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UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

PRODUCTION PRACTICES AND SAMPLE COSTS TO PRODUCE

~ *Loose Leaf Lettuce*~

Coachella Valley
Riverside County

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Sample Costs To Produce Loose Leaf Lettuce
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INTRODUCTION

Detailed costs to produce loose leaf lettuce in Coachella Valley, Riverside County, California are presented in this study. The hypothetical farm used in this report consists of 1200 acres of which 300 acres are in lettuce production.

We base this study on assumption of production practices and costs that are considered typical for loose leaf lettuce production in the Coachella Valley of Riverside County. These production practices and costs are an amalgamation of costs and practices in the region. They do not reflect the exact values or practices of any grower or shipper. Sample costs given for labor, materials, equipment and contract services are based on 1996 prices. *The use of trade names in this report does not constitute an endorsement or recommendation by the University of California nor is any criticism implied by omission of other similar products.* This study is intended as a guide, it can be used in making production decisions, determining potential returns, preparing budgets and evaluating production loans.

Costs are presented in six tables:

Table 1. **Costs Per Acre To Produce Loose Leaf Lettuce**
Table 2. **Costs And Returns Per Acre To Produce Loose Leaf Lettuce**
Table 3. **Monthly Cash Costs Per Acre To Produce Loose Leaf Lettuce**
Table 4. **Whole Farm Equipment List, Prices, And Annual Investment, And Business Overhead Costs**
Table 5. **Hourly Equipment Costs Based On Whole Farm Operation**
Table 6. **Ranging Analysis To Produce Loose Leaf Lettuce**

A blank ***Your Costs*** column is provided to enter your actual costs on **Tables 1 (Costs Per Acre To Produce Lettuce)** and **2 (Costs And Returns Per Acre To Produce Lettuce)**.

For an explanation of calculations used in the study refer to the attached General Assumptions, call Etaferahu Takele, Area Farm Management Economics Advisor, Riverside County Cooperative Extension, (909) 683-6491 ext. 243 or call Jose Aguiar, Vegetable Crops Farm Advisor in the Coachella Valley of Riverside County, (619) 863-7949.

ASSUMPTIONS USED IN THIS STUDY

The following is a description of the assumptions used in this study to develop costs for production of fall planted and harvested loose leaf lettuce in the Coachella Valley of Riverside County in 1996.

Loose leaf lettuce is an aggregate term for the different types including the greenleaf, endive, escarole, redleaf, butterhead and romaine types with very similar cultural, harvesting and marketing requirements. In Riverside County, romaine lettuce is considered a separate crop. It is the most popular type, constituting about 40% of loose leaf lettuce.

1. LAND RENT

This report is based on a 1200 acre farm, of which 50% is double cropped. This practice results in 1800 farmed acres per year with 300 acres of loose leaf lettuce production.

Rental contracts and charges for land suitable for lettuce production can range widely. Land in this study is leased on a cash rent basis at $200 per acre per year for the entire 1200 acres. As 600 of the 1200 acres is double cropped, the amount of the annual rent per planted acre allocated to the lettuce operation is $133.

2. CULTURAL PRACTICES AND PRODUCTION INPUTS

Land Preparation: Primary tillage and planting groundwork operations which include plowing, ripping, stubble discing, leveling, discing, and listing beds are performed from July through September. Most operations requiring equipment are performed with a 120 or 200 hp 4-wheel drive tractor. A D-8 crawler is rented to perform pre-planting ripping procedures. Operations that are done on only a portion of the lettuce acreage are noted throughout this section and in the tables; all other operations are done on 100% of the crop acreage of this study.

Beginning in July the acreage intended for loose leaf lettuce production is plowed. Stubble is disced across the previous crop rows to assure good aeration of the soil, adequate burial of organic matter from previous crops, and control of pests and diseases. This operation is followed by deep ripping the soil profile 2 to 3 feet, breaking up any underlying soil compaction for improved root and water penetration. Then laser leveling is done using a landplane to improve irrigation efficiency of the soil. Laser leveling typically is performed by a contract leveling company every two to four years.

Following leveling of the field, chicken manure is spread on the soil. Chicken manure is custom applied a week or more prior to the lettuce bed formation. The manure is broadcasted, and then incorporated by discing the soil twice to break up any remaining clods and to smooth and firm the soil. After discing, the soil is ready for bed preparation and it is then listed into lettuce beds of 40 inches width.

Stand Establishment: Planting for the fall crop in the Coachella Valley is done from the early part of September to the end of October.

In this study, seeds are planted using a machine at a depth of _ inch. Seeding is spaced at 2” intervals in two lines per bed. Approximately 120,000 seeds per acre are planted. About one month later the lettuce crop is thinned to an 11” spacing between lettuce plants and weeded manually to enhance growth and quality.

Weed Management: Weeds common in this area include the various winter grasses and broad leaf weeds. Many growers and consultants advise against planting lettuce without using a herbicide. In this study, an application of Kerb® herbicide is broadcasted at 3 pounds per acre. At the time of thinning the lettuce crop, hand weeding is also a common practice.

Fertilization: In this study chicken manure, as indicated above, is applied prior to discing during land preparation. The manure is broadcasted, then disced and floated for incorporation. The soil is then listed into the lettuce beds. A light application of starter fertilizer (3/35/0) is injected at planting two inches away and below the seed line. It is used to provide a synergistic effect to the lettuce seedling.

Nitrogen fertilizer is applied in liquid form using UAN 32 or CAN 17. Liquid N is applied into the lettuce beds via shank injection during three growth stages. A typical liquid nitrogen fertilizer application approximates 50 gallons per acre. Also light cultivations are performed during the N application.

Irrigation: Lettuce is germinated via sprinkler irrigation. In this study the sprinkler irrigation equipment and pumps are rented. Once the seedlings have broken through the soil, irrigation is converted to a less costly system of furrow irrigation. Surface gated pipe is used to furrow irrigate.

Commonly, about 48 acre inches of water is applied to the lettuce crop up to the beginning of harvest for a cost of $55 per acre. Within each calendar year a farm can take irrigation water deliveries from 180 to 365 days a year. However, the actual number of days of water deliveries can often be found by determining the amount of days a crop will be in the ground. The majority of farms within the district will grow two crops per year over the same acreage. This is based on nine months of cultural activities and three months of land preparation in each year. Therefore the approximate number of delivery days for two crops will be 275 per year. In our study, a single crop of loose leaf lettuce with four one-half months of an actual growing period (or one-half (_) of a standard delivery schedule for a calendar year.), receives 138 scheduled and 31 unscheduled deliveries.

The CVWD Gate Charges include $10 for each scheduled delivery and $65 for each unscheduled delivery. Based on the 300 acre loose leaf lettuce farm, this results in a per acre charge for scheduled deliveries of $4.60 and for unscheduled deliveries of $6.75.

The energy costs for irrigating lettuce vary by type of irrigation. For the first acre-foot of water, the crop is irrigated via a sprinkler system. The cost is approximately $45 per acre. The remaining three acre-feet of water is irrigated by furrow irrigation at a cost of about $20 per acre foot. This results in energy costs of approximately $105 per acre. Therefore the total cost of water, deliveries and energy approximates to $171.35 per acre. The cost of irrigation shown in **Tables 1**, **2**, and **3** are for the cost of the water and labor to apply it.

Pest Management: Silverleaf whiteflys are a common pest of loose leaf lettuce in the Coachella Valley. They are treated by an application of Admire™ at planting. Other insects that can affect lettuce during the cultural period include armyworms, aphids, cutworms and loopers. Most of these pests can be treated at the larval stage with an application of biological insecticides such as Dipel 2x ® or Agree™ . In addition, Ladybugs are used for a biological control of aphid infestation. Typically, one gallon of Ladybugs per acre are applied in the growing period. If you have a specific pest problem, consult a

licensed pest control advisor (PCA). Chemicals which may be legally used to control these pests are subject to change frequently. Current information is imperative before treating a field.

At planting, avian control is essential. The birds are controlled with people watching over the field with a shotgun. Growers feel that this is the most effective way to prevent birds from consuming the seeds.

Disease Management: Depending on the region, a number of diseases may infect lettuce during any phase of growth. In the Coachella Valley the most common diseases affecting loose leaf lettuce are fungi such as downy mildew, bottom rot, and lettuce big vein. Treatments can vary for each disease. Consult your PCA before commencing a treatment regime.

Many growers take preventive steps to ensure a good crop. In this study, a soil analysis is done in August prior to planting to examine soil nutritive value and fertility. Additionally, the field is checked twice during the growing period by a PCA to ensure that pest management guidelines are being followed and to diagnose any potential threats to the crop.

The pesticides and rates mentioned in this cost study are a few of those that are listed in *Pest of the Garden and Small Farm: A Growers Guide to Using Less Pesticide* and *University of California Pest Management Guidelines*. In this study, no disease treatment was included. Written recommendations, made by State of California licensed pest control advisors, are required for pesticides. For information and pesticide use permits, contact the local county Agricultural Commissioner's office. Contact the Riverside County farm advisor for additional production information. Pest management information can also be found on the University of California Integrated Pest Management web site: http://www.ipm.ucdavis.edu.

3. HARVESTING AND POSTHARVEST HANDLING.

Loose leaf lettuce is field packed beginning in December. Boxes typically contain 24 head of lettuce per box packaged in 35 pound boxes for romaine lettuce and in 22 pound boxes for the other varieties of loose leaf lettuce. After packing, the lettuce is transported to a local storage facility where it is chilled quickly and palletized before being shipped directly to market. On occasion growers are charged fees for this service, but the majority of the time chilling and palletization fees are charged to the party receiving the lettuce.

Lettuce is subject to chilling injury at temperatures below 45° F (7°C). Damage will be expressed as discoloration of the leaves, and excessive decay. When held at the proper temperature and humidity, loose leaf lettuce's storage shelf life is two to three weeks.

In general, lettuce has the same storage requirements as green beans, cucumber, eggplant, and squash. These products may be stored together without deleterious effect. Improper storage will cause rapid deterioration of the lettuce. Costs for harvest operations are shown in **Tables 1** and **3**.
After the lettuce is harvested, the soil is disced two times in preparation of the next crop to be planted.

4. YIELDS & RETURNS

Yields: In any given year yields vary considerably. Average crop yields in Coachella Valley from 1986 to 1995 are shown to range from 530 to 900 boxes per acres (**Tables A & B**). In this study, a yield of 875 boxes per acre is used.

Returns: The market for loose leaf lettuce is very volatile and prices per box can vary greatly during the season. Growers market their crop through the local or Los Angeles brokers where they pay a percentage fee based on the FOB price per box. Brokers fees are usually 10% of the wholesale prices in the local market and 20% of the wholesale prices in the Los Angeles Market. In this study, marketing of lettuce is through a local broker. We used a price of $6.20/box as the basis for our analysis. This price approximates the ten year weighted average price for romaine lettuce and loose leaf lettuce in Riverside County. However, to cover a broader scenario of productivity and prices, we analyzed returns at various yields and prices **(Table 6)**.

Table A. Acres Planted, Average Yield, and Average Prices for Fresh Market Romaine Lettuce, Riverside County, 1986 - 1995[1]

Year	Acres Planted	Boxes Per Acre	Price/Box
1986	490	873	6.93
1987	1266	753	4.21
1988	1421	547	12.19
1989	1387	610	5.10
1990	1346	633	5.66
1991	1157	731	5.54
1992	1159	540	3.80
1993	379	792	7.22
1994	1258	714	4.44
1995	1611	789	11.48
Average	1147	698.20	6.66

Table B. Acres Planted, Average Yield, and Average Prices for Fresh Market Loose Leaf Lettuce, Riverside County, 1986 - 1995[2]

Year	Acres Planted	Boxes Per Acre	Price per Box
1986	855	590	5.24
1987	2002	752	4.11
1988	1510	568	10.86
1989	1174	630	5.11
1990	1969	669	4.51
1991	1612	545	4.75
1992	1579	536	4.54
1993	2687	803	6.68
1994	1875	768	4.14
1995	2371	891	8.67
Average	1763	675	5.85

[1] Riverside County Agricultural Production Reports, 1986-1995.
[2] Riverside County Agricultural Production Reports, 1986-1995.

5. RISK

The risks associated with fresh market lettuce production should be noted. While this study makes every effort to model a production system based on typical, real world practices, it cannot fully represent financial, agronomic, and market risks which affect the profitability and economic viability of fresh market lettuce production. Risk is caused by various sources of uncertainty which include production, price, and financing. Examples of these risks are insect damage, a decrease in price, and increase in interest rates. Because of the risk involved, access to information on production practices, prices, and markets is crucial.

6. LABOR

Hourly labor wages used in this study are $6.25 per hour for machine operators and $5.50 per hour for non-machine workers. Growers also pay 20 to 34 percent for Workers Compensation, Social Security, Medicare insurance and other possible benefits. In this study we used 34% which brings the labor rate to $8.38 per hour for machine operators and $7.37 for non-machine workers. Machinery labor is 20% higher than the actual operation time to account for equipment set up, moving, maintenance and repair

7. CASH OVERHEAD

Cash overhead consists of various cash expenses paid out during the year that are assigned to the whole farm. These costs include property taxes, interest on operating capital, office expense, liability and property insurance, and equipment repairs.

Property Taxes: Counties charge a base property tax rate of 1% on the assessed value of the property. In some counties special assessment districts exist and charge additional taxes on property including equipment, buildings, and improvements. For this study, county taxes are calculated as 1% of the average value of the property. Average value equals new cost plus salvage value divided by 2.

Interest On Operating Capital: Interest on operating capital is based on cash operating costs and is calculated monthly until harvest at a nominal rate of 11.61% per year. A nominal interest rate is the going market cost of borrowed funds during the production year.

Insurance: Insurance for farm investments vary depending on the assets included and the amount of coverage. Property insurance provides coverage for property loss and is charged at 0.713% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs $35 per cropped acre.

Management Fee: A fee for management at $105 per acre per year is included for a professional supervisor of the farm. An owner - manager must adjust the cost study for salary or management fees.

Office Expenses: Office and business expenses are estimated at $50.00 per acre. These expenses include office supplies, telephone, bookkeeping, accounting, legal fees, road maintenance, etc. Cash overhead costs are found in **Tables 1**, **2**, **3,** and **4**.

8. NON-CASH OVERHEAD

Non-cash overhead is comprised of depreciation and interest charged on equipment and other investments. Typically farm equipment in the Coachella Valley is purchased used. In this study, the current purchase price for new equipment is reduced by 40% to indicate a mix of new and used equipment. Annual equipment and investment costs are shown in **Tables 1** and **4**. They represent the per acre depreciation and interest costs for each investment on an annual basis.

Depreciation: Depreciation is a reduction in market value of investments due to wear, obsolescence, and age, and is on a straight line basis. Annual depreciation is calculated as purchase price minus salvage value divided by years of ownership of the investment. The purchase price and years of life are shown in **Table 4**.

Interest On Investment: Interest is charged on investments to account for income foregone (opportunity cost) that could be received from an alternative investment. The investments are assumed to be owned outright. Therefore, interest on investments is a non-cash cost. Investments include buildings and equipment. Interest is calculated as the average value of the investment during its useful life, multiplied by 3.72% per year.

Average value for equipment and buildings equals new cost plus salvage value divided by 2. The interest rate used to calculate opportunity cost is the average of the agricultural sector long-run rate of return to production assets.

9. EQUIPMENT CASH COSTS

Equipment costs are composed of three parts; non-cash overhead, cash overhead, and operating costs. The non-cash and cash overhead have been discussed in previous sections. The operating costs consist of fuel, lubrication, and repairs.

In allocating the equipment costs on a per acre basis, hourly charges are calculated first and shown in **Table 5**. Repair costs are based on purchase price, annual hours of use, total hours of life, and repair coefficients formulated by the American Society of Agricultural Engineers (ASAE). Fuel and lubrication costs are also determined by ASAE equations based on maximum PTO hp, and type of fuel used. The fuel and repair cost per acre for each operation in **Table 1** is determined by multiplying the total hourly operating cost in **Table 5** for each piece of equipment by the number of hours per acre for that operation. Tractor time is 10% higher than implement time for a given operation to account for setup time. Prices for on-farm delivery of diesel is $1.10 (off-road, no tax) and gasoline is $1.25 per gallon.

ADDENDUM:

1. Due to rounding, totals may be slightly different from the sum of components.

2. The per acre equipment costs in Table 1 reflect both the value and the level of use (hours and years of use) of the machinery complement. Therefore this cost could be different from the per acre value of the machinery complement in Table 4.

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Table 1. COSTS PER ACRE TO PRODUCE LOOSE LEAF LETTUCE

Coachella Valley - 1996

Labor Rate: $ 8.38/hr. machine labor Interest Rate: 11.61%

$ 7.37/hr. non-machine labor Yield per Acre: 875.00 Box

Operation	Operation Time (Hrs/A)	Cash and Labor Costs per Acre: Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/ Rent	Total Cost	Your Cost
Preplant:							
Plow	1.15	12	31	0	0	43	
Stubble Disc	0.76	8	19	0	0	27	
Rip	1.15	12	2	0	25	39	
Landplane	0.00	0	0	0	15	15	
Commercial Fertilizer	0.00	0	0	0	70	70	
Disc 2x	1.55	16	33	0	0	49	
Soil Analysis	0.00	0	0	0	2	2	
Pre-Irrigate	5.60	41	0	43	0	84	
Insecticide	0.06	1	0	42	0	43	
List Beds	1.15	12	22	0	0	34	
Pre-Plant Fertilization	0.39	4	10	64	0	78	
TOTAL PREPLANT COSTS	11.81	104	118	149	112	482	
Cultural:							
Plant	1.36	14	43	125	0	182	
Bird Control	0.00	0	0	0	36	36	
Herbicide	0.06	1	0	75	0	76	
Irrigate	16.80	124	0	129	0	252	
Cultivate	0.50	5	8	0	0	13	
Thinning & Weeding	0.00	0	0	0	160	160	
Inject Fertilizer 3x	1.16	12	18	145	0	174	
Insecticide	0.22	2	1	121	0	125	
Beneficial Insects	2.00	15	0	38	0	53	
PCA Field Check	0.00	0	0	0	20	20	
TOTAL CULTURAL COSTS	22.10	172	71	633	216	1091	
Harvest:							
Harvest	0.00	0	0	0	2730	2730	
TOTAL HARVEST COSTS	0.00	0	0	0	2730	2730	
Postharvest:							
Disc 2x	1.55	16	33	0	0	49	
TOTAL POSTHARVEST COSTS	1.55	16	33	0	0	49	
Interest on operating capital @ 11.61%						85	
TOTAL OPERATING COSTS/ACRE		291	221	782	3058	4437	
TOTAL OPERATING COSTS/BOX						5.07	

Table 1. Continued

CASH OVERHEAD:				
Office Expense				50
Liability Insurance				35
Land Rent				133
Management				105
Sprinkler Pipe Rent				130
Sprinkler Pump Rent				75
Property Taxes				3
Property Insurance				2
Investment Repairs				1
TOTAL CASH OVERHEAD COSTS				534
TOTAL CASH COSTS/ACRE				4970
TOTAL CASH COSTS/BOX				5.68
NON-CASH OVERHEAD:				
	Per producing	Annual Cost		
Investment	Acre	Depreciation	Interest @ 3.72%	
Shop Building	7	0	0	1
Shop Tools	7	0	0	1
Fuel Tanks & Pumps	21	1	0	2
Surface Pipe	0	0	0	0
Equipment	456	82	9	91
TOTAL NON-CASH OVERHEAD COSTS	491	84	10	94
TOTAL COSTS/ACRE				5065
TOTAL COSTS/BOX				5.79

Table 2. COSTS AND RETURNS PER ACRE TO PRODUCE LOOSE LEAF LETTUCE

Labor Rate: $ 8.38/hr. machine labor Interest Rate: 11.61%
$ 7.37/hr. non-machine labor

	Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Lettuce	875.00	Box	6.20	5425	
TOTAL GROSS RETURNS FOR LOOSE LEAF LETTUCE				5425	
OPERATING COSTS					
Rent:					
D-8 Crawler Rental	1.00	Acre	25.00	25	
Custom:					
Laser Level	1.00	Acre	15.00	15	
Chicken Manure	1.00	Acre	70.00	70	
Soil Testing	1.00	Acre	2.00	2	
Bird Control	1.00	Acre	36.00	36	
Thinning & Weeding	1.00	Acre	160.00	160	
Water:					
Irrigate	48.00	AcIn	3.57	171	
Insecticide:					
Admire	10.00	Oz	4.19	42	
Dipel 2x	10.00	Lb	12.13	121	
Ladybugs	1.00	Gal	38.00	38	
Seed:					
Lettuce Seed	10.00	Lbs	12.50	125	
Fertilizer:					
Special F (3/35/0)	32.50	Gal	1.98	64	
Liquid N	150.00	Gal	0.965	145	
Herbicide:					
Kerb 50W	3.00	Lbs	24.98	75	
Contract:					
PCA Field Check	1.00	Acre	20.00	20	
Harvesting	875.00	Box	1.50	1313	
Boxes	875.00	Box	1.00	875	
Broker Commission	875.00	Box	0.620	542	
Labor (machine)	13.27	hrs	8.38	111	
Labor (non-machine)	24.40		7.37	180	
Fuel - Diesel	99.46	gal	1.10	109	
Lube				16	
Machinery repair				96	
Interest on operating capital @	11.61%			85	
TOTAL OPERATING COSTS/ACRE				4437	
TOTAL OPERATING COSTS/BOX				5.07	
NET RETURNS ABOVE OPERATING COSTS				988	

Table 2. Continued

CASH OVERHEAD COSTS:	
Office Expense	50
Liability Insurance	35
Land Rent	133
Management	105
Sprinkler Pipe Rent	130
Sprinkler Pump Rent	75
Property Taxes	3
Property Insurance	2
Investment Repairs	1
TOTAL CASH OVERHEAD COSTS/ACRE	534
TOTAL CASH COSTS/ACRE	4970
TOTAL CASH COSTS/BOX	5.68
NON-CASH OVERHEAD COSTS (DEPRECIATION & INTEREST):	
Shop Building	1
Shop Tools	1
Fuel Tanks & Pumps	2
Surface Pipe	0
Equipment	91
TOTAL NON-CASH OVERHEAD COSTS/ACRE	94
TOTAL COSTS/ACRE	5065
TOTAL COSTS/BOX	5.79
NET RETURNS ABOVE TOTAL COSTS	360

U.C. COOPERATIVE EXTENSION

Table 3. MONTHLY CASH COSTS PER ACRE TO PRODUCE LOOSE LEAF LETTUCE

Coachella Valley - 1996

Beginning JUL 96 Ending JUN 97	JUL 96	AUG 96	SEP 96	OCT 96	NOV 96	DEC 96	JAN 97	FEB 97	MAR 97	APR 97	MAY 97	JUN 97	TOTAL
Preplant:													
Plow	43												43
Stubble Disc	27												27
Rip	39												39
Landplane	15												15
Commercial Fertilizer	70												70
Disc 2x	49												49
Soil Analysis		2											2
Pre-Irrigate		84											84
Insecticide			43										43
List Beds			34										34
Pre-Plant Fertilization			78										78
TOTAL PREPLANT COSTS	242	86	154										482
Cultural:													
Plant			182										182
Bird Control			36										36
Herbicide			76										76
Irrigate			84	84	84								252
Cultivate				13									13
Thinning & Weeding				160									160
Inject Fertilizer 3x				174									174
Insecticide				62	62								125
Beneficial Insects					53								53
PCA Field Check			20										20
TOTAL CULTURAL COSTS			398	494	199								1091
Harvest:													
Harvest						2730							2730
TOTAL HARVEST COSTS						2730							2730
Postharvest:													
Disc 2x						49							49
TOTAL POSTHARVEST COSTS						49							49
Interest on oper. capital	2	3	9	13	15	42							85
TOTAL OPERATING COSTS/ACRE	244	89	561	507	214	2821							4437
TOTAL OPERATING COSTS/BOX	0.28	0.10	0.64	0.58	0.25	3.22							5.07

Table 3. Continued

Beginning JUL 96 Ending JUN 97	JUL 96	AUG 96	SEP 96	OCT 96	NOV 96	DEC 96	JAN 97	FEB 97	MAR 97	APR 97	MAY 97	JUN 97	TOTAL
OVERHEAD:													
Office Expense	4	4	4	4	4	4	4	4	4	4	4	4	50
Liability Insurance	3	3	3	3	3	3	3	3	3	3	3	3	35
Land Rent						133							133
Management	9	9	9	9	9	9	9	9	9	9	9	9	105
Sprinkler Pipe Rent			130										130
Sprinkler Pump Rent			75										75
Property Taxes	1							1					3
Property Insurance	1							1					2
Investment Repairs	0	0	0	0	0	0	0	0	0	0	0	0	1
TOTAL CASH OVERHEAD COSTS	18	16	221	16	16	149	16	18	16	16	16	16	534
TOTAL CASH COSTS/ACRE	262	105	782	523	230	2970	16	18	16	16	16	16	4970
TOTAL CASH COSTS/BOX	0.30	0.12	0.89	0.60	0.26	3.39	0.02	0.02	0.02	0.02	0.02	0.02	5.68

Table 4. WHOLE FARM EQUIPMENT LIST, PRICES, AND ANNUAL INVESTMENT, AND BUSINESS OVERHEAD COSTS

ANNUAL EQUIPMENT COSTS

Description	Price	Yrs Life	Non-Cash Overhead Costs - Depre-ciation	Interest	Cash Overhead Costs Insur-ance	Taxes	Total
120 HP 4WD Tractor #1	75180	5	13532	1538	295	413	15779
120 HP 4WD Tractor #2	75180	5	13532	1538	295	413	15779
120 HP 4WD Tractor #3	75180	5	13532	1538	295	413	15779
120 HP 4WD Tractor #4	75180	5	13532	1538	295	413	15779
200 HP 4WD Tractor #1	135500	5	24390	2772	531	745	28439
200 HP 4WD Tractor #2	135500	5	24390	2772	531	745	28439
200 HP 4WD Tractor #3	135500	5	24390	2772	531	745	28439
200 HP 4WD Tractor #4	135500	5	24390	2772	531	745	28439
Cult - 4 Row 40" #1	7130	7	917	146	28	39	1130
Cult - 4 Row 40" #2	7130	7	917	146	28	39	1130
Cult - 4 Row 40" #3	7130	7	917	146	28	39	1130
Disc - 20' Stubble #1	12944	7	1664	265	51	71	2051
Disc - 20' Stubble #2	12944	7	1664	265	51	71	2051
Disc - 20' Stubble #3	12944	7	1664	265	51	71	2051
Disc - 20' Stubble #4	12944	7	1664	265	51	71	2051
Disc - 21' Offset #1	16510	3	4953	338	65	91	5446
Disc - 21' Offset #2	16510	3	4953	338	65	91	5446
Disc - 21' Offset #3	16510	3	4953	338	65	91	5446
Disc - 21' Offset #4	16510	3	4953	338	65	91	5446
Disc - 21' Offset #5	16510	3	4953	338	65	91	5446
Disc - 21' Offset #6	16510	3	4953	338	65	91	5446
Disc - 21' Offset #7	16510	3	4953	338	65	91	5446
Disc - 21' Offset #8	16510	3	4953	338	65	91	5446
Lister - 3 Row 40" #1	1600	5	288	33	6	9	336
Lister - 3 Row 40" #2	1600	5	288	33	6	9	336
Lister - 3 Row 40" #3	1600	5	288	33	6	9	336
Lister - 3 Row 40" #4	1600	5	288	33	6	9	336
Planter-Hayes 6 row #1	16380	5	2948	335	64	90	3438
Planter-Hayes 6 row #2	16380	5	2948	335	64	90	3438
Plow - 6 bottom #1	12000	5	2160	246	47	66	2519
Plow - 6 bottom #2	12000	5	2160	246	47	66	2519
Plow - 6 bottom #3	12000	5	2160	246	47	66	2519
Plow - 6 bottom #4	12000	5	2160	246	47	66	2519
Shank Injector #1	1800	4	405	37	7	10	459
Shank Injector #2	1800	4	405	37	7	10	459
Shank Injector #3	1800	4	405	37	7	10	459
Shank Injector #4	1800	4	405	37	7	10	459
Shank Injector #5	1800	4	405	37	7	10	459
Shank Injector #6	1800	4	405	37	7	10	459
Shank Injector #7	1800	4	405	37	7	10	459
Shank Injector #8	1800	4	405	37	7	10	459

Table 4. Continued

WHOLE FARM EQUIPMENT LIST, PRICES, AND ANNUAL INVESTMENT, AND BUSINESS OVERHEAD COSTS

ANNUAL EQUIPMENT COSTS

Description	Price	Yrs Life	Non-Cash Overhead Costs - Depre-ciation	Interest	Cash Overhead Costs Insur-ance	Taxes	Total
Sprayer - 600 gal	100000	20	4500	2046	392	550	7488
Subsoiler - 12' #1	6490	5	1168	133	25	36	1362
Subsoiler - 12' #2	6490	5	1168	133	25	36	1362
Subsoiler - 12' #3	6490	5	1168	133	25	36	1362
Subsoiler - 12' #4	6490	5	1168	133	25	36	1362
TOTAL	1275486		228822	26096	5002	7015	266936
60% of New Cost *	765292		137293	15658	3001	4209	160162

* Used to reflect a mix of new and used equipment.
All equipment prices are based on 1996 models.

ANNUAL INVESTMENT COSTS

Description	Price	Yrs Life	Non-Cash Overhead Cost - Depre-ciation	Interest	Cash Overhead Cost------ Insur-ance	Taxes	Repairs	Total
INVESTMENT								
Fuel Tanks & Pumps	38100	15	2286	780	149	210	762	4186
Shop Building	12500	15	750	256	49	69	250	1374
Shop Tools	12500	15	750	256	49	69	250	1374
Surface Pipe	813	15	49	17	3	4	41	114
TOTAL INVESTMENT	63913		3835	1308	251	352	1303	7047

Table 4. Continued

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Land Rent	1800.00	Acre	133.33	239994
Liability Insurance	1800.00	Each	35.00	63000
Management	1800.00	Acre	105.00	189000
Office Expense	1800.00	Acre	50.00	90000
Sprinkler Pipe Rent	300.00	Acre	130.00	39000
Sprinkler Pump Rent	300.00	Acre	75.00	22500

Table 5. HOURLY EQUIPMENT COSTS BASED ON WHOLE FARM OPERATION
Coachella Valley - 1996

			COSTS PER HOUR							
			Non-Cash Overhead Costs		Cash Overhead Costs			Operating		
Description	Budgeted Hours	Actual Hours Used	Depre-ciation	Interest	Insur-ance	Taxes	Repairs	Fuel & Lube	Total Oper.	Total Costs/Hr.
120 HP 4WD Tractor #1	2400	2482.8	3.27	0.37	0.07	0.10	3.76	8.81	12.57	16.39
120 HP 4WD Tractor #2	"	2305.1	3.52	0.40	0.08	0.11	3.76	8.81	12.57	16.68
120 HP 4WD Tractor #3	"	2251.2	3.61	0.41	0.08	0.11	4.51	8.81	13.32	17.53
120 HP 4WD Tractor #4	"	2383.3	3.41	0.39	0.07	0.10	4.51	8.81	13.32	17.29
200 HP 4WD Tractor #1	2400	2293.1	6.38	0.73	0.14	0.19	6.77	14.68	21.45	28.90
200 HP 4WD Tractor #2	"	2281.2	6.42	0.73	0.14	0.20	6.77	14.68	21.45	28.93
200 HP 4WD Tractor #3	"	2482.8	5.89	0.67	0.13	0.18	6.77	14.68	21.45	28.33
200 HP 4WD Tractor #4	"	2486.5	5.89	0.67	0.13	0.18	6.77	14.68	21.45	28.32
Cult - 4 Row 40" #1	357	301.1	1.83	0.29	0.06	0.08	2.05	0.00	2.05	4.30
Cult - 4 Row 40" #2	"	301.1	1.83	0.29	0.06	0.08	2.05	0.00	2.05	4.30
Cult - 4 Row 40" #3	"	301.1	1.83	0.29	0.06	0.08	2.05	0.00	2.05	4.30
Disc - 20' Stubble #1	357	342.0	2.92	0.46	0.09	0.12	3.72	0.00	3.72	7.32
Disc - 20' Stubble #2	"	342.0	2.92	0.46	0.09	0.12	3.72	0.00	3.72	7.32
Disc - 20' Stubble #3	"	342.0	2.92	0.46	0.09	0.12	3.72	0.00	3.72	7.32
Disc - 20' Stubble #4	"	342.0	2.92	0.46	0.09	0.12	3.72	0.00	3.72	7.32
Disc - 21' Offset #1	853	698.4	4.26	0.29	0.06	0.08	4.75	0.00	4.75	9.42
Disc - 21' Offset #2	"	698.4	4.26	0.29	0.06	0.08	4.75	0.00	4.75	9.42
Disc - 21' Offset #3	"	698.4	4.26	0.29	0.06	0.08	4.75	0.00	4.75	9.42
Disc - 21' Offset #4	"	698.4	4.26	0.29	0.06	0.08	4.75	0.00	4.75	9.42

Table 5.Continued

HOURLY EQUIPMENT COSTS BASED ON WHOLE FARM OPERATION
Coachella Valley - 1996

			COSTS PER HOUR							
		Actual	Non-Cash Overhead Costs		Cash Overhead Costs			Operating		
Description	Budgeted Hours	Hours Used	Depre-ciation	Interest	Insur-ance	Taxes	Repairs	Fuel & Lube	Total Oper.	Total Costs/Hr.
Disc - 21' Offset #5	"	698.4	4.26	0.29	0.06	0.08	4.75	0.00	4.75	9.42
Disc - 21' Offset #6	"	698.4	4.26	0.29	0.06	0.08	4.75	0.00	4.75	9.42
Disc - 21' Offset #7	"	698.4	4.26	0.29	0.06	0.08	4.75	0.00	4.75	9.42
Disc - 21' Offset #8	"	698.4	4.26	0.29	0.06	0.08	4.75	0.00	4.75	9.42
Lister - 3 Row 40" #1	500	518.4	0.33	0.04	0.01	0.01	0.46	0.00	0.46	0.85
Lister - 3 Row 40" #2	"	518.4	0.33	0.04	0.01	0.01	0.46	0.00	0.46	0.85
Lister - 3 Row 40" #3	"	518.4	0.33	0.04	0.01	0.01	0.46	0.00	0.46	0.85
Lister - 3 Row 40" #4	"	518.4	0.33	0.04	0.01	0.01	0.46	0.00	0.46	0.85
Planter-Hayes 6 row #1	240	204.0	8.67	0.99	0.19	0.26	8.21	0.00	8.21	18.33
Planter-Hayes 6 row #2	"	204.0	8.67	0.99	0.19	0.26	8.21	0.00	8.21	18.33
Plow - 6 bottom #1	500	518.4	2.50	0.28	0.05	0.08	3.45	0.00	3.45	6.37
Plow - 6 bottom #2	"	518.4	2.50	0.28	0.05	0.08	3.45	0.00	3.45	6.37
Plow - 6 bottom #3	"	518.4	2.50	0.28	0.05	0.08	3.45	0.00	3.45	6.37
Plow - 6 bottom #4	"	518.4	2.50	0.28	0.05	0.08	3.45	0.00	3.45	6.37
Shank Injector #1	300	347.9	0.70	0.06	0.01	0.02	1.09	0.00	1.09	1.88
Shank Injector #2	"	349.2	0.70	0.06	0.01	0.02	1.09	0.00	1.09	1.87
Shank Injector #3	"	349.2	0.70	0.06	0.01	0.02	1.09	0.00	1.09	1.87
Shank Injector #4	"	349.2	0.70	0.06	0.01	0.02	1.09	0.00	1.09	1.87
Shank Injector #5	"	349.2	0.70	0.06	0.01	0.02	1.09	0.00	1.09	1.87
Shank Injector #6	"	349.2	0.70	0.06	0.01	0.02	1.09	0.00	1.09	1.87
Shank Injector #7	"	347.9	0.70	0.06	0.01	0.02	1.09	0.00	1.09	1.88
Shank Injector #8	"	349.2	0.70	0.06	0.01	0.02	1.09	0.00	1.09	1.87
Sprayer - 600 gal	1000	653.9	4.13	1.88	0.36	0.50	0.00	5.06	5.06	11.93
Subsoiler - 12' #1	500	518.4	1.35	0.15	0.03	0.04	1.87	0.00	1.87	3.44
Subsoiler - 12' #2	"	518.4	1.35	0.15	0.03	0.04	1.87	0.00	1.87	3.44
Subsoiler - 12' #3	"	518.4	1.35	0.15	0.03	0.04	1.87	0.00	1.87	3.44
Subsoiler - 12' #4	"	518.4	1.35	0.15	0.03	0.04	1.87	0.00	1.87	3.44

Table 6. Continued

U.C. COOPERATIVE EXTENSION
RANGING ANALYSIS TO PRODUCE LOOSE LEAF LETTUCE
Coachella Valley - 1996

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE LOOSE LEAF LETTUCE

	YIELD (BOX/ACRE)						
	725	775	825	875	925	975	1025
OPERATING COSTS/ACRE:							
Preplant Cost	482	482	482	482	482	482	482
Cultural Cost	1091	1091	1091	1091	1091	1091	1091
Harvest Cost	2262	2418	2574	2730	2886	3042	3198
Postharvest Cost	49	49	49	49	49	49	49
Interest on operating capital	80	82	83	85	86	88	89
TOTAL OPERATING COSTS/ACRE	3964	4122	4279	4437	4594	4752	4909
TOTAL OPERATING COSTS/BOX	5.47	5.32	5.19	5.07	4.97	4.87	4.79
CASH OVERHEAD COSTS/ACRE	534	534	534	534	534	534	534
TOTAL CASH COSTS/ACRE	4498	4655	4813	4970	5128	5285	5443
TOTAL CASH COSTS/BOX	6.20	6.01	5.83	5.68	5.54	5.42	5.31
NON-CASH OVERHEAD COSTS/ACRE	94	94	94	94	94	94	94
TOTAL COSTS/ACRE	4592	4750	4907	5065	5222	5380	5537
TOTAL COSTS/BOX	6.33	6.13	5.95	5.79	5.65	5.52	5.40

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR LOOSE LEAF LETTUCE

PRICE	YIELD (BOX/ACRE)						
(DOLLARS PER BOX)	725	775	825	875	925	975	1025
4.70	-557	-479	-402	-324	-247	-169	-92
5.20	-194	-92	11	113	216	318	421
5.70	168	296	423	551	678	806	933
6.20	531	683	836	988	1141	1293	1446
6.70	893	1071	1248	1426	1603	1781	1958
7.20	1256	1458	1661	1863	2066	2268	2471
7.70	1618	1846	2073	2301	2528	2756	2983

Table 6. Continued

NET RETURNS PER ACRE ABOVE CASH COSTS FOR LOOSE LEAF LETTUCE

PRICE (DOLLARS PER BOX)	YIELD (BOX/ACRE) 725	775	825	875	925	975	1025
4.70	-1090	-1013	-935	-858	-780	-703	-625
5.20	-728	-625	-523	-420	-318	-215	-113
5.70	-365	-238	-110	17	145	272	400
6.20	-3	150	302	455	607	760	912
6.70	360	537	715	892	1070	1247	1425
7.20	722	925	1127	1330	1532	1735	1937
7.70	1085	1312	1540	1767	1995	2222	2450

NET RETURNS PER ACRE ABOVE TOTAL COSTS FOR LOOSE LEAF LETTUCE

PRICE (DOLLARS PER BOX)	YIELD (BOX/ACRE) 725	775	825	875	925	975	1025
4.70	-1185	-1107	-1030	-952	-875	-797	-720
5.20	-822	-720	-617	-515	-412	-310	-207
5.70	-460	-332	-205	-77	50	178	305
6.20	-97	55	208	360	513	665	818
6.70	265	443	620	798	975	1153	1330
7.20	628	830	1033	1235	1438	1640	1843
7.70	990	1218	1445	1673	1900	2128	2355