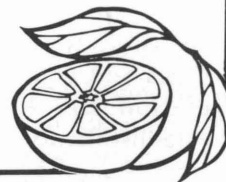


# Texas Agricultural Extension Service

## Texas Citrus Orchard Establishment Costs

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Prior to the 1983 freeze, the citrus industry in the Lower Rio Grande Valley was tied to large investments in groves that were not providing returns comparable to alternative agricultural investments. Growers recognized that there were new varieties, ownership arrangements, planting schemes and production systems that would increase profit potential of the land resource but were unable to make the costly changes.

The devastating freeze in December 1983 resulted in a loss of about 70 percent of the citrus trees—from approximately 69,000 acres to 22,000 acres. In addition, those trees that remained alive required extensive rehabilitation. Production was virtually zero in the 1984-85 season. In the ensuing three years production reached about 2 to 3, 18 to 20 and 35 to 40 percent of pre-freeze levels, respectively, on rehabilitated trees.

Some of the land previously planted in citrus was only marginally suited because of poor drainage and land quality. However, many of the fields were excellent for citrus production. The re-establishment of the better lands into citrus groves provides an opportunity for the Texas citrus industry to develop more modern production systems and more productive orchards. The availability of comparatively inexpensive suitable land, water resources and other economic factors have attracted an increasing number of investors interested in reestablishing a major part of the Texas citrus industry.

Citrus orchard production is a capital and labor intensive, longterm enterprise. Citrus orchard establishment often requires 3 to 4 years and it

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takes 8 to 9 years to recapture the accumulated expenses. Costs of entry, however, are highly variable and depend on orchard size, land quality, equipment available and the owner's management capabilities.

The objective of this paper is to outline the economic factors that affect the establishment and operation of a citrus orchard. This will include the equipment required and expected costs and returns for the specific case of a small-acreage, high-technology operation. The case of a large commercial scale farm will not be addressed in this paper. Establishment and development costs will be converted to a 15-year cash flow projection and the investment will be analyzed using the net present value system.

### Assumptions

The data used to support this publication were collected from orchard managers, research scientists, agribusinessmen, Texas A&I Citrus Center personnel and Texas A&M University Extension and Research specialists.

### Land Tenure

The three most common types of citrus operations in the Lower Rio Grande area are: 1) complete management services for investor-owned orchards; 2) owner managed with major equipment operations performed by use of custom services and 3) complete owner/operator-managed orchards. This paper will concentrate on the second category where some equipment and services are provided by the manager, but the major spray operations are conducted by custom operators.

### Returns

Returns are to management and risk because an imputed charge is not calculated for the owner's management.



## Orchard Size

A hypothetical 20-acre orchard model is used throughout this study, but the costs are discussed on a cost-per-acre basis. It was necessary to select an historically economic unit because high management and equipment requirements and the operation size form a substantial influence on establishment costs. It is understood that a larger tract of land probably would reduce the cost-per-acre charges for equipment.

## Soil and Irrigation

It is assumed that the orchard will be established on alluvial soil in an area previously occupied by a producing orchard and needing no drainage system. Rio Grande water supplied through existing water districts will be used as a primary water source, applied through a permanent valve system.

## Orchard Characteristics

The management unit is a 20-acre orchard with a tree density of 145 trees/acre.

## Prices

The establishment costs are based on Fall, 1987 costs. Citrus fruit sales are estimated to average \$135 per ton.

## Miscellaneous

The study assumes that the equipment, labor and other supplies will be obtained specifically for the orchard establishment and operation. Harvesting will be conducted and paid for by the buyer.

## Tax Issues

This study does not address income tax issues as these implications should be addressed in the context of the total business and with specialized professional assistance.

## Land Preparation

Land preparation is the first consideration after site selection and orchard planning. Table 1 provides an estimate of land preparation costs. It is suggested that custom-hire operators be used because heavy equipment is required and equipment purchase or lease considerations appear too expensive for a 20-acre tract. Custom-hire costs are highly variable and depend on the availability of custom-hire operators to provide required services in a particular area. The costs for the various required activities varied 20 percent to 30 percent in the survey group. The costs shown in Table 1 represent the middle of the range.

**Table 1. Land preparation custom hire costs, (Fall 1987).**

Operation	
Land preparation and leveling	\$100.00/acre
Custom lay out/plant orchard	\$1.00/tree
Tree wrap	\$0.60/tree

## Overhead Costs

Although the expenditures to purchase equipment and establish the orchard are substantial, they are not considered a cost, but rather an investment. Investments, however, generate costs to the business. These costs are represented as ownership costs of operating the "manufacturing plant". Ownership costs or fixed costs, as they are normally called, include depreciation, interest on the investment, taxes and insurance. These costs occur annually and are unrelated to the amount of production from the orchard.

Capital investments in machinery, excluding land and orchard establishment, during the first year total \$24,200 for the orchard or \$1,210 per acre, as shown in Table 2. The investment shown in this table is the minimum amount required to operate an intensive, well-managed citrus orchard. Items shown are assumed to be new. Good used equipment is available and could be used to reduce initial investment requirements. Note that only one-fourth of the pickup value is allocated to the orchard.

**Table 2. Basic machinery required for citrus orchard maintenance, Lower Rio Grande Valley, Texas.**

Equipment	Estimated cost for 20-acre orchard	Cost per acre
Pickup truck \$13,000/4	\$ 3,250	\$162.50
Tractor (30-45 PTO hp)	12,750	637.50
Blade (5 ft)	600	30.00
Shredder (5 ft)	800	40.00
Disk (offset 8 ft)	3,200	160.00
Disk (border)	1,600	80.00
Herbicide rig	2,000	100.00
	<u>\$24,200</u>	<u>\$1,210.00</u>

## Orchard Establishment Costs

Table 3 provides an estimate of the costs in the initial establishment year that includes land leveling and tree purchasing and planting. The orchard



will require approximately \$1,331/acre in variable costs and \$373/acre in overhead costs for a total of about \$1,704/acre.

The values provided in these budgets represent an average of the costs and returns that were obtained from growers. They do not represent the costs and returns of any particular orchard. Potential investors should modify these estimates and adapt them to more accurately describe a specific operation.

## Orchard Development and Operational Costs

Table 4 provides an estimate of the costs and returns to develop and operate the orchard during the second and third years after establishment. A small amount of production should begin in the third year. During the first year of economic production (year 3), variable production costs will average about \$484/acre with overhead costs averaging about \$291/acre for a total projected cost of about \$775/acre.

**Table 3. Citrus orchard establishment (year 1) Lower Rio Grande Valley, 1988 projected costs and returns per acre**

Category	Projected yield unit	Projected	
		\$/unit	value
1. Gross receipts	0.00	0.00	\$0.00
Total projected returns			\$0.00
2. Variable costs	Input use		
Preharvest costs			
Land prep. and level	1.00 acre	100.00	\$100.00
Trees	145.00 tree	4.50	652.50
Custom layout/plant	145.00 tree	1.00	145.00
Tree wrap	145.00 tree	0.60	87.00
Nitrogen	19.00 lb.	0.26	4.94
Fertilizer appl.	4.00 appl.	3.00	12.00
Miticide	0.60 qt.	8.28	4.97
Insecticide	0.60 qt.	9.70	5.82
Insecticide appl.	2.00 appl.	8.00	16.00
Spot herbicide	1.00 acre	17.00	17.00
Preemergence herbicide	1.40 qt.	15.00	21.00
Irrig water (strips)	12.00 appl.	4.00	48.00
Fuel and lube	1.00 acre	2.26	2.26
Repairs	1.00 acre	0.47	0.47
Labors—machinery	1.09 hour	6.13	6.68
irrigation	12.00 hour	4.70	56.40
herb and other	12.00 hour	4.70	56.40
Tree insurance (LVL-2)	1 acre	25.58	25.58
Operating capital int.	631.01 sum/2	0.11	69.41
Total variable costs	acre		\$1,331.43
3. Income above variable costs	acre		(\$1,331.43)
4. Fixed costs			
Cash Costs			
Taxes	1.00 acre	20.00	\$20.00
Misc. admin. o/h	1.00 acre	7.50	7.50
Interest on equipment	11.00 5 year	1210.00	133.10
Interest on irr. syst.	11.00 5 year	300.00	33.00
Non cash costs			
Land	\$2,000.00 acre	5%	100.00
Equipment depreciation	15.00 years	1210.00	64.53
Irr. syst. depreciation	20.00 years	300.00	15.00
Total fixed costs	acre		\$373.13
5. Total projected costs	acre		\$1,704.56
6. Net projected returns to risk and management	acre		(\$1,704.56)

Note: Projections for planning purposes only. Should not be used without updating.



**Table 4. Citrus orchard establishment budget estimates for Years 2 and 3, Lower Rio Grande Valley, 1988 projected costs and returns per acre**

Category	Phase of Development					
	Projected Yield (unit)	Establishment (year 2)		Projected Yield (unit)	Establishment (year 3)	
		\$/Unit	Value		\$/Unit	Value
1. Total projected receipts	0.00 ton	\$0.00	\$0.00	2.00 ton	\$135.00	\$270.00
2. Variable costs	Input Use		Input Use			
Preharvest costs						
Nitrogen	37.00 lb.	\$0.26	\$9.62	74.00 lb.	\$0.26	\$19.24
Fertilizer appl.	4.00 appl.	3.00	12.00	3.00 appl.	3.00	9.00
Tree replacement	3.00 tree	8.00	24.00	0.00 tree	8.00	0.00
Tree hedging	0.00 acre	60.00	0.00	0.00 acre	60.00	0.00
Miticide	1.00 qt.	8.28	8.28	2.00 qt.	8.28	16.56
Citrus oil	0.00 gal.	4.60	0.00	5.00 gal.	4.60	23.00
Insecticide #1	1.20 qt.	9.68	11.62	2.00 qt.	9.68	19.36
Insecticide #2	0.00 qt.	38.76	0.00	0.50 qt.	38.76	19.38
Insecticide appl. #1	2.00 appl.	8.00	16.00	0.00 appl.	8.00	0.00
Insecticide appl.#2	0.00 appl.	21.75	0.00	3.00 appl.	21.75	65.25
Fungicide	0.00 lb.	2.30	0.00	6.00 lb.	2.30	13.80
Contact herbicide	1.00 appl.	17.50	17.50	1.00 appl.	17.50	17.50
Contact herb. appl.	1.00 appl.	8.00	8.00	1.00 appl.	8.00	8.00
Selective herb. #1	0.00 qt.	3.60	0.00	5.00 qt.	3.60	18.00
Selective herb #2	0.00 lb.	3.20	0.00	5.00 lb.	3.20	16.00
Preemergence herb	1.33 qt.	15.00	19.95	qt.	15.00	0.00
Irrigation water	6.00 appl.	8.00	48.00	6.00 appl.	8.00	48.00
Fuel & lube	1.00 acre	1.69	1.69	1.00 acre	1.13	1.13
Repairs	1.00 acre	0.35	0.35	1.00 acre	0.24	0.24
Labor—machinery	3.00 hour	6.13	18.39	0.55 hour	6.13	3.37
irrigation	12.00 hour	4.70	56.40	9.00 hour	4.70	42.30
other	14.00 hour	4.70	65.80	12.00 hour	4.70	56.40
Tree insurance LVL-2	1.00 acre	46.50	46.50	1.00 acre	62.00	62.00
Operating capital int.	\$182.05 sum/2	11%	20.02	229.27 sum/2	0.11	25.22
Total variable costs	per acre		\$384.12	per acre		\$483.75
Break-even price/ton	to cover variable costs		N/A	to cover variable costs		\$241.88
3. Income above variable cost	per acre		(\$384.12)	per acre		(\$213.75)
4. Fixed costs						
Cash costs						
Taxes	1.00 acre	20.00	\$20.00	1.00 acre	\$20.00	\$20.00
Misc. admin. o/h	1.00 acre	7.50	7.50	1.00 acre	7.50	7.50
Int. on equip.	\$1,210.00 5 yrs	11%	85.18	\$1,210.00 5 yrs	11%	63.89
Int. on irr. sys.	\$300.00 5 yrs	11%	26.40	\$300.00 5 yrs	11%	19.80
Non-cash						
Land	\$2,000.00/acre	5%	100.00	\$2,000.00/acre	5%	100.00
Equip. deprec.	\$1,210.00	15 yr Str. Ln.	64.53	\$1,210.00	15 yr Str. Ln.	64.53
Irr. sys. depr.	\$300.00	20 yr Str. Ln.	15.00	\$300.00	20 yr Str. Ln.	15.00
Total fixed costs	per acre		\$318.62	per acre		\$290.72
5. Total projected costs	per acre		\$702.74	per acre		\$774.57
Break-even price			N/A			\$387.24
6. Net projected returns to risk and management	per acre		(\$702.74)	per acre		(\$504.47)

Note: Projections for planning purposes only. Should not be used without updating

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