different meanings. Financial feasibility is determined by whether or not the cash flows are there to sustain the project. Profitability is determined through a capital budgeting analysis - net present value. When the net present value is greater than zero then an investment is considered to be profitable. A sign of profitability is not always a sign of financial feasibility.

Net Present Value

The procedures for determining net present value are first to determine a discount rate. This rate typically represents the firm's minimum acceptable rate of return, the opportunity cost of funds. The opportunity cost is defined as the return that can be achieved for the use of a resource in its most profitable alternative use. If the operator can borrow all of the capital that can profitably be used in the business, then the nominal opportunity cost can be approximated by the market rate of interest (Boehlje and Eidman, 1984). Three before tax discount rates are considered: 10, 12.5, and 15 percent. Since the cash flows are calculated on an after-tax basis, the discount rate will be expressed on an after-tax basis as well. This after-tax discount rate will be the rate an investor will expect to earn, after taxes have been paid, if the money were invested in the best alternative. The after-tax discount rate is calculated as follows:

$$ATDR = BTDR \times (1-TR)$$

where:

$ATDR$ = After-tax discount rate

$BTDR$ = Before tax discount rate

TR = Tax rate

After determining the discount rate, the next step is to compute the after-tax cash flows. The before tax cash flows, capital purchases, depreciation, and capital expensing figures are taken from the cash flow budget to calculate the after-tax flows. The before tax cash flows consist of inflows minus operating expenses and labor. Capital purchases consists of equipment, machinery, building, trees,

irrigation system, etc., (the fixed investment costs). Capital expensing and depreciation result in tax savings. The computation for after-tax cash flows is as follows:

$$ATCF = BTCF \times (1-TR) + [(CE+D) \times TR] - CP$$

where:

BTCF = Before tax cash flows (inflows minus operating cash expenses and labor)

TR = Tax Rate

CE = Capital expensing - the operating expenses that are deducted up to $10,000 before the pecans become productive.

D = Depreciation.

CP = Capital Purchases.

Following the computation of after-tax cash flows, the next step is to calculate the present value. Present value is computed as follows:

$$PV = \frac{ATCF}{(1+ATDR)^n}$$

where:

ATCF = After tax cash flow for the year.

ATDR = After tax discount rate.

n = Number of years before ATCF is received.

Present value represents the current or present value of an income received sometime in the future. Net present value is just the summation of the present values for each year of the investment's life. Table X shows the net present value per acre for the representative orchard and the alternative wage rates, pecan prices,

TABLE X

NET PRESENT VALUE OF INVESTMENT PER ACRE AT
THE END OF FORTY-ONE YEARS UNDER
ALTERNATIVE WAGE RATES, PECAN
PRICES, AND DISCOUNT RATES

Discount Rate	After-Tax Discount Rate	Pecan Price $/cwt		
		70	85	125
%	%	- - - - - - - - -Wage Rate = $0/hour- - - - - - - -		
10	6.5	36,641	98,240	262,505
12.5	8.13	5,432	51,987	176,133
15	9.75	(16,138)	19,726	115,363
		- - - - - - - -Wage Rate = $4.65/hour- - - - - - - -		
10	6.5	(10,533)	51,066	215,331
12.5	8.13	(33,424)	13,131	137,276
15	9.75	(48,934)	(13,070)	82,567

and discount rates. The net present value per acre ranges from -$48,934 to $262,505 per acre. A negative net present value is not economically profitable because it will return less than the investors cost of capital. On the other hand, a positive net present value indicates that the investment will cover the cost of capital; thus the investment is profitable. The result of net present value analysis, based on the assumptions of the representative orchard and using a discount rate equal to the cost of capital (12.5 percent), is a positive $13,131. Thus, with these assumptions, the investment is profitable.

An annual payment equivalent to the net present value of the representative orchard can be used to compare other alternative uses with the same planning horizon, of the land. A $21 per acre return to land, risk, and management is the annual equivalent value computed for the representative orchard. If an alternative use of the land yielding greater than the $21 return per acre is available, it would be a more desirable investment than establishing an improved variety pecan orchard.

Internal Rate of Return

Another measure of investment profitability is the internal rate of return. This method, like the net present value method, reflects the time value of money concept. Internal rate of return is defined as the interest rate that equates the present value of the expected future cash flows to the initial cost outlay. Acceptability of alternative management strategies depends upon the comparison of the firms internal rate of return with the operator's required rate of

return. The investment criterion is as follows: if the internal rate of return exceeds the rates on other investments or the minimum acceptable rate then the investment is accepted. The long-term return to agriculture is 4-6 percent before taxes (Boehlje and Eidman, 1984). Based on the representative orchard, investment in the establishment of an improved pecan orchard has a return of 13.64 percent before taxes and 8.87 percent after taxes. The internal rate of return numbers show an acceptable investment.

Scenario Development

To fulfill the final objective, forty scenarios are developed based on the representative orchard that has been analyzed through enterprise budgets, cash flow budget, and capital budgeting analysis. The sensitivity of the investment decision to changes in owner's equity infusions, pecan price, cost of capital, and wage rate will be analyzed. The scenarios are summarized in Table XI.

Group One

Each individual farm operator has limits on capital available for investment purposes as with any other resource. Using the representative orchard's cash flow statement, four combinations of initial owner's equity and annual inflows of owner's equity are considered to determine the effects the use of equity capital has on the financial feasibility of establishing a position in the pecan industry. The annual inflows of owner's equity are assumed to be a percent of the gross cash position. The four combinations that will be analyzed are:

TABLE XI

SUMMARY OF ALL SCENARIO'S FOR EACH PECAN
PRICE, INTEREST RATE, WAGE RATE, AND
OWNER'S EQUITY CAPITAL CONTRIBUTION

Scenario	Pecan Price ($/cwt.)	Interest Rate (%)	Wage Rate ($)	Initial Owner's Equity Capital ($)	Additional[1] Owner's Equity Capital
- - - - - - - - - - - - - - - Group I- - - - - - - - - - - - - - - - -
1	85	12.5	4.65	0	N
2	85	12.5	4.65	0	Y
3	85	12.5	4.65	80,000	N
4	85	12.5	4.65	80,000	Y
- - - - - - - - - - - - - -Group II- - - - - - - - - - - - - - -
5	70	12.5	4.65	0	N
6	70	12.5	4.65	0	Y
7	70	12.5	4.65	80,000	N
8	70	12.5	4.65	80,000	Y
9	125	12.5	4.65	0	N
10	125	12.5	4.65	0	Y
11	125	12.5	4.65	80,000	N
12	125	12.5	4.65	80,000	Y
- - - - - - - - - - - - - Group III - - - - - - - - - - - - - -
13	85	10.0	4.65	0	N
14	85	10.0	4.65	0	Y
15	85	10.0	4.65	80,000	N
16	85	10.0	4.65	80,000	Y
17	85	15.0	4.65	0	N
18	85	15.0	4.65	0	Y
19	85	15.0	4.65	80,000	N
20	85	15.0	4.65	80,000	Y
- - - - - - - - - - - - - -Group IV- - - - - - - - - - - - - - -
21	85	12.5	0	0	N
22	85	12.5	0	0	Y
23	85	12.5	0	80,000	N
24	85	12.5	0	80,000	Y
25	70	12.5	0	0	N
26	70	12.5	0	0	Y
27	70	12.5	0	80,000	N
28	70	12.5	0	80,000	Y
29	125	12.5	0	0	N
30	125	12.5	0	0	Y
31	125	12.5	0	80,000	N
32	125	12.5	0	80,000	Y
33	85	10.0	0	0	N
34	85	10.0	0	0	Y
35	85	10.0	0	80,000	N
36	85	10.0	0	80,000	Y
37	85	15.0	0	0	N
38	85	15.0	0	0	Y
39	85	15.0	0	80,000	N
40	85	15.0	0	80,000	Y

[1] N represents a zero percent and Y represents fifty percent of an amount equal to any negative gross cash position for the year. This amount is the inflow of owner's equity for the year.

A) The operator will not put any money into the investment nor
    will he inject into the orchard each year a portion of the
    gross cash position. In other words, the operator will
    borrow at the specified interest rate all capital required to
    establish the orchard except for the cost of land which is
    assumed owned debt free.

B) The operator will not put any initial amount of money into
    the investment but he will inject into the operation, in any
    year, an amount of equity equal to 50 percent of any negative
    gross cash position. The other half of the needed capital
    will be borrowed at the specified interest rate.

C) The operator can invest 1,000 dollars per acre or 80,000
    dollars into the orchard in year zero. This is a one time
    injection of equity capital to the orchard. The rest of the
    needed capital will be borrowed at the specified interest
    rate.

D) The operator invests 80,000 dollars of owner's equity in year
    zero and, in any year, an amount equal to 50 percent of the
    gross cash position if the balance is negative. The rest of
    the needed capital will be borrowed at the specified interest
    rate.

Results from this group will give the operator an idea of the
influence of adding capital from owner's equity will have on the
amount that will need to be borrowed. This will help the operator
determine investment needs and also, when cash will be available for
payment in order to help a lender tailor loan terms to the cash flow
of the business.

Group Two

The trend in agricultural prices, including the pecan industry, is more erratic than those in most other industries, because of the biological nature and competitive characteristics of farming. The price of any commodity or product in the long run is determined by supply and demand conditions. This second group examines alternative pecan prices so that the operator will have a basis to make adjustments to his operation when changes in supply and demand conditions or changes in the overall economy occur. The two alternative pecan prices examined are $70 per cwt. and $125 per cwt. Each price will be used with each of the equity combinations considered in group one. Results from this group should help producers determine the impact alternative price levels will have on the investment's cash flow.

Group Three

As noted earlier, pecan orchard development is a capital intensive, long-term operation where the cost of borrowed capital becomes an important part of the investment decision. Interest charges are a fixed cost that do not vary with the level of production or the amount of output. Thus, interest must be paid whether the operator has a crop or not. Therefore, it is important to look at alternative interest rates to prepare for changes that might take place from supply and demand conditions, risk loss associated with the loan, administration and supervision costs, competition, or legal restrictions on the maximum interest rates charged. For the third

group, two interest rates are analyzed, 2.5 percent lower and higher than the representative orchard rate of 12.5 percent. Each of the interest rates will be analyzed with each equity investment level from group one, to determine the effect of alternative interest rates on the cash flow of the investment.

Group Four

The final group repeats each of the alternatives for the first three groups under the assumption labor is paid no wage. If no wage is paid, labor will become one of the residual claimants of returns. The purpose of this group is to determine the effect on cash flow if the operator's family supplies all the labor. Even though compensation for operator and family labor will be available indirectly from excess cash flow from the orchard, cash income will first go to pay the non-labor cash expenses of the orchard. Making labor unpaid will improve the cash flow position. Alternatives from this group allows the potential producer to see the decreased borrowed capital requirements when labor is not paid.

CHAPTER IV

ORCHARD INVESTMENT ANALYSIS

The cash flow budget of the representative orchard is condensed

for ease of workability of the scenarios. The assumptions of the

representative orchard are: 1) all money needed for establishment is

borrowed, 2) pecan price is $85 per cwt., 3) interest rate is 12.5

percent, and 4) wage rate is $4.65 per hour. One or more of these

assumptions are changed for each of the scenarios except Scenario One,

the representative orchard. Table XII is a summary of the owner's

equity, maximum outstanding principal balance, and ending cash balance

of each of the forty scenario's.

Group I

Results of Scenario One

Scenario One is the representative orchard. If an operator

starts with only land (land he already owns), based on the

representative orchard assumptions there is never enough cash

generated by the orchard to make a principal payment on the loan. The

amount of capital that must be borrowed to operate in year zero is

$34,143. This amount is also the same as total cash outflows.

Therefore, net cash flow to the owner is a negative $34,143 for year

zero.

TABLE XII

RESULTS FROM THE CASH FLOW BUDGET
FOR ALL SCENARIO'S

Scenario	First Yr. of Positive Net Cash Flow to Owner	Total Amt. of Owner's Equity Capital Contributed	Yr. of Max. Outstanding Principal Balance	Max. Outstanding Principal Balance	Ending Cash Balance
- - - - - - - - - - - - - - Group I - - - - - - - - - - - - - - -					
1	--	0	40	2,645,390	0
2	14	117,713	7	117,713	532,533
3	16	80,000	8	137,181	499,406
4	11	138,630	7	58,630	623,784
- - - - - - - - - - - - - -Group II- - - - - - - - - - - - - -					
5	--	0	40	6,577,440	0
6	19	123,162	8	121,839	266,873
7	26	80,000	8	145,971	174,278
8	12	140,430	7	60,430	377,377
9	19	0	8	305,931	850,957
10	11	112,913	7	112,913	1,196,373
11	12	80,000	7	125,697	1,178,311
12	10	133,830	7	53,829	1,274,328
- - - - - - - - - - - - - - Group III - - - - - - - - - - - - - -					
13	40	0	9	290,913	8,685
14	13	111,817	7	111,817	553,227
15	14	80,000	7	127,570	456,283
16	11	137,069	7	57,069	628,782
17	--	0	40	12,924,560	0
18	15	125,759	8	125,759	506,718
19	18	80,000	8	150,314	451,046
20	11	140,267	7	60,267	618,153
- - - - - - - - - - - - - -Group IV- - - - - - - - - - - - - - -					
21	40	0	9	290,237	13,704
22	12	103,353	7	103,353	595,366
23	12	80,000	7	98,838	689,234
24	10	124,322	7	44,322	765,046
25	--	0	40	2,841,881	0
26	14	105,153	7	105,153	430,431
27	14	80,000	7	102,438	380,137
28	11	126,122	7	46,122	466,141
29	16	0	8	261,351	905,953
30	11	98,553	7	98,553	1,166,610
31	10	80,000	7	89,238	1,178,811
32	9	119,522	7	39,522	1,412,622
33	24	0	8	248,000	421,682
34	12	98,142	7	98,142	609,970
35	12	80,000	7	94,486	615,020
36	10	123,433	7	43,433	680,583
37	--	0	40	5,458,209	0
38	13	108,893	7	108,893	576,770
39	13	80,000	7	103,591	673,352
40	16	125,252	7	45,252	675,028

By year seven, which is the first year of pecan harvest, the gross cash position (inflows minus expenses, labor, interest, and income taxes) is a negative $82,162. There is no principal or interest paid. The outstanding loan balance is $306,133 after total cash outflows of $74,565. The net cash flow to the owner (the inflows minus total cash outflows) is a negative $54,165.

Beginning in year eight, inflows are such that operating expenses, labor, income taxes, and a part of the interest can be paid. The net cash position is a negative $23,238 and the outstanding loan balance is $329,371. The total cash outflow is $34,000 which is equal to the inflows when there is an outstanding loan balance and not enough funds to pay the balance off. With outflows equal to inflows, the net cash flow to the owner is zero.

The net cash flow to the owner remains at zero until year thirty-seven when it becomes negative again because the interest payment can not be made. In year thirty-seven, a large amount of capital is needed to purchase equipment that has worn out. The total cash outflows, in year thirty-seven, equaled $69,388 with inflows equalling $68,000.

By year forty, the net cash position is a negative $259,343. The loan balance is $2,645,390. The inflows equal outflows making the net cash flow to the owner zero.

The results of this scenario suggest that some amount of equity capital needs to be contributed to reduce the amount of cash interest that must be paid. Before any returns are realized, debt accumulates to $223,971. The operation does not generate enough excess cash to completely service a debt of this magnitude.

Results of Scenario Two

An amount of owner's equity capital equal to 50 percent of any negative gross cash position is invested in the operation. The rest of the needed capital is assumed borrowed. For year zero, the amount borrowed, $17,071, is only one-half the amount borrowed in scenario one. The gross cash position is still a negative $34,143 but now the operator injects $17,071 into the investment.

Year seven is the last year the orchard has a negative gross cash position thus, the owner contributes no owner's equity capital after year seven. The total amount of contribution through year seven is $117,713. By year eight the gross cash position is $314. All operating and capital expenses, labor charges, and interest are paid. Taxable income is negative, therefore $11,376 is applied to the payment of the cash expenses, labor, and interest expenses. With a gross cash position of $314 and an outstanding loan balance, the outstanding loan balance can be reduced. The outstanding loan balance at the end of the eighth year is $117,399. There is a zero outstanding loan balance in year fourteen and a positive net cash flow to the owner of $18,849. No new borrowings are needed after year fourteen. There are three years that the net cash flow to the owner is negative -- years twenty, thirty-five, and thirty-seven -- meaning cash will need to be withdrawn from previous cash flows to the owner. The reason for these negative cash flows to the owner is that in years twenty and thirty-five, the trees are thinned cutting back on pecan yields which reduces income. In year thirty-seven, there is a large capital expense which contributes to the negative net cash flow to the

owner. By year forty, the net cash position is $532,533 and net cash flow to the owner is $24,667.

The results from injecting into the operation owner's equity capital equal to 50 percent of any negative annual gross cash position are 1) a positive net cash flow to the owner by year fourteen, 2) a zero outstanding loan balance after year fifteen, 3) an owner's equity contribution of $117,713, and 4) a maximum outstanding loan balance of $117,713.

Results of Scenario Three

In this scenario, $80,000 of owners equity capital is injected in the operation in year zero. Capital is not borrowed in year zero, but in year one, $18,691 is borrowed to maintain the operation. By year nine, enough income is generated to begin reducing the outstanding loan balance. The outstanding loan balance becomes zero in year sixteen. The net cash flow to the owner, in year twenty, is a negative $13,171 due to the thinning of the trees. In year twenty-one, net cash flow to the owner is $27,756. Again, years thirty-five and thirty-seven have a negative net cash flow to the owner because of the decrease in income from thinning the trees and a large amount of capital expenses. By year forty, the net cash position is $499,406, and the net cash flow to the owner is $24,667.

Injection of $80,000 of owner's equity capital, in year zero, leads to 1) a positive net cash flow to the owner by year sixteen, 2) a zero outstanding loan balance by year seventeen, 3) a total contribution of owner's equity capital of $80,000, and 4) a maximum outstanding loan balance of $63,180.

Results of Scenario Four

Scenario four assumes that $80,000 of owner's equity capital is invested in the orchard in year zero, and in any year thereafter, an amount of owner's equity capital equal to 50 percent of any negative gross cash position is invested in the orchard. The owner contributes through year six $109,692 and the outstanding loan balance is $29,692. The total amount of owner's equity capital contributed through year seven is $138,630. After year seven, contributions from the owner are not required. By year eleven, the outstanding loan balance is zero and the net cash flow to the owner is a positive $16,740. After year eleven, additional financing is not needed. There is enough cash to operate the orchard with positive net cash flows except for years twenty, thirty-five, and thirty-seven. By year forty, the net cash position is $623,784 and the net cash flow to the owner is $24,667.

The results of the owner's equity contributions are 1) a positive net cash flow to the owner by year eleven, 2) a zero outstanding loan balance by year twelve, 3) a total contribution of owner's equity capital of $138,630, and 4) a maximum outstanding loan balance of $58,630.

Group II

The change that will be considered for group II is the pecan price. The pecan price is changed first to $70 per cwt. and then to $125. Each of the equity situation from group I are examined for both prices. From the eight different mixtures of pecan prices and equity combinations, four mixtures with significant changes are discussed.

Results of Scenario Six

This scenario examines the injection of an amount of owner's equity capital equal to 50 percent of the gross cash position, if negative, when the pecan price is $70 per cwt. By year eight, the maximum loan balance of $121,839 occurs. New borrowings are needed in only a few years after year eight, but the inflows are not enough to decrease the outstanding loan balance to zero until the nineteenth year of operation. The net cash flow to the owner becomes positive in year nineteen and stays positive except for years twenty, thirty-five, and thirty-seven. The net cash position becomes positive in year nineteen. Additional financing is needed for year twenty. The loan is paid off in year twenty-two. The total amount of owner's equity that is contributed is $123,163. By year forty, the ending cash balance is $226,873 and the net cash flow to the owner is $16,873. The results of this scenario suggest that even with a low pecan price, if the operator can contribute an amount equal to 50 percent of any negative gross cash position, the orchard may realize positive cash flows to the owner.

Results of Scenario Seven

This scenario assumes a $70 per cwt. pecan price with the owner contributing $80,000 of owner's equity capital in year zero. The maximum outstanding loan balance, $145,971, occurs in year eight. Principal reductions are made beginning in year nine. The outstanding loan balance becomes zero in year twenty-six even though additional borrowings are needed in some years after year nine. Net cash flow to

the owner becomes positive in year twenty-six but becomes negative again in years twenty-seven, thirty-five, and thirty-seven. By year forty the cash balance is $174,278, the net cash flow to the owner is $16,867, and the outstanding loan balance is zero.

The results from injecting $80,000 of owner's equity capital in year zero at a low pecan price are 1) a positive net cash flow to the owner by year twenty-six, 2) an outstanding loan balance paid off by year twenty-nine, and 3) a maximum outstanding loan balance of $145,971.

Results of Scenario Nine

This scenario considers a pecan price of $125 per cwt. and no owner contributions of owner's equity capital. If an operator is willing to carry a large debt amount, then a positive net cash flow to the owner can be obtained in year nineteen and the loan paid off in year twenty. Net cash flow to the owner becomes negative in the years typical to previous scenarios. By the end of the planning horizon, (year forty) the ending cash balance is $850,957. In this year, the net cash flow to the owner is $45,467.

The results from being totally financed and obtaining a $125 price per cwt. are 1) a positive net cash flow to the owner by year nineteen, 2) a zero outstanding loan balance by year twenty, and 3) a maximum outstanding loan balance of $305,931.

Results of Scenario Eleven

This scenario considers a pecan price of $125 per cwt. and an initial owner's equity capital contribution of $80,000 in year zero.

When this equity assumption was used with the $70 per cwt. pecan price the loan was paid off in year twenty-nine. With a $125 per cwt. pecan price, the loan is paid off in year thirteen. After year seven, no additional borrowings are needed to maintain this operation. Net cash flow to the owner becomes positive in year twelve, $51,091, and is only negative in the two years that the trees are cut. Total amount of owner's equity capital contribution is $80,000. Total amount borrowed is $125,697. The net cash position becomes positive in year twelve. By year forty, the ending cash balance is $1,178,311 and the net cash flow to the owner is $45,467.

Group III

Group III examines the impact of different interest rates on the financial feasibility of the orchard. The agricultural sector is a very capital intensive sector and is very susceptible to interest rate variability. Higher interest rates increase interest costs to farmers and threatens the financial health of those who are heavily in debt. Lower interest rates, of course, lends relief to those farmers. The four equity assumptions are analyzed with interest rates of 10 and 15 percent. The combinations with significant changes are discussed.

Results of Scenario Fourteen

This scenario assumes 50 percent of any negative gross cash position and an interest rate of 10 percent. The maximum outstanding loan balance is $111,817 and occurs in year seven. After year seven, additional financing is not needed. The operator contributes an amount of equity capital equal to 50 percent of the gross cash

position, if negative, to the operation, thus, total owner contribution is $111,817. Beginning in year eight, the operation generates enough cash to pay all expenses plus a portion of the outstanding loan balance. In year thirteen, the net cash flow to the owner becomes positive and remains positive throughout the life of the orchard with the exception of the three years with large expenses or tree thinning. The outstanding loan balance is paid off in year fourteen. The lower interest rate allows for a quicker payoff date and lower interest costs. By year forty, the ending cash balance is $553,227 and the net cash flow to the owner is $24,667.

Results of Scenario Sixteen

For this scenario, $80,000 of owner's equity capital is injected in year zero and 50 percent of any negative gross cash position is injected as owner's equity capital. Borrowed funds are still needed to operate but, with a 10 percent interest rate, capital requirements are much easier to handle. The owner contributes $137,069 through year seven. The maximum outstanding loan balance, for this scenario, occurs in year seven, and is $57,069. Neither additional financing nor additional owner contribution is needed after year seven. The net cash flow to the owner is negative through year seven, zero for three years, then becomes positive in year eleven. This amount becomes negative for the same three years as in previous scenarios. The lower interest rate allows more of the income to be applied towards the outstanding loan balance allowing the loan to be paid off by year twelve. By year forty, the ending cash balance is $628,782 and the net cash flow to the owner is $24,667.

Results of Scenario Seventeen

This interest rate scenario is the worst one for the farmers. Here the interest rate is set at 15 percent and all operating capital is financed. Serious cash shortfalls become the issue when there are high interest costs. There is no chance for survival when the operator must pay interest on interest at high interest rates. By the year that income is realized, (seven) the outstanding loan balance is already $340,667 and continues to grow. Principal payments can never be made and only partial interest payments are made. By year forty, the interest charge is $1,690,888 and the outstanding loan balance is $12,924,560.

Results of Scenario Eighteen

With an additional source of capital, the high interest rates can be tolerated. In this scenario, an amount of owner's equity capital equal to 50 percent of any negative gross cash position is injected to the operation. The interest rate on non-equity capital is 15 percent. The maximum outstanding principal balance and the amount contributed by the owner is $125,759 and occurs in year eight. No additional capital from either source is needed after year eight. Cash flows become positive for the owner in year fifteen. The outstanding loan balance is paid off in year sixteen. Again there are three years of negative returns to the owner after year fifteen. The ending cash balance, by year forty, is $506,718 and the net cash flow to the owner is $24,667. With a no cost source of capital, the operation can be financially feasible even at high interest rates.

Group IV

Labor is a significant factor in agricultural production. Group IV shows the impact of using all unpaid owner-operator and family labor instead of hired labor. Use of unpaid labor will decrease cash costs while increasing net cash flows. Group IV looks at each of the alternatives from the previous three groups with labor paid a wage rate of zero. Only the combinations with major changes are discussed.

Results of Scenario Twenty-three

This scenario is based on the representative orchard with an initial owner's equity contribution in year zero of $80,000. With the wage rate at zero, this cuts cash costs by about $5,500 per year. The corresponding scenario with labor charges, number 3, yields positive returns to the owner in year sixteen. By cutting out the labor charge, positive returns to the owner occur in year twelve, four years sooner. The maximum outstanding principal balance is $98,838 and occurs in year seven. This amount is considerably lower than the scenario with labor charges. Decreasing the need for borrowed funds lowers the interest charges, making cash increase quicker than with the added cash cost of labor. The outstanding loan balance is completely paid off by year thirteen. By year forty, the net cash flow to the owner is $28,234 and the ending cash balance is $689,234.

Results of Scenario Twenty-six

The assumptions for this scenario are 1) a pecan price of $70 per cwt., 2) an interest rate of 15 percent, and 3) an amount of owner's

equity equal to 50 percent of any negative gross cash position is injected into the operation. With the zero wage rate, a considerable difference is made in this scenario as compared with the same scenario with a wage rate of $4.65. A quicker positive cash flow to the owner is realized five years sooner. Again the maximum outstanding principal balance decreases substantially from $121,838 to $105,153 - a difference of $16,686. Total owner contribution decreases as well. The outstanding loan balance is fully paid off in year fifteen. This scenario also has a $15 per cwt. lower price than the representative orchard and still shows positive returns. By year forty, the net cash flow to the owner is $20,434 and the ending cash balance is $430,431.

Results of Scenario Thirty-two

The most optimistic scenario considered is: a pecan price of $125 per cwt., an injection of $80,000 owner's equity capital in year zero, and an injection of owner's equity capital equal to 50 percent of any negative gross cash position. The outstanding loan balance is paid off in year ten, just three years after the pecans become productive. A positive net cash flow to the owner is realized in year nine and is never again negative. For these price and equity assumptions, changing the wage rate from $4.65 to zero has little effect on the cash flow of the operation. When the wage rate is $4.65, the loan is paid off in year eleven. The total owner contribution is $119,522. By year forty, the net cash flow to the owner is $49,034 and the cash balance is $1,412,662.

Results of Scenario Thirty-three

This scenario assumes no owner equity contributions and the interest rate is 10 percent. The outcome is quite different than the same scenario with the wage rate at $4.65 per hour. When the wage rate is $4.65, the loan is never paid off. With the wage rate at zero, the loan is paid off in year twenty-five. The owner realizes a positive net cash flow by year twenty-four. By year forty, the net cash flow to the owner is $28,234 and the ending cash balance is $421,682. Even with years showing positive returns, these assumptions may not allow the establishing operator to get ahead, but for future generations - a feasible enterprise.

Results of Scenario Thirty-nine

For this scenario, an owner's equity contribution of $80,000 is made in year zero, and the interest rate is 15 percent. With this high rate of interest, the less borrowed the better off the operator is. Setting the wage rate to zero, decreases the amount of borrowed capital required. Not only does the zero wage rate take away labor costs, but it also decreases interest expenses. The effect that this has on the feasibility is five years. Meaning that, when comparing the same scenarios, but with different wage rates, there is a five year difference in the payoff of the loan. When the wage rate is $4.65, the payoff is in year nineteen, and when the wage rate is zero the payoff is in year fourteen. The owner's net cash flow becomes positive in year thirteen, when the wage rate is zero. The maximum outstanding principal balance, when the wage rate is zero, is $103,591,

and when the wage rate is \$4.65 the amount is \$150,314. When the
interest rate is high, the smaller amount of borrowed capital needed,
while still maintaining efficiency, the better off the operator will
be.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS FOR

FURTHER RESEARCH

Conclusions

The agricultural industry today is experiencing low net farm income thus, increasing the need for diversification of the farm enterprise mix. Diversification is a management strategy of producing a number of different commodities in order to use resources more efficiently or to reduce risk (Castle, Becker, and Nelson, 1987). This study examined the feasibility of establishing an improved variety pecan orchard as a means of diversification to increase farm income.

Total U.S. pecan production appears to be trending upward over the last ten years. Total U.S. pecan production increased 18.6 percent between 1971-75 and 1981-85 with southwestern production, which includes Oklahoma, increasing 13.0 percent (Texas Agricultural Experiment Station, March 1986). Without economic costs and returns, profitability, and feasibility studies, there is little incentive for the operator to use a pecan enterprise as an alternative crop. This study was designed to determine the economic factors which influence the establishment of a pecan orchard. The study included an assessment of enterprise budgets, cash flow budgeting, and capital

budgeting analysis of the representative orchard to determine the financial feasibility and economic profitability of the investment decision.

Enterprise budgets, from the year before establishment to year forty, showing costs and returns of producing and selling pecans on a monthly basis were developed using the Oklahoma State University Enterprise Budget Generator. Machinery and input requirements, prices, and production potential of the representative orchard were determined with the help of Oklahoma State University horticulturists.

Feasibility and profitability analysis were both completed for the representative orchard. Feasibility involves whether or not the cash flows are there to sustain the project. The conclusions from developing a long-term cash flow budget of the representative orchard proved not feasible. The revenue from the sale of pecans was not enough to cover the ever increasing interest expense. The years of non-production and large capital expenses were contributing factors to the high cost.

A capital budgeting analysis of the representative orchard was used to determine profitability. The net present value and internal rate of return criteria both concluded that a pecan orchard was a desirable investment. However, at a discount rate of 12.5 percent, the accumulation of annual present values does not become positive until year thirty-one.

Scenario's were developed, based on the representative orchard, to determine the sensitivity of the financial feasibility of the investment decision to changes in pecan prices, interest rates, and wage rates. Four combinations of initial owner's equity capital and

annual inflows of owner's equity were added to the scenario's to determine the amount of borrowed funds and the amount of funds contributed from the owner for a feasible investment.

Changing the pecan price, interest rate, or wage rate made significant influences on feasibility but, the greatest significance was the injection of cost free owner's equity into the operation. In the best case scenario, when all operating funds were from an owner's alternative cost free source, the wage rate equal to zero, and the pecan price equal to $125 per cwt., a positive net cash flow to the owner was realized in year ten. Ten years is three years after the initial production year. Even with the worst combinations of pecan price and wage rate, the investment proved feasible when all operating funds were from an owner's alternative cost free source. This is not to say that establishing a pecan orchard is not feasible with all or partially borrowed funds but, that it takes a significant longer time to realize positive returns to the owner when there are large amounts of interest payments to make.

These scenario's show how sensitive the feasibility and profitability of a pecan orchard investment are to interest rates. Increase interest costs only threatens the financial health of the farmer.

Recommendations for Further Research

Suggestions for further research basically entails bringing more realism into the operation. The study is based on a constant pecan price and yield schedule for forty-one years. These constant variables probably cause distortions in the investment analysis. To

be more true to the erratic form of the pecan industry, one suggestion is to research price and yield trends to get a more accurate investment analysis. Another suggestion is to look at alternative ways to cut capital expenditure costs. Capital expenditures have an enormous effect on feasibility and profitability in this type of operation. In reality, a farmer will choose the least-cost way of operation.

Machinery costs are a large part of the total cost of production for pecans and therefore, the potential exists for substantial cost savings in this area. Machinery management should be an important area of managerial concern. Control over machinery costs is accomplished by efficient use and management decisions regarding the number, type, and size of machinery to be used, purchasing new or used machinery, and the extent to which machinery requirements are met by leasing machinery or hiring custom operators. Machinery is costly to purchase, own, and operate. Good machinery management requires a knowledge of these costs and how they are related to machinery use. One alternative for cutting cost is the lease versus ownership option for machinery and equipment.

A final suggestion might be to produce part native variety and part improved variety pecans. An unmanaged native pecan grove can yield returns the same year of development whereas the improved variety takes seven years after the preplant year to realize returns. If an unmanaged grove is available, development of it could ease the cash flow problems found from establishing the improved variety pecans. A linear programming model could be developed to choose the most efficient allocation of resources, the value of those resources,

and the optimal combination of native and improved variety pecans that maximizes profits.

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APPENDIX

ENTERPRISE BUDGETS

Budgets, for years one through twelve, twenty through twenty-two and forty, are shown in Table XIII through XXIX. Other even year budgets are essentially the same as year eight and odd years the same as year seven. Differences occur due to changes in prorated establishment cost, yields, irrigation, and potash requirements. No potash is used in the nonreported years, except years fifteen, twenty-five, thirty, and thirty-five.

Irrigation costs are presented in Table VI. Yields are presented in Table VII. Total operating cost, fixed costs, and gross returns, for each year, are presented in VIII.

TABLE XIII

PECANS (IMPROVED VARIETY) YEAR BEFORE
ESTABLISHMENT

PECANS (IMPROVED VARIETY) YEAR BEFORE ESTABLISHMENT

OKLAHOMA

OPERATING INPUTS:	UNITS	PRICE	QUANTITY	VALUE	YOUR VALUE
ROUNDUP	GAL.	98.590	1.000	98.59	_____
2-4-D	PT.	5.300	1.000	5.30	_____
PHOSPH (P205)	LBS.	0.150	100.000	15.00	_____
POTASH (K20)	LBS.	0.090	100.000	9.00	_____
NITROGEN (N)	LBS.	0.160	50.000	8.00	_____
SOIL TEST	ACRE	6.000	0.010	0.06	_____
WHEAT SEED	BU.	4.100	1.000	4.10	_____
CUSTOM SPRD FERT	ACRE	2.000	1.000	2.00	_____
CUSTOM PLOW	ACRE	9.000	1.000	9.00	_____
CUSTOM DISK	ACRE	6.000	1.000	6.00	_____
CUSTOM HARROW	ACRE	3.000	1.000	3.00	_____
CUSTOM DRILL GR	ACRE	5.000	1.000	5.00	_____
ANNUAL OPERATING CAPITAL	DOL.	0.125	48.767	6.10	_____
LABOR CHARGES	HR.	4.650	3.145	14.62	_____
MACHINERY FUEL,LUBE,REPAIRS	ACRE			13.40	_____

TOTAL OPERATING COST   199.16 _____

FIXED COSTS		VALUE	YOUR VALUE
MACHINERY			
INTEREST AT 12.5%	DOL.	7.006	_____
DEPR.,TAXES,INSUR.	DOL.	7.541	_____
LAND			
INTEREST AT 0.0%	DOL.	0.000	_____
TAXES	DOL.	0.000	_____

TOTAL FIXED COSTS   14.55 _____

100# PHOSPH. AND POTASH; AND 50# NITROGEN   CAMPBELL,SCHATZER,SMITH,GALLOTT
APPLIED PER ACRE. ROUNDUP, 2-4-D 1 APPLICATION.
                                                    05/16/87

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TABLE XIV

PECANS (IMPROVED VARIETY) ESTABLISHMENT YEAR

PECANS (IMPROVED VARIETY) ESTABLISHMENT YEAR 35 FEET BY 35 FEET ROW SPACINGS 6 FEET STRIP OF CLEAR GROUND ALONG ROW				OKLAHOMA	
OPERATING INPUTS:	UNITS	PRICE	QUANTITY	VALUE	YOUR VALUE
PARAQUAT	QT.	13.570	0.330	4.48	_____
SURFLAN 75W	LBS.	14.590	0.830	12.11	_____
TREES	EA.	11.750	36.000	423.00	_____
ORTHO X77	PT.	2.040	0.080	0.16	_____
10-10-10 FERT	LBS.	0.099	36.000	3.56	_____
ZNSO4	LBS.	0.483	6.000	2.90	_____
ZOLONE	QT.	8.500	4.000	34.00	_____
ESTAB PRORATE	DOL.	1.000	26.710	26.71	_____
ANNUAL OPERATING CAPITAL	DOL.	0.125	404.857	50.61	_____
LABOR CHARGES	HR.	4.650	12.863	59.81	_____
MACHINERY FUEL,LUBE,REPAIRS	ACRE			30.37	_____
IRRIGATION FUEL,LUBE,REPAIRS	ACRE			0.69	_____
TOTAL OPERATING COST				648.40	_____

FIXED COSTS		VALUE	YOUR VALUE
MACHINERY			
INTEREST AT 12.5%	DOL.	18.140	_____
DEPR.,TAXES,INSUR.	DOL.	18.711	_____
IRRIGATION			
INTEREST AT 12.5%	DOL.	11.353	_____
DEPR.,TAXES,INSUR.	DOL.	10.259	_____
LAND			
INTEREST AT 0.0%	DOL.	0.000	_____
TAXES	DOL.	0.000	_____
TOTAL FIXED COSTS		58.46	_____

1# 10-10-10 PER TREE APPLIED AT PLANTING   CAMPBELL,SCHATZER,SMITH,GALLOTT
PARAQUAT, SURFLAN, ORTHO X-77 1APPLIC; ZOLONE,   2ND COMP
2 APPLIC; ZNSO4, 3 APPLIC.   08/11/87

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TABLE XV

PECANS (IMPROVED VARIETY) YEAR TWO

PECANS (IMPROVED VARIETY) YEAR 2
35 FEET BY 35 FEET ROW SPACINGS   OKLAHOMA
6 FEET STRIP OF CLEAR GROUND ALONG ROW

OPERATING INPUTS:	UNITS	PRICE	QUANTITY	VALUE	YOUR VALUE
10-10-10 FERT	LBS.	0.099	72.000	7.13	_____
PARAQUAT	QT.	13.570	0.170	2.31	_____
ORTHO X77	PT.	2.040	0.080	0.16	_____
ZNSO4	LBS.	0.483	6.000	2.90	_____
ZOLONE	QT.	8.500	4.000	34.00	_____
SOLICAM	LBS.	14.260	0.500	7.13	_____
10% TREE LOSS	EA.	11.750	3.600	42.30	_____
ESTAB PRORATE	DOL.	1.000	115.070	115.07	_____
ANNUAL OPERATING CAPITAL	DOL.	0.125	76.490	9.56	_____
LABOR CHARGES	HR.	4.650	7.668	35.65	_____
MACHINERY FUEL,LUBE,REPAIRS	ACRE			22.77	_____
IRRIGATION FUEL,LUBE,REPAIRS	ACRE			0.69	_____

TOTAL OPERATING COST   279.68 _____

FIXED COSTS		VALUE	YOUR VALUE
MACHINERY			
INTEREST AT 12.5%	DOL.	14.080	_____
DEPR.,TAXES,INSUR.	DOL.	13.949	_____
IRRIGATION			
INTEREST AT 12.5%	DOL.	11.353	_____
DEPR.,TAXES,INSUR.	DOL.	10.259	_____
LAND			
INTEREST AT 0.0%	DOL.	0.000	_____
TAXES	DOL.	0.000	_____

TOTAL FIXED COSTS   49.64 _____

ASSUME 10% TREE LOSS. PARAQUAT, SOLICAM,   CAMPBELL,SCHATZER,SMITH,GALLOTT
ORTHO X-77 1 APPLIC. 2# 10-10-10 PER TREE. ZOLONE 2 APPLIC;   2ND COMP
ZNSO4 3 APPLIC.   08/11/87

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TABLE XVI

PECANS (IMPROVED VARIETY) YEAR THREE

```
PECANS (IMPROVED VARIETY) YEAR 3
35 FEET BY 35 FEET ROW SPACINGS                          OKLAHOMA
6 FEET STRIP OF CLEAR GROUND ALONG ROW
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OPERATING INPUTS:	UNITS	PRICE	QUANTITY	VALUE	YOUR VALUE
10-10-10 FERT	LBS.	0.099	108.000	10.69	_____
SURFLAN 75W	LBS.	14.590	0.500	7.30	_____
PARAQUAT	QT.	13.570	0.170	2.31	_____
ORTHO X77	PT.	2.040	0.080	0.16	_____
ZNSO4	LBS.	0.483	6.000	2.90	_____
ZOLONE	QT.	8.500	4.000	34.00	_____
ESTAB PRORATE	DOL.	1.000	156.240	156.24	_____
ANNUAL OPERATING CAPITAL	DOL.	0.125	45.442	5.68	_____
LABOR CHARGES	HR.	4.650	6.946	32.30	_____
MACHINERY FUEL,LUBE,REPAIRS	ACRE			21.93	_____
IRRIGATION FUEL,LUBE,REPAIRS	ACRE			0.69	_____

TOTAL OPERATING COST				274.19	_____

FIXED COSTS			VALUE	YOUR VALUE
MACHINERY				
INTEREST AT 12.5%	DOL.		13.629	_____
DEPR.,TAXES,INSUR.	DOL.		13.419	_____
IRRIGATION				
INTEREST AT 12.5%	DOL.		11.353	_____
DEPR.,TAXES,INSUR.	DOL.		10.259	_____
LAND				
INTEREST AT 0.0%	DOL.		0.000	_____
TAXES	DOL.		0.000	_____

TOTAL FIXED COSTS		48.66	_____

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3# 10-10-10 PER TREE. PARAQUAT, SOLICAM,       CAMPBELL,SCHATZER,SMITH,GALLOTT
ORTHO X77 1 APPLIC. ZOLONE 2 APPLIC. ZNSO4 3 APPLIC.                    2ND COMP
                                                      08/11/87
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TABLE XVII

PECANS (IMPROVED VARIETY) YEAR FOUR

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PECANS (IMPROVED VARIETY) YEAR 4
35 FEET BY 35 FEET ROW SPACINGS                      OKLAHOMA
6 FEET STRIP OF CLEAR GROUND ALONG ROW
```

OPERATING INPUTS:	UNITS	PRICE	QUANTITY	VALUE	YOUR VALUE
NITROGEN (N)	LBS.	0.160	100.000	16.00	_____
PARAQUAT	QT.	13.570	0.170	2.31	_____
ORTHO X77	PT.	2.040	0.080	0.16	_____
SOLICAM	LBS.	14.260	0.500	7.13	_____
PRINCEP 80W	LBS.	3.700	0.250	0.92	_____
ZNSO4	LBS.	0.483	6.000	2.90	_____
ZOLONE	QT.	8.500	4.000	34.00	_____
CUSTOM SPRD FERT	ACRE	2.000	1.000	2.00	_____
ESTAB PRORATE	DOL.	1.000	196.590	196.59	_____
ANNUAL OPERATING CAPITAL	DOL.	0.125	52.425	6.55	_____
LABOR CHARGES	HR.	4.650	8.496	39.51	_____
MACHINERY FUEL,LUBE,REPAIRS	ACRE			21.93	_____
IRRIGATION FUEL,LUBE,REPAIRS	ACRE			1.39	_____
TOTAL OPERATING COST				331.38	_____

FIXED COSTS		VALUE	YOUR VALUE
MACHINERY			
INTEREST AT 12.5%	DOL.	13.629	_____
DEPR.,TAXES,INSUR.	DOL.	13.419	_____
IRRIGATION			
INTEREST AT 12.5%	DOL.	11.353	_____
DEPR.,TAXES,INSUR.	DOL.	10.259	_____
LAND			
INTEREST AT 0.0%	DOL.	0.000	_____
TAXES	DOL.	0.000	_____
TOTAL FIXED COSTS		48.66	_____

```
100# NITROGEN PER ACRE. PARAQUAT, SOLICAM,     CAMPBELL,SCHATZER,SMITH,GALLOTT
ORTHO X77, PRINCEP 80W 1 APPLIC. ZOLONE 2 APPLIC.                        2ND COMP
ZNSO4 3 APPLIC.                                     08/11/87
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TABLE XVIII

PECANS (IMPROVED VARIETY) YEAR FIVE

PECANS (IMPROVED VARIETY) YEAR 5
35 FEET BY 35 FEET ROW SPACINGS   **OKLAHOMA**
6 FEET STRIP OF CLEAR GROUND ALONG ROW

OPERATING INPUTS:	UNITS	PRICE	QUANTITY	VALUE	YOUR VALUE
NITROGEN (N)	LBS.	0.160	100.000	16.00	_____
PARAQUAT	QT.	13.570	0.170	2.31	_____
ORTHO X77	PT.	2.040	0.080	0.16	_____
SURFLAN 75W	LBS.	14.590	0.500	7.30	_____
KARMEX	LBS.	5.960	0.250	1.49	_____
ZNSO4	LBS.	0.483	6.000	2.90	_____
ZOLONE	QT.	8.500	4.000	34.00	_____
CUSTOM SPRD FERT	ACRE	2.000	1.000	2.00	_____
ESTAB PRORATE	DOL.	1.000	244.100	244.10	_____
ANNUAL OPERATING CAPITAL	DOL.	0.125	53.034	6.63	_____
LABOR CHARGES	HR.	4.650	8.496	39.51	_____
MACHINERY FUEL,LUBE,REPAIRS	ACRE			21.93	_____
IRRIGATION FUEL,LUBE,REPAIRS	ACRE			1.39	_____
TOTAL OPERATING COST				379.70	_____

FIXED COSTS		VALUE	YOUR VALUE
MACHINERY			
INTEREST AT 12.5%	DOL.	13.629	_____
DEPR.,TAXES,INSUR.	DOL.	13.419	_____
IRRIGATION			
INTEREST AT 12.5%	DOL.	11.353	_____
DEPR.,TAXES,INSUR.	DOL.	10.259	_____
LAND			
INTEREST AT 0.0%	DOL.	0.000	_____
TAXES	DOL.	0.000	_____
TOTAL FIXED COSTS		48.66	_____

100# NITROGEN PER ACRE. PARAQUAT, SURFLAN 75W,   CAMPBELL,SCHATZER,SMITH,GALLOTI
ORTHO X77, KARMEX 1 APPLIC. ZOLONE 2 APPLIC.   2ND COMP
ZNSO4 3 APPLIC.   08/11/87

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TABLE XIX

PECANS (IMPROVED VARIETY) YEAR SIX

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PECANS (IMPROVED VARIETY) YEAR 6
35 FEET BY 35 FEET ROW SPACINGS                              OKLAHOMA
6 FEET STRIP OF CLEAR GROUND ALONG ROW
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OPERATING INPUTS:	UNITS	PRICE	QUANTITY	VALUE	YOUR VALUE
NITROGEN (N)	LBS.	0.160	100.000	16.00	_____
PARAQUAT	QT.	13.570	0.170	2.31	_____
ORTHO X77	PT.	2.040	0.080	0.16	_____
SOLICAM	LBS.	14.260	0.500	7.13	_____
PRINCEP 80W	LBS.	3.700	0.250	0.92	_____
ZNSO4	LBS.	0.483	6.000	2.90	_____
ZOLONE	QT.	8.500	4.000	34.00	_____
CUSTOM SPRD FERT	ACRE	2.000	1.000	2.00	_____
ESTAB PRORATE	DOL.	1.000	297.640	297.64	_____
ANNUAL OPERATING CAPITAL	DOL.	0.125	52.425	6.55	_____
LABOR CHARGES	HR.	4.650	8.496	39.51	_____
MACHINERY FUEL,LUBE,REPAIRS	ACRE			21.93	_____
IRRIGATION FUEL,LUBE,REPAIRS	ACRE			1.39	_____

TOTAL OPERATING COST				432.43	_____

FIXED COSTS		VALUE	YOUR VALUE
MACHINERY			
INTEREST AT 12.5%	DOL.	13.629	_____
DEPR.,TAXES,INSUR.	DOL.	13.419	_____
IRRIGATION			
INTEREST AT 12.5%	DOL.	11.353	_____
DEPR.,TAXES,INSUR.	DOL.	10.259	_____
LAND			
INTEREST AT 0.0%	DOL.	0.000	_____
TAXES	DOL.	0.000	_____

TOTAL FIXED COSTS	48.66	_____

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100# NITROGEN PER ACRE. PARAQUAT, ORTHO X77,     CAMPBELL,SCHATZER,SMITH,GALLOTT
SOLICAM, PRINCEP 80W 1 APPLIC. ZNSO4 3 APPLIC.                          2ND COMP
ZOLONE 2 APPLIC.                                 08/11/87
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TABLE XX

PECANS (IMPROVED VARIETY) YEAR SEVEN

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PECANS (IMPROVED VARIETY) YEAR 7
35 FEET BY 35 FEET ROW SPACINGS                    OKLAHOMA
6 FEET STRIP OF CLEAR GROUND ALONG ROW
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OPERATING INPUTS:	UNITS	PRICE	QUANTITY	VALUE	YOUR VALUE
BURLAP SACK FEE	EACH	0.030	3.000	0.09	
PARAQUAT	QT.	13.570	0.170	2.31	
ORTHO X77	PT.	2.040	0.080	0.16	
SURFLAN 75W	LBS.	14.590	0.500	7.30	
KARMEX	LBS.	5.960	0.250	1.49	
NITROGEN (N)	LBS.	0.160	100.000	16.00	
LORSBAN 4E	PT.	5.120	4.500	23.04	
ZNSO4	LBS.	0.483	6.000	2.90	
BENLATE 50W	LBS.	14.260	1.500	21.39	
DU-TER	LBS.	12.320	2.000	24.64	
ZOLONE	QT.	8.500	4.000	34.00	
SEVIN 80W	LBS.	3.010	9.000	27.09	
MALATHION 57EC	QT.	5.380	2.250	12.10	
CUSTOM SPRD FERT	ACRE	2.000	1.000	2.00	
ESTAB PRORATE	DOL.	1.000	357.780	357.78	
ANNUAL OPERATING CAPITAL	DOL.	0.125	102.622	12.83	
LABOR CHARGES	HR.	4.650	12.421	57.76	
MACHINERY FUEL,LUBE,REPAIRS	ACRE			67.12	
IRRIGATION FUEL,LUBE,REPAIRS	ACRE			5.55	
TOTAL OPERATING COST				675.54	

FIXED COSTS		VALUE	YOUR VALUE
MACHINERY			
INTEREST AT 12.5%	DOL.	44.957	
DEPR.,TAXES,INSUR.	DOL.	48.451	
IRRIGATION			
INTEREST AT 12.5%	DOL.	13.378	
DEPR.,TAXES,INSUR.	DOL.	12.284	
LAND			
INTEREST AT 0.0%	DOL.	0.000	
TAXES	DOL.	0.000	
TOTAL FIXED COSTS		119.07	

PRODUCTION:	UNITS	PRICE	QUANTITY	VALUE	YOUR VALUE
PECANS(IMPROVED)	CWT.	85.000	3.000	255.00	

RETURNS ABOVE TOTAL OPERATING COSTS	-420.54	

RETURNS ABOVE ALL COSTS EXCEPT OVERHEAD,RISK AND MANAGEMENT	-539.61	

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DUTER 2 APPLIC., 2 WKS APART.  LORSBAN 1 APPLIC. CAMPBELL,SCHATZER,SMITH,GALLOTT
BENLATE 50W & ZNSO4 3 APPLIC. ZOLONE 2 APPLIC.                          2ND COMP
SEVIN 80W 2 APPLIC.  MALATHION 57EC 1 APPLIC.        08/11/87
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TABLE XXI

PECANS (IMPROVED VARIETY) YEAR EIGHT

PECANS (IMPROVED VARIETY) YEAR 8
35 FEET BY 35 FEET ROW SPACINGS   OKLAHOMA
6 FEET STRIP OF CLEAR GROUND ALONG ROW

OPERATING INPUTS:	UNITS	PRICE	QUANTITY	VALUE	YOUR VALUE
BURLAP SACK FEE	EACH	0.030	5.000	0.15	
PARAQUAT	QT.	13.570	0.170	2.31	
ORTHO X77	PT.	2.040	0.080	0.16	
SOLICAM	LBS.	14.260	0.500	7.13	
PRINCEP 80W	LBS.	3.700	0.250	0.92	
NITROGEN (N)	LBS.	0.160	100.000	16.00	
LORSBAN 4E	PT.	5.120	4.500	23.04	
ZNSO4	LBS.	0.483	6.000	2.90	
BENLATE 50W	LBS.	14.260	1.500	21.39	
DU-TER	LBS.	12.320	2.000	24.64	
ZOLONE	QT.	8.500	4.000	34.00	
SEVIN 80W	LBS.	3.010	9.000	27.09	
MALATHION 57 EC	QT.	5.380	2.250	12.10	
CUSTOM SPRD FERT	ACRE	2.000	1.000	2.00	
ESTAB PRORATE	DOL.	1.000	448.850	448.85	
ANNUAL OPERATING CAPITAL	DOL.	0.125	94.962	11.87	
LABOR CHARGES	HR.	4.650	13.029	60.59	
MACHINERY FUEL,LUBE,REPAIRS	ACRE			67.62	
IRRIGATION FUEL,LUBE,REPAIRS	ACRE			5.55	

TOTAL OPERATING COST   768.31

FIXED COSTS		VALUE	YOUR VALUE
MACHINERY			
INTEREST AT 12.5%	DOL.	45.564	
DEPR.,TAXES,INSUR.	DOL.	49.260	
IRRIGATION			
INTEREST AT 12.5%	DOL.	13.378	
DEPR.,TAXES,INSUR.	DOL.	12.284	
LAND			
INTEREST AT 0.0%	DOL.	0.000	
TAXES	DOL.	0.000	

TOTAL FIXED COSTS   120.49

PRODUCTION:	UNITS	PRICE	QUANTITY	VALUE	YOUR VALUE
PECANS(IMPROVED)	CWT.	85.000	5.000	425.00	

RETURNS ABOVE TOTAL OPERATING COSTS   -343.31

RETURNS ABOVE ALL COSTS EXCEPT
OVERHEAD,RISK AND MANAGEMENT   -463.80

DUTER 2 APPLIC., 2 WKS APART. LORSBAN 1 APPLIC. CAMPBELL,SCHATZER,SMITH,GALLOTT
BENLATE 50W & ZNSO4 3 APPLIC. ZOLONE 2 APPLIC.   2ND COMP
SEVIN 80W 2 APPLIC. MALATHION 57EC 1 APPLIC.   08/11/87

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PROGRAM DEVELOPED BY DEPT. OF AGRI. ECON. OKLAHOMA STATE UNIVERSITY

TABLE XXII

PECANS (IMPROVED VARIETY) YEAR NINE

PECANS (IMPROVED VARIETY) YEAR 9 35 FEET BY 35 FEET ROW SPACINGS 6 FEET STRIP OF CLEAR GROUND ALONG ROW				OKLAHOMA	
OPERATING INPUTS:	UNITS	PRICE	QUANTITY	VALUE	YOUR VALUE
BURLAP SACK FEE	EACH	0.030	6.000	0.18	
PARAQUAT	QT.	13.570	0.170	2.31	
ORTHO X77	PT.	2.040	0.080	0.16	
SURFLAN 75W	LBS.	14.590	0.500	7.30	
KARMEX	LBS.	5.960	0.250	1.49	
NITROGEN (N)	LBS.	0.160	100.000	16.00	
LORSBAN 4E	PT.	5.120	4.500	23.04	
ZNSO4	LBS.	0.483	6.000	2.90	
BENLATE 50W	LBS.	14.260	1.500	21.39	
DU-TER	LBS.	12.320	2.000	24.64	
ZOLONE	QT.	8.500	4.000	34.00	
SEVIN 80W	LBS.	3.010	9.000	27.09	
MALATHION 57 EC	QT.	5.380	2.250	12.10	
CUSTOM SPRD FERT	ACRE	2.000	1.000	2.00	
ESTAB PRORATE	DOL.	1.000	448.850	448.85	
ANNUAL OPERATING CAPITAL	DOL.	0.125	94.209	11.78	
LABOR CHARGES	HR.	4.650	13.435	62.47	
MACHINERY FUEL,LUBE,REPAIRS	ACRE			67.95	
IRRIGATION FUEL,LUBE,REPAIRS	ACRE			5.55	
TOTAL OPERATING COST				771.20	

FIXED COSTS		VALUE	YOUR VALUE		
MACHINERY					
INTEREST AT 12.5%	DOL.	45.968			
DEPR.,TAXES,INSUR.	DOL.	49.798			
IRRIGATION					
INTEREST AT 12.5%	DOL.	13.378			
DEPR.,TAXES,INSUR.	DOL.	12.284			
LAND					
INTEREST AT 0.0%	DOL.	0.000			
TAXES	DOL.	0.000			
TOTAL FIXED COSTS		121.43			

PRODUCTION:	UNITS	PRICE	QUANTITY	VALUE	YOUR VALUE
PECANS(IMPROVED)	CWT.	85.000	6.000	510.00	
RETURNS ABOVE TOTAL OPERATING COSTS				-261.20	
RETURNS ABOVE ALL COSTS EXCEPT OVERHEAD,RISK AND MANAGEMENT				-382.63	

DUTER 2 APPLIC., 2 WKS APART. LORSBAN 1 APPLIC.   CAMPBELL,SCHATZER,SMITH,GALLOTT
BENLATE 50W AND ZNSO4 3 APPLIC. ZOLONE 2 APPLIC.   2ND COMP
SEVIN 80W 2 APPLIC. MALATHION 57EC 1 APPLIC.   08/11/87

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TABLE XXIII

PECANS (IMPROVED VARIETY) YEAR TEN

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PECANS (IMPROVED VARIETY) YEAR 10
35 FEET BY 35 FEET ROW SPACINGS                    OKLAHOMA
6 FEET STRIP OF CLEAR GROUND ALONG ROW
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OPERATING INPUTS:	UNITS	PRICE	QUANTITY	VALUE	YOUR VALUE
BURLAP SACK FEE	EACH	0.030	8.000	0.24	
PARAQUAT	QT.	13.570	0.170	2.31	
ORTHO X77	PT.	2.040	0.080	0.16	
SOLICAM	LBS.	14.260	0.500	7.13	
PRINCEP 80W	LBS.	3.700	0.250	0.92	
NITROGEN (N)	LBS.	0.160	100.000	16.00	
POTASH (K20)	LBS.	0.090	250.000	22.50	
LORSBAN 4E	PT.	5.120	4.500	23.04	
ZNSO4	LBS.	0.483	6.000	2.90	
BENLATE 50W	LBS.	14.260	1.500	21.39	
DU-TER	LBS.	12.320	2.000	24.64	
ZOLONE	QT.	8.500	4.000	34.00	
SEVIN 80W	LBS.	3.010	9.000	27.09	
MALATHION 57EC	QT.	5.380	2.250	12.10	
CUSTOM SPRD FERT	ACRE	2.000	1.000	2.00	
ESTAB PRORATE	DOL.	1.000	448.850	448.85	
ANNUAL OPERATING CAPITAL	DOL.	0.125	110.521	13.82	
LABOR CHARGES	HR.	4.650	14.043	65.30	
MACHINERY FUEL,LUBE,REPAIRS	ACRE			69.23	
IRRIGATION FUEL,LUBE,REPAIRS	ACRE			5.55	
TOTAL OPERATING COST				799.17	

FIXED COSTS		VALUE	YOUR VALUE
MACHINERY			
INTEREST AT 12.5%	DOL.	47.761	
DEPR.,TAXES,INSUR.	DOL.	52.123	
IRRIGATION			
INTEREST AT 12.5%	DOL.	13.378	
DEPR.,TAXES,INSUR.	DOL.	12.284	
LAND			
INTEREST AT 0.0%	DOL.	0.000	
TAXES	DOL.	0.000	
TOTAL FIXED COSTS		125.55	

PRODUCTION:	UNITS	PRICE	QUANTITY	VALUE	YOUR VALUE
PECANS(IMPROVED)	CWT.	85.000	8.000	680.00	

RETURNS ABOVE TOTAL OPERATING COSTS   -119.17

RETURNS ABOVE ALL COSTS EXCEPT
OVERHEAD,RISK AND MANAGEMENT   -244.71

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DUTER 2 APPLIC., 2 WKS APART. LORSBAN 1 APPLIC.  CAMPBELL,SCHATZER,SMITH,GALLOTI
BENLATE 50W AND ZNSO4 3 APPLIC. ZOLONE 2 APPLIC.                         2ND COMP
SEVIN 80W 2 APPLIC. MALATHION 57EC 1 APPLIC.         08/11/87
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TABLE XXIV

PECANS (IMPROVED VARIETY) YEAR ELEVEN

PECANS (IMPROVED VARIETY) YEAR 11 35 FEET BY 35 FEET ROW SPACINGS 6 FEET STRIP OF CLEAR GROUND ALONG ROW				OKLAHOMA	
OPERATING INPUTS:	UNITS	PRICE	QUANTITY	VALUE	YOUR VALUE
BURLAP SACK FEE	EACH	0.030	9.000	0.27	
PARAQUAT	QT.	13.570	0.170	2.31	
ORTHO X77	PT.	2.040	0.080	0.16	
SURFLAN 75W	LBS.	14.590	0.500	7.30	
KARMEX	LBS.	5.960	0.250	1.49	
NITROGEN (N)	LBS.	0.160	100.000	16.00	
LORSBAN 4E	PT.	5.120	4.500	23.04	
ZNSO4	LBS.	0.483	6.000	2.90	
BENLATE 50W	LBS.	14.260	1.500	21.39	
DU-TER	LBS.	12.320	2.000	24.64	
ZOLONE	QT.	8.500	4.000	34.00	
SEVIN 80W	LBS.	3.010	9.000	27.09	
MALATHION 57EC	QT.	5.380	2.250	12.10	
CUSTOM SPRD FERT	ACRE	2.000	1.000	2.00	
ESTAB PRORATE	DOL.	1.000	448.850	448.85	
ANNUAL OPERATING CAPITAL	DOL.	0.125	94.892	11.86	
LABOR CHARGES	HR.	4.650	14.448	67.19	
MACHINERY FUEL,LUBE,REPAIRS	ACRE			69.56	
IRRIGATION FUEL,LUBE,REPAIRS	ACRE			7.87	
TOTAL OPERATING COST				780.01	

FIXED COSTS		VALUE	YOUR VALUE
MACHINERY			
INTEREST AT 12.5%	DOL.	48.165	
DEPR.,TAXES,INSUR.	DOL.	52.661	
IRRIGATION			
INTEREST AT 12.5%	DOL.	13.378	
DEPR.,TAXES,INSUR.	DOL.	12.284	
LAND			
INTEREST AT 0.0%	DOL.	0.000	
TAXES	DOL.	0.000	
TOTAL FIXED COSTS		126.49	

PRODUCTION:	UNITS	PRICE	QUANTITY	VALUE	YOUR VALUE
PECANS(IMPROVED)	CWT.	85.000	9.000	765.00	
RETURNS ABOVE TOTAL OPERATING COSTS				-15.01	
RETURNS ABOVE ALL COSTS EXCEPT OVERHEAD,RISK AND MANAGEMENT				-141.50	

DUTER 2 APPLIC., 2 WKS APART. LORSBAN 1 APPLIC. CAMPBELL,SCHATZER,SMITH,GALLOTT
BENLATE 50W AND ZNSO4 3 APPLIC. ZOLONE 2 APPLIC.   2ND COMP
SEVIN 80W 2 APPLIC. MALATHION 57EC 1 APPLIC.   08/11/87

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TABLE XXV

PECANS (IMPROVED VARIETY) YEAR TWELVE

PECANS (IMPROVED VARIETY) YEAR 12
35 FEET BY 35 FEET ROW SPACINGS   OKLAHOMA
6 FEET STRIP OF CLEAR GROUND ALONG ROW

OPERATING INPUTS:	UNITS	PRICE	QUANTITY	VALUE	YOUR VALUE
BURLAP SACK FEE	EACH	0.030	10.000	0.30	_____
PARAQUAT	QT.	13.570	0.170	2.31	_____
ORTHO X77	PT.	2.040	0.080	0.16	_____
SOLICAM	LBS.	14.260	0.500	7.13	_____
PRINCEP 80W	LBS.	3.700	0.250	0.92	_____
NITROGEN (N)	LBS.	0.160	100.000	16.00	_____
LORSBAN 4E	PT.	5.120	4.500	23.04	_____
ZNSO4	LBS.	0.483	6.000	2.90	_____
BENLATE 50W	LBS.	14.260	1.500	21.39	_____
DU-TER	LBS.	12.320	2.000	24.64	_____
ZOLONE	QT.	8.500	4.000	34.00	_____
SEVIN 80W	LBS.	3.010	9.000	27.09	_____
MALATHION 57EC	QT.	5.380	2.250	12.10	_____
CUSTOM SPRD FERT	ACRE	2.000	1.000	2.00	_____
ESTAB PRORATE	DOL.	1.000	448.850	448.85	_____
ANNUAL OPERATING CAPITAL	DOL.	0.125	94.347	11.79	_____
LABOR CHARGES	HR.	4.650	14.753	68.60	_____
MACHINERY FUEL,LUBE,REPAIRS	ACRE			69.81	_____
IRRIGATION FUEL,LUBE,REPAIRS	ACRE			7.87	_____

TOTAL OPERATING COST   780.91 _____

FIXED COSTS			VALUE	YOUR VALUE
MACHINERY				
INTEREST AT 12.5%	DOL.		48.469	_____
DEPR.,TAXES,INSUR.	DOL.		53.066	_____
IRRIGATION				
INTEREST AT 12.5%	DOL.		13.378	_____
DEPR.,TAXES,INSUR.	DOL.		12.284	_____
LAND				
INTEREST AT 0.0%	DOL.		0.000	_____
TAXES	DOL.		0.000	_____

TOTAL FIXED COSTS   127.20 _____

PRODUCTION:	UNITS	PRICE	QUANTITY	VALUE	YOUR VALUE
PECANS(IMPROVED)	CWT.	85.000	10.000	850.00	_____

RETURNS ABOVE TOTAL OPERATING COSTS   69.09 _____

RETURNS ABOVE ALL COSTS EXCEPT
        OVERHEAD,RISK AND MANAGEMENT   -58.10 _____

DUTER 2 APPLIC., 2 WKS APART. LORSBAN 1 APPLIC.   CAMPBELL,SCHATZER,SMITH,GALLOTT
BENLATE 50W AND ZNSO4 3 APPLIC. ZOLONE 2 APPLIC.   2ND COMP
SEVIN 80W 2 APPLIC. MALATHION 57EC 1 APPLIC.   08/11/87

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     PROGRAM DEVELOPED BY DEPT. OF AGRI. ECON. OKLAHOMA STATE UNIVERSITY

TABLE XXVI

PECANS (IMPROVED VARIETY) YEAR TWENTY

PECANS (IMPROVED VARIETY) YEAR 20 THIN TO 49 FEET BY 49 FEET ROW SPACING 6 FEET STRIP OF CLEAR GROUND ALONG ROW				OKLAHOMA	
OPERATING INPUTS:	UNITS	PRICE	QUANTITY	VALUE	YOUR VALUE
BURLAP SACK FEE	EACH	0.030	5.000	0.15	
PARAQUAT	QT.	13.570	0.170	2.31	
ORTHO X77	PT.	2.040	0.080	0.16	
SOLICAM	LBS.	14.260	0.500	7.13	
PRINCEP 80W	LBS.	3.700	0.250	0.92	
NITROGEN (N)	LBS.	0.160	100.000	16.00	
POTASH (K20)	LBS.	0.090	250.000	22.50	
LORSBAN 4E	PT.	5.120	4.500	23.04	
ZNSO4	LBS.	0.483	6.000	2.90	
BENLATE 50W	LBS.	14.260	1.500	21.39	
DU-TER	LBS.	12.320	2.000	24.64	
ZOLONE	QT.	8.500	4.000	34.00	
SEVIN 80W	LBS.	3.010	9.000	27.09	
MALATHION 57EC	QT.	5.380	2.250	12.10	
CUSTOM SPRD FERT	ACRE	2.000	1.000	2.00	
ESTAB PRORATE	DOL.	1.000	448.850	448.85	
ANNUAL OPERATING CAPITAL	DOL.	0.125	115.046	14.38	
LABOR CHARGES	HR.	4.650	23.029	107.09	
MACHINERY FUEL,LUBE,REPAIRS	ACRE			68.39	
IRRIGATION FUEL,LUBE,REPAIRS	ACRE			9.02	
TOTAL OPERATING COST				844.07	

FIXED COSTS				VALUE	YOUR VALUE
MACHINERY					
INTEREST AT 12.5%	DOL.			46.749	
DEPR.,TAXES,INSUR.	DOL.			50.775	
IRRIGATION					
INTEREST AT 12.5%	DOL.			15.403	
DEPR.,TAXES,INSUR.	DOL.			14.309	
LAND					
INTEREST AT 0.0%	DOL.			0.000	
TAXES	DOL.			0.000	
TOTAL FIXED COSTS				127.24	

PRODUCTION:	UNITS	PRICE	QUANTITY	VALUE	YOUR VALUE
PECANS(IMPROVED)	CWT.	85.000	5.000	425.00	
RETURNS ABOVE TOTAL OPERATING COSTS				-419.07	
RETURNS ABOVE ALL COSTS EXCEPT OVERHEAD,RISK AND MANAGEMENT				-546.31	

DUTER 2 APPLIC., 2 WKS APART. LORSBAN 1 APPLIC. CAMPBELL,SCHATZER,SMITH,GALLOTT
BENLATE 50W AND ZNSO4 3 APPLIC. ZOLONE 2 APPLIC.   2ND COMP
SEVIN 80W 2 APPLIC. MALATHION 57EC 1 APPLIC.   08/11/87

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TABLE XXVII

PECANS (IMPROVED VARIETY) YEAR TWENTY-ONE

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PECANS (IMPROVED VARIETY) YEAR 21
49 FEET BY 49 FEET ROW SPACINGS              OKLAHOMA
6 FEET STRIP OF CLEAR GROUND ALONG ROW
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OPERATING INPUTS:	UNITS	PRICE	QUANTITY	VALUE	YOUR VALUE
BURLAP SACK FEE	EACH	0.030	8.000	0.24	_____
PARAQUAT	QT.	13.570	0.170	2.31	_____
ORTHO X77	PT.	2.040	0.080	0.16	_____
SURFLAN 75W	LBS.	14.590	0.500	7.30	_____
KARMEX	LBS.	5.960	0.250	1.49	_____
NITROGEN (N)	LBS.	0.160	100.000	16.00	_____
LORSBAN 4E	PT.	5.120	4.500	23.04	_____
ZNSO4	LBS.	0.483	6.000	2.90	_____
BENLATE 50W	LBS.	14.260	1.500	21.39	_____
DU-TER	LBS.	12.320	2.000	24.64	_____
ZOLONE	QT.	8.500	4.000	34.00	_____
SEVIN 80W	LBS.	3.010	9.000	27.09	_____
MALATHION 57EC	QT.	5.380	2.250	12.10	_____
CUSTOM SPRD FERT	ACRE	2.000	1.000	2.00	_____
ESTAB PRORATE	DOL.	1.000	448.850	448.85	_____
ANNUAL OPERATING CAPITAL	DOL.	0.125	95.227	11.90	_____
LABOR CHARGES	HR.	4.650	14.043	65.30	_____
MACHINERY FUEL,LUBE,REPAIRS	ACRE			69.23	_____
IRRIGATION FUEL,LUBE,REPAIRS	ACRE			9.02	_____
TOTAL OPERATING COST				778.96	_____

FIXED COSTS		VALUE	YOUR VALUE		
MACHINERY					
INTEREST AT 12.5%	DOL.	47.761	_____		
DEPR.,TAXES,INSUR.	DOL.	52.123	_____		
IRRIGATION					
INTEREST AT 12.5%	DOL.	15.403	_____		
DEPR.,TAXES,INSUR.	DOL.	14.309	_____		
LAND					
INTEREST AT 0.0%	DOL.	0.000	_____		
TAXES	DOL.	0.000	_____		
TOTAL FIXED COSTS		129.60	_____		

PRODUCTION:	UNITS	PRICE	QUANTITY	VALUE	YOUR VALUE
PECANS(IMPROVED)	CWT.	85.000	8.000	680.00	_____

RETURNS ABOVE TOTAL OPERATING COSTS	-98.96	_____
RETURNS ABOVE ALL COSTS EXCEPT OVERHEAD,RISK AND MANAGEMENT	-228.56	_____

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DUTER 2 APPLIC., 2 WKS APART. LORSBAN 1 APPLIC.  CAMPBELL,SCHATZER,SMITH,GALLOTT
BENLATE 50W AND ZNSO4 3 APPLIC, ZOLONE 2 APPLIC.                       2ND COMP
SEVIN 80W 2 APPLIC. MALATHION 57EC 1 APPLIC.          08/11/87
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TABLE XXVIII

PECANS (IMPROVED VARIETY) YEAR TWENTY-TWO

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PECANS (IMPROVED VARIETY) YEAR 22
49 FEET BY 49 FEET ROW SPACINGS                          OKLAHOMA
6 FEET STRIP OF CLEAR GROUND ALONG ROW
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OPERATING INPUTS:	UNITS	PRICE	QUANTITY	VALUE	YOUR VALUE
BURLAP SACK FEE	EACH	0.030	10.000	0.30	_____
PARAQUAT	QT.	13.570	0.170	2.31	_____
ORTHO X77	PT.	2.040	0.080	0.16	_____
SOLICAM	LBS.	14.260	0.500	7.13	_____
PRINCEP 80W	LBS.	3.700	0.250	0.92	_____
NITROGEN (N)	LBS.	0.160	100.000	16.00	_____
LORSBAN 4E	PT.	5.120	4.500	23.04	_____
ZNSO4	LBS.	0.483	6.000	2.90	_____
BENLATE 50W	LBS.	14.260	1.500	21.39	_____
DU-TER	LBS.	12.320	2.000	24.64	_____
ZOLONE	QT.	8.500	4.000	34.00	_____
SEVIN 80W	LBS.	3.010	9.000	27.09	_____
MALATHION 57EC	QT.	5.380	2.250	12.10	_____
CUSTOM SPRD FERT	ACRE	2.000	1.000	2.00	_____
ESTAB PRORATE	DOL.	1.000	448.850	448.85	_____
ANNUAL OPERATING CAPITAL	DOL.	0.125	94.684	11.84	_____
LABOR CHARGES	HR.	4.650	14.753	68.60	_____
MACHINERY FUEL,LUBE,REPAIRS	ACRE			69.81	_____
IRRIGATION FUEL,LUBE,REPAIRS	ACRE			9.02	_____

TOTAL OPERATING COST				782.10	_____

FIXED COSTS				VALUE	YOUR VALUE
MACHINERY					
INTEREST AT 12.5%	DOL.			48.469	_____
DEPR.,TAXES,INSUR.	DOL.			53.066	_____
IRRIGATION					
INTEREST AT 12.5%	DOL.			15.403	_____
DEPR.,TAXES,INSUR.	DOL.			14.309	_____
LAND					
INTEREST AT 0.0%	DOL.			0.000	_____
TAXES	DOL.			0.000	_____

TOTAL FIXED COSTS				131.25	_____

PRODUCTION:	UNITS	PRICE	QUANTITY	VALUE	YOUR VALUE
PECANS(IMPROVED)	CWT.	85.000	10.000	850.00	_____

RETURNS ABOVE TOTAL OPERATING COSTS				67.90	_____

RETURNS ABOVE ALL COSTS EXCEPT OVERHEAD,RISK AND MANAGEMENT				-63.35	_____

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DUTER 2 APPLIC., 2 WKS APART, LORSBAN 1 APPLIC.  CAMPBELL,SCHATZER,SMITH,GALLOTT
BENLATE 50W AND ZNSO4 3 APPLIC. ZOLONE 2 APPLIC.                          2ND COMP
SEVIN 80W 2 APPLIC. MALATHION 57EC 1 APPLIC.             08/11/87
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TABLE XXIX

PECANS (IMPROVED VARIETY) YEAR FORTY

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PECANS (IMPROVED VARIETY) YEAR 40
70 FEET BY 70 FEET ROW SPACINGS                         OKLAHOMA
6 FEET STRIP OF CLEAR GROUND ALONG ROW
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OPERATING INPUTS:	UNITS	PRICE	QUANTITY	VALUE	YOUR VALUE
BURLAP SACK FEE	EACH	0.030	10.000	0.30	_____
PARAQUAT	QT.	13.570	0.170	2.31	_____
ORTHO X77	PT.	2.040	0.080	0.16	_____
SOLICAM	LBS.	14.260	0.500	7.13	_____
PRINCEP 80W	LBS.	3.700	0.250	0.92	_____
NITROGEN (N)	LBS.	0.160	100.000	16.00	_____
POTASH (K20)	LBS.	0.090	250.000	22.50	_____
LORSBAN 4E	PT.	5.120	4.500	23.04	_____
ZNSO4	LBS.	0.483	6.000	2.90	_____
BENLATE 50W,	LBS.	14.260	1.500	21.39	_____
DU-TER	LBS.	12.320	2.000	24.64	_____
ZOLONE	QT.	8.500	4.000	34.00	_____
SEVIN 80W	LBS.	3.010	9.000	27.09	_____
MALATHION 57EC	QT.	5.380	2.250	12.10	_____
CUSTOM SPRD FERT	ACRE	2.000	1.000	2.00	_____
ANNUAL OPERATING CAPITAL	DOL.	0.125	111.559	13.94	_____
LABOR CHARGES	HR.	4.650	14.753	68.60	_____
MACHINERY FUEL,LUBE,REPAIRS	ACRE			69.81	_____
IRRIGATION FUEL,LUBE,REPAIRS	ACRE			9.02	_____
TOTAL OPERATING COST				357.87	_____

FIXED COSTS		VALUE	YOUR VALUE
MACHINERY			
INTEREST AT 12.5%	DOL.	48.469	_____
DEPR.,TAXES,INSUR.	DOL.	53.066	_____
IRRIGATION			
INTEREST AT 12.5%	DOL.	15.403	_____
DEPR.,TAXES,INSUR.	DOL.	14.309	_____
LAND			
INTEREST AT 0.0%	DOL.	0.000	_____
TAXES	DOL.	0.000	_____
TOTAL FIXED COSTS		131.25	_____

PRODUCTION:.	UNITS	PRICE	QUANTITY	VALUE	YOUR VALUE
PECANS(IMPROVED)	CWT.	85.000	10.000	850.00	_____

RETURNS ABOVE TOTAL OPERATING COSTS	492.13	_____

RETURNS ABOVE ALL COSTS EXCEPT		
OVERHEAD,RISK AND MANAGEMENT	360.89	_____

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DUTER 2 APPLIC., 2 WKS APART. LORSBAN 1 APPLIC.   CAMPBELL,SCHATZER,SMITH,GALLOTT
BENLATE 50W AND ZNSO4 3 APPLIC. ZOLONE 2 APPLIC.                        2ND COMP
SEVIN 80W 2 APPLIC. MALATHION 57EC 1 APPLIC.             08/11/87
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VITA

Karen Jo Campbell

Candidate for the Degree of

Master of Science

Thesis: ECONOMIC COSTS, RETURNS, CASH FLOW, AND INVESTMENT DECISIONS FOR ESTABLISHING AN IMPROVED VARIETY PECAN ORCHARD IN OKLAHOMA

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