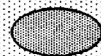


Economic Analysis of Watermelon Production: Seeded versus Seedless

Western Riverside County, 1989



Eta Takele

Farm Management Specialist

UCR

Aziz Baameur

Farm Advisor,

**Western Riverside
& San Bernardino Counties**

University of California Cooperative Extension

ACKNOWLEDGEMENT

We would like to acknowledge the following people

Timothy Hartz, Extension Vegetable Specialist, for his input and evaluation of the manuscript.

Forest Cress, Extension Communication Specialist, for his critical review of the manuscript.

Western Riverside County watermelon growers for their participation and help in this project.

To simplify information, trade names of products have been used. No endorsement of named products is intended, nor is criticism implied of similar products which are not mentioned.

The University of California, in compliance with the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, and the Rehabilitation Act of 1973, does not discriminate on the basis of race, creed, religion, color, national origin, sex, or mental or physical handicap any of its programs or activities, or with respect to any of its employment policies, practices or procedures. The University of California does not discriminate on the basis of age, ancestry, sexual orientation, marital status, citizenship, medical condition (as defined in section 12926 of the California Government Code) or because individuals are disabled or Vietnam era veterans. Inquiries regarding this policy may be directed to the Personnel Studies and Affirmative Action Manager, Agriculture and Natural Resources, 300 Lakeside Drive, Sixth Floor, Oakland, Ca 94612-3560, (415) 987-0097.

TABLE OF CONTENTS

Acknowledgment	i
Table of Content	ii
Tables	iii
Figures	iii
Introduction	1
Watermelon Acreage and Production in Riverside County	1
Cultural Practices	3
Soil preparation	3
Fertility	3
Planting	3
Varieties and hybrids	4
Pests	4
Harvest and yields	4
Cost of Production Analysis and Development	4
Assumptions	4
Cost Analysis	6
Profitability Analysis	6
Summary	9
Appendices	

TABLES

Table 1.	Watermelon Acreage, Yield, and Gross Value Riverside County, 1984-1988 1
Table 2 .	Western Riverside County watermelon acreage, yield, and value, 1984-1988 3
Table 3.	Summary of watermelon production costs in Western Riverside County, 1989 6
Table 4.	Watermelon Gross returns at various prices and yield combinations Riverside County, 1989 8

FIGURES

Figure 1.	Watermelon acreage & Value. Riverside County, 1984-1988 2
Figure 2 A.	Breakdown of per acre seeded watermelon production cost. Riverside county, 1989 7
Figure 2 B.	Breakdown of per acre seedless watermelon production cost. Riverside County, 1989 7
Figure 3.	Break-even analysis of seeded watermelon production at various prices and yields. Western Riverside, 1989 10
Figure 4.	Break-even analysis of seedless watermelon production at various prices and yields. Western Riverside, 1989 11

APPENDICES

Table A.	Equipment complement for a 200 acre farm with 20 acres of watermelon. Western Riverside, 1989	12
Table B1.	Per acre operation schedule and costs of seeded watermelon production. Western Riverside, 1989	13
Table B2.	Seeded watermelon production cost per acre. Western Riverside, 1989	14
Table B3.	Per acre operation schedule and costs of seedless watermelon production. Western Riverside, 1989	15
Table B4.	Seedless watermelon production cost per acre. Western Riverside, 1989	16

Economic Analysis of Watermelon Production : Seeded versus Seedless. Western Riverside County, 1989

INTRODUCTION

Watermelon is one of the most popular cucurbit and economically viable crops in Riverside County. Several inquiries have been made in regard to the cost of growing this crop. This interest has been especially heightened with the availability of new and enhanced varieties and hybrids, particularly the seedless type.

This paper compiles the results of a sample study, conducted in Western Riverside County for the 1989 watermelon production season.

WATERMELON ACREAGE AND PRODUCTION IN RIVERSIDE COUNTY

Total acreage in 1988 was more than 14,000 acres with a value of more than \$ 2 million (Table 1).

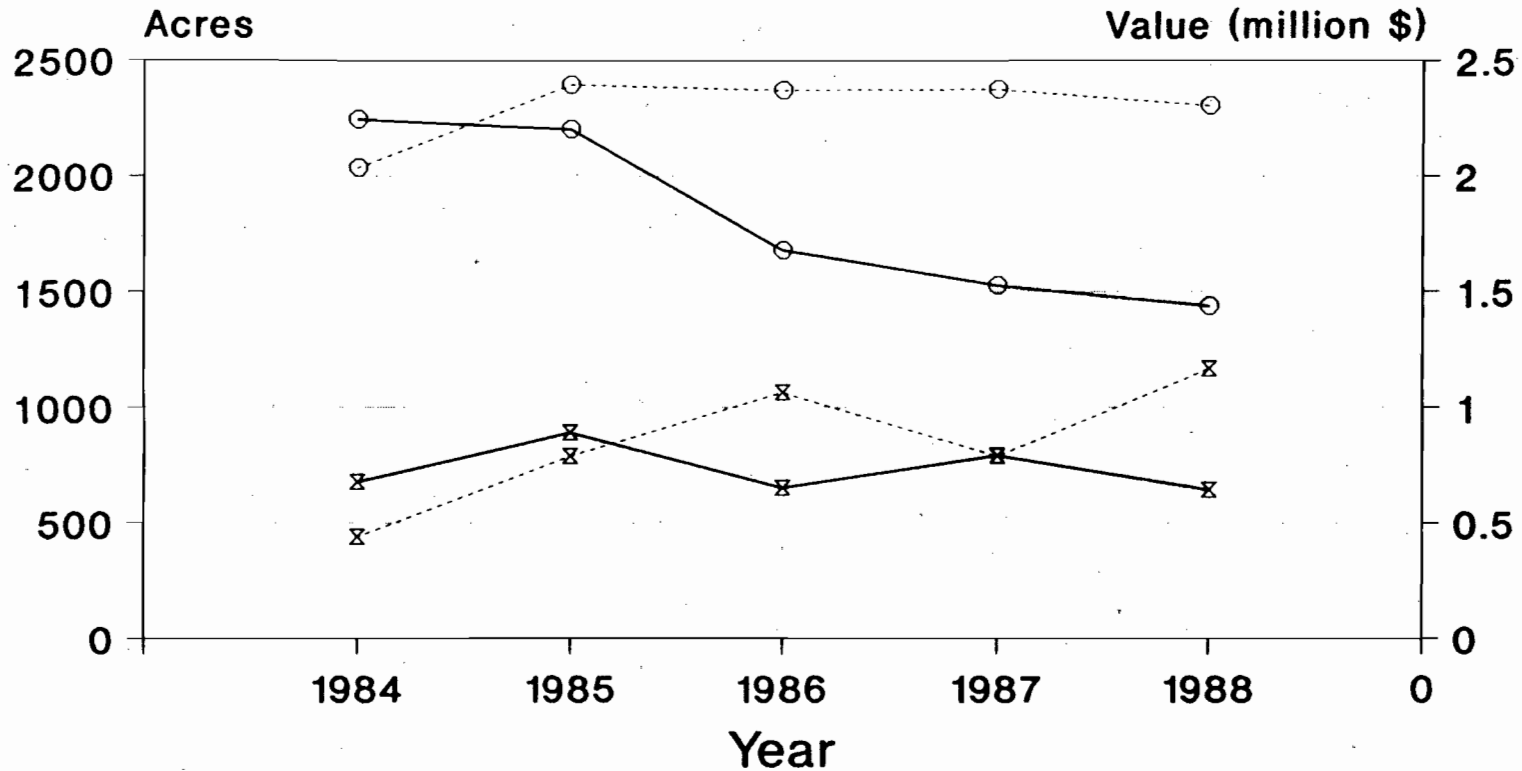
**Table 1. Watermelon Acreage, Yields and Gross Value
Riverside County, 1984-1988.**

Year	Acres	Yield (tons/acre)	Gross Value (\$)
1984	2,244	8.5	2,035,300
1985	2,203	12.0	2,394,800
1986	1,676	12.0	2,369,800
1987	1,524	14.0	2,376,000
1988	1,437	14.4	2,304,100

Source: Riverside County Agricultural Crop and Livestock Report, 1984-88

During this period, Western Riverside County had 643 acres of watermelon grossing a value of more than \$ 1.1 millions. This is an increase of 36 percent over 1984, despite a 13% decrease in acreage (Table 2). Figure 2 is a graphic comparison of watermelon acreage and value in Riverside County and the Western section of the county, during the 1984-88 period.

Figure 1. Watermelon Acreage & Value Riverside County, 1984-1988



—○— Riverside Co. acres

—x— W. Riverside acres

---○--- Riverside Co. Value

---x--- W. Riverside Value

Table 2. Western Riverside County Watermelon Acreage, Yield and Gross Value. 1984- 1988

Year	Acres	Yield (tons/acre)	Gross Value (\$)
1984	677	9.4	440,600
1985	890	12.4	790,100
1986	652	13.7	1,062,200
1987	793	9.0	789,400
1988	643	19.2	1,164,400

Source: Riverside County Agricultural Crop and Livestock Reports, 1984-88

Several factors have contributed to this increase in crop value: a) increased productivity due to better management, b) more adapted varieties and hybrids, c) use of high value seedless watermelon, and, d) diversified marketing outlets.

CULTURAL PRACTICES.

Watermelon is grown under a variety of conditions and in several different soils. However, soils with good water holding capacity, good structure, low salinity and good drainage are preferred.

Soil Preparation.

Soil is usually plowed, disced, floated, and shaped into beds. Beds are required to allow for soil warmup, better irrigation management and drainage. If manure is used, it has to be worked into the soil in advance of bed shaping.

Beds are formed when soil moisture is adequate and are spaced between 5 and 8 feet. First irrigation should be of sufficient length to allow water to penetrate the soil profile to a depth of 5 or 6 feet. This would also move some of the salts away from the soil surface.

Fertility. A crop of watermelon requires between 80 and 100 pounds of nitrogen (N). Up to half of the N is applied preplant; the rest is side dressed. Growers using drip irrigation can slowly supply the crop with the nutrients it needs throughout its growth period.

Planting. Watermelon can be either directly seeded or transplanted. Seedless watermelon is 100 percent transplanted. Seeding or planting takes place from early spring to early summer. When seeded, emerged seedlings are thinned to the appropriate spacing of 4, 5, 6, or 8 feet apart.

Seedless watermelon is male sterile and thus requires the presence of a pollen donor. For this reason, every third bed is planted to a seeded type that supplies pollen. The seeded type should have a fruit shape or color distinctly different from that of the seedless to avoid confusion at harvest. Also, bee presence is required at pollination time.

Varieties and Hybrids.

Two main types of watermelon are popular: seeded and seedless. Both come in red and yellow fleshed types.

Seeded type can be either open pollinated varieties or hybrids. Some of the popular ones are *Cal Sweet*, *Royal Sweet*, *Peacock Improved*, and *Picnic*. Some of the most commonly used seedless watermelon hybrids include *Tri-X Improved*, *King of Hearts*, *Queen of Hearts*, and *Quality*.

Pests.

Several pests affect watermelon growth and yield. Their control can be either cultural, chemical, or biological, or a combination. For example, weed abatement can affect aphid populations which in turn may decrease the incidence of virus infection. Similarly, the use of "biologicals" can minimize the effect of loopers.

Insects. Some of the most damaging insects are cutworms, aphids, spider mites, leaf hoppers, and cabbage loopers.

Diseases. The most damaging diseases that attack watermelon are mosaic viruses, pythium and phytophthora root rots, and downy mildew.

Weeds. Several weeds compete with the crops for nutrients, water, and light. These includes several summer grasses and broad leaves such as pigweed and mustard family. Cultivation, hoeing, herbicides, or fumigation provide successful weed control.

Harvest and Yields.

Harvest. Length of time from planting to first harvest depends on the watermelon variety used and the season. Between 90 to 130 days may be required. A given field can be picked four to five times, depending on the market value of the crop.

Fruit is picked on the basis of color change, rind roughness, tendril browning, blossom end, and ground spot color. Cutting open randomly selected fruits may be more reliable, especially when dealing with new cultivars or some of the seedless hybrids.

Yield. The Riverside County average varies between 10 to 20 tons per acre. Some growers have obtained higher yields--25 tons per acre or more-- depending on the season, variety/hybrid used, and experience. Generally seedless watermelon type will yield between 8 and 16 tons per acre--this taking into account that only a third of the area is planted to seedless.

COST OF PRODUCTION DEVELOPMENT AND ANALYSIS

ASSUMPTIONS

Costs and returns differ from one farm to the next, depending on location, growing practices, enterprise size, changes in input and product prices. Costs also can be calculated differently for different purposes. Because these factors can make a significant difference, costs for general application such as state and regional use are based on assumptions that approximate

the most common practices. Therefore, for cost information to make sense, it must be used along with the assumptions upon which it is based. If assumptions don't fit a specific situation, adjustments must be made. Following are some of the assumptions for the sample; the range reflects the variation observed among the farms visited.

Sample Assumptions	Ranges
Farm acres about 200	100 - 700 acres
Watermelon acres about 20	10 - 400 acres
Production period of 4 months	3 - 5 months
Yield about 20 tons/acre - seeded	14-20 tons/acre
14 tons/acre - seedless	8 - 16 tons/acre (on 2/3 of an acre)
Labor wage-manual \$ 4.25/hr	
machine \$ 5.00/hr	\$ 4.25-\$9.75/hr
Tractor sizes 120 hp	18 hp - 140 hp
Land rent \$100/acre	\$100-\$500/acre
Water cost \$240/acre ft	\$160/acre ft-\$240/acre ft
Seed - direct seeding for seeded	\$ 21 per acre
transplants for seedless	\$ 276 per acre
80" bed spacing, 40" wide	60"-96"; narrow spacing for seedless
Fumigation - none	\$0 for none -\$630/acre for fumigation
Harvesting - \$43/ton	\$30-\$50 per ton

Other assumptions include:

- *Interest on operating capital @ 11.5%: annual rate calculated as follows:*

$$c = (M) * P * (I/12)$$
where: c = interest on operating capital;
M = monthly cost of material and operating cost of equipment (fuel, lube, oil)
I/12 = monthly interest rate ,i.e., (11.5%)/12
- *Depreciation - straight line, i.e.,*
$$\frac{\text{Purchase Price} - \text{Salvage Value}}{\text{Years of Service}}$$
- *Interest on investment @ 11.5% of average investment calculated as follows:*

$$I = AI * i$$
where: I = interest on investment and
AI = averaged investment (i.e., purchase price/2)
i = interest rate.
- *Taxes, housing and insurance @ 2% of average investment*

Equipment listing and values - Appendix Table A lists equipment required on a farm of 200 acres or more. Variation in age and value of equipment made it impossible to come up with an average or typical profile for the county. Because most of the equipment used is relatively old, we took current value (1989 prices) of the equipment and reduced it to 30 percent.

COST ANALYSIS

Costs of production are categorized into two main groups: variable and fixed costs. Variable or operating costs, also expressed as direct costs, include amounts and costs of material inputs such as fertilizer, water, seed, fuel, lube and machinery repairs.

The fixed or ownership cost category includes machinery depreciation, interest on investment, taxes, insurance, housing and land ownership charge. In this study, most land was on a rental basis so the cost was included in the variable cost category.

Based on all of the above stated assumptions, costs of production schedules for both seedless and seeded type were developed. Overall, two tables of costs and accompanying schedules of operations are included in the Appendix Tables B1-B4. Table 3 presents the summaries of production costs.

Table 3. Summary of Watermelon Production Costs in Western Riverside, 1989.

Costs \$ per acre	Seeded	Seedless
Variable:		
Preharvest Cash	1055.91	1436.12
Harvest ¹	860.00	774.00
Total variable	1915.91	2210.12
Fixed ²	62.02	60.68
Total	1977.93	2270.80

From this summary we note that the total watermelon production cost estimate in Western Riverside was \$ 1978 for seeded and \$ 2271 for seedless. Variable costs accounted for over 95% of the total cost in both cases. Further breakdown of costs on the average include: 42 percent for preharvest cash excluding water; 16 percent for water; 39 percent for harvest; and 3 percent for machinery ownership. Whereas most cultural practices are common to both seeded and seedless type, there are two significant differences (see Figures 2A and 2B.) The cost of transplanting seedless watermelon is a significant item amounting to \$ 403 per acre, \$377 more per acre than to direct seed for seeded watermelon. On the other hand, the seeded types must be thinned due to overseeding, and this cost runs about \$22 per acre. Overall, seedless watermelon costs \$355 per acre more to plant than the seeded type.

Profitability Analysis

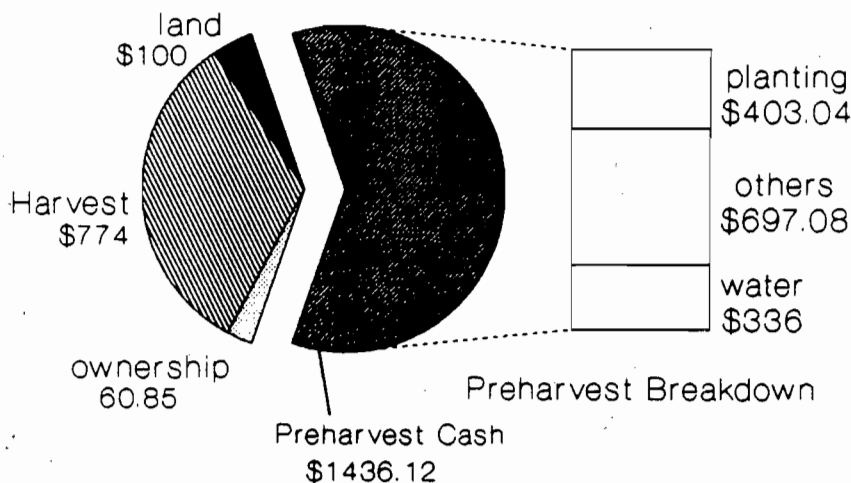
The next step is to do a profitability analysis using a break-even analysis. Break-even analysis shows the income level necessary to cover costs. In other words, it calculates the price and

1 -Based on 20 tons per acre for seeded and 14 tons per acre for seedless watermelon.

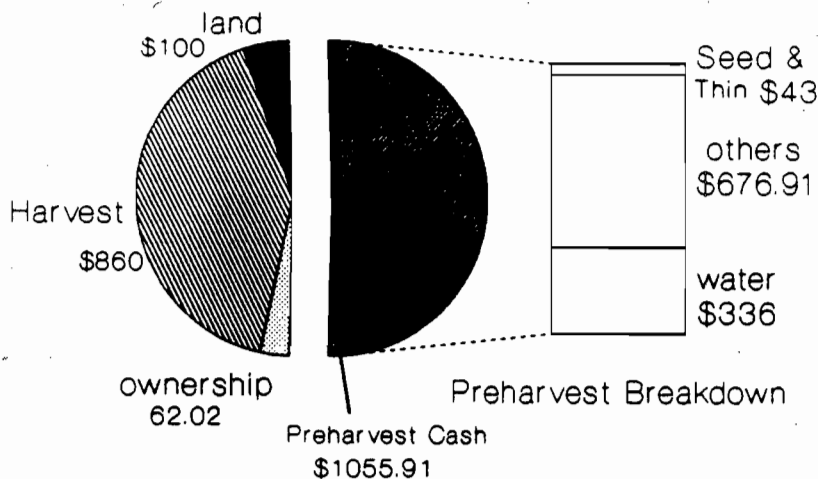
2 -The use of a relatively older machinery resulted in \$ 72 lower cost than if new machinery were used. One should realize that the difference between the machinery costs reflects the amount that should be saved in order to replace old equipment with new one. In any case, machinery ownership costs constitute a small portion of the total cost, about 4 percent.

Figure 2. Watermelon Breakdown of Per-acre Production Cost. Riverside County, 1989

A. Seedless Watermelon



B. Seeded Watermelon



yield combinations that equate the gross income to costs of production. The formula to calculate break-even is as follows:

$$\text{Break-even Price} = \frac{\text{Total Cost}}{\text{Yield}}, \text{ if yield expectation is known}$$

$$\text{Break-even Yield} = \frac{\text{Total Cost}}{\text{Price}}, \text{ if price expectation is known}$$

Break-even analysis can be done at various stages of the cost of production. To see how much is needed to cover variable costs, a similar procedure can be used as follows:

$$\text{Break-even Price} = \frac{\text{Variable Costs}}{\text{Yield}}, \text{ if yield expectation is known}$$

$$\text{Break-even Yield} = \frac{\text{Variable Costs}}{\text{Price}}, \text{ if price expectation is known}$$

Using our assumption of 20 tons/acre for seeded watermelon, the price needed to breakeven variable costs (preharvest and harvest) will be \$95.80 per ton (\$0.048 per pound) and for total costs will be \$98.90 per ton (\$0.049 per pound). For seedless type, using our assumption of 18 tons per acre, the price needed to break even variable costs (preharvest and harvest) will be \$122.78 (\$0.061 per pound) and for total costs it will be \$126.16 per ton (\$0.063 per pound). When price expectation can be established, the yield needed to break even can also be calculated accordingly.

A more practical way would be to develop a matrix of gross returns such as shown in Table 4 or in Figures 3 and 4 at various levels of prices and yields. This type of matrix or figure will help answer questions such as how much a drop in yield and price will the investment be able to withstand and still cover costs. In the figures, gross returns are represented by the upward trending successive lines, and costs are represented by the horizontal lines. The lower horizontal line is a variable cost, and the upper horizontal line is total cost. Thus, the break-even points are at the point where the horizontal (cost lines) cross the gross returns lines. Based on their expectations, managers can calculate the price and yield combination that will cover their costs.

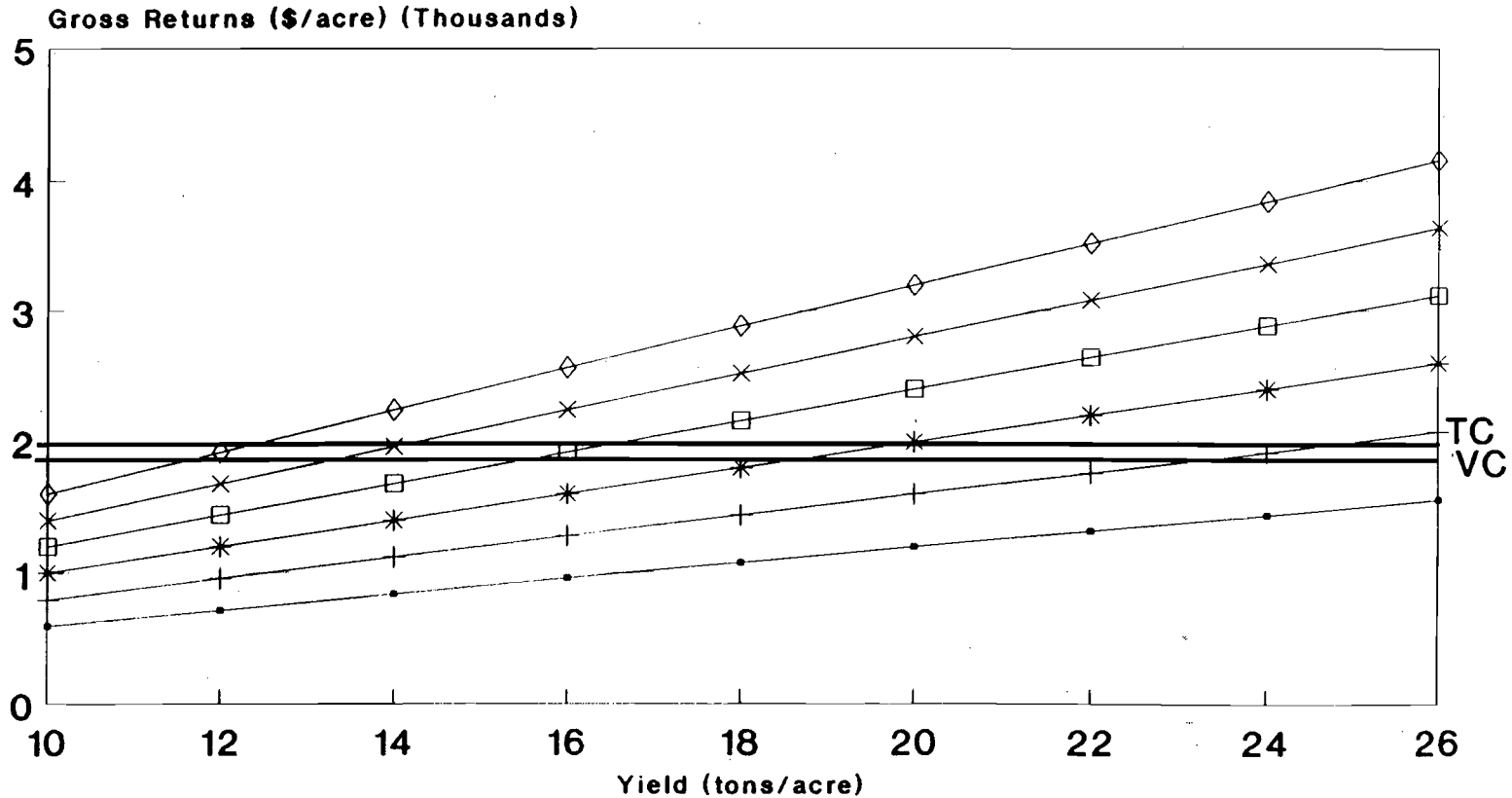
Table 4. Watermelon Gross Return at Various Price and Yield Combinations. Riverside County, 1989

Price per pound (\$)	Yield (tons/acre)								
	10	12	14	16	18	20	22	24	26
0.03	\$ 600	\$ 720	\$ 840	\$ 960	\$ 1080	\$ 1200	\$ 1320	\$ 1440	\$ 1560
0.04	800	960	1120	1280	1440	1600	1760	1920	2080
0.05	1000	1200	1400	1600	1800	2000	2200	2400	2600
0.06	1200	1440	1680	1920	2160	2400	2640	2880	3120
0.07	1400	1680	1960	2240	2520	2800	3080	3360	3640
0.08	1600	1920	2240	2560	2880	3200	3520	3840	4160

COST ANALYSIS SUMMARY

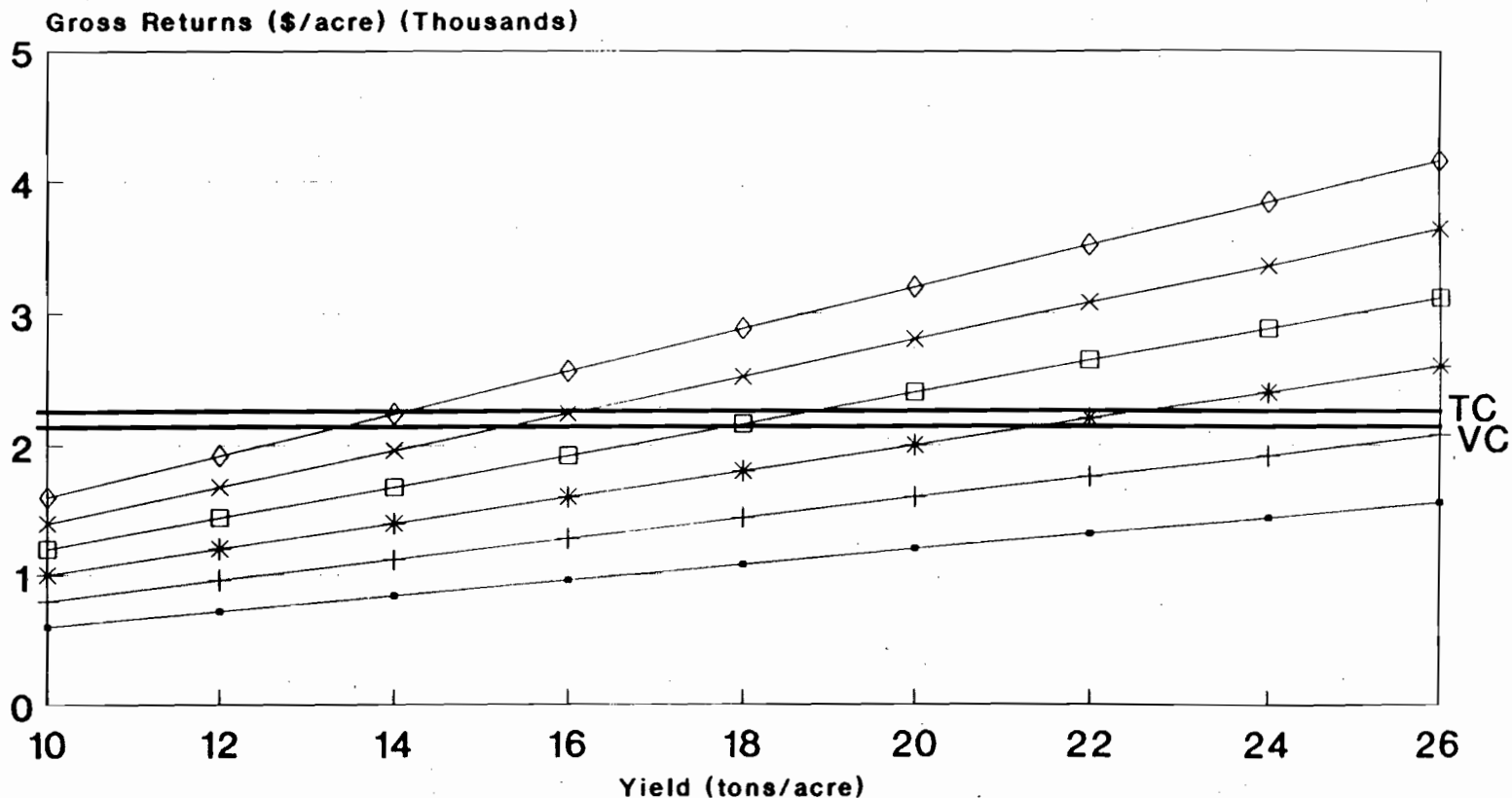
- ✘ Watermelon production cost per acre is about: \$ 1,978 for seeded and \$ 2,271 for seedless watermelon.
- ✘ Harvest cost can be as much as 42 percent of the total cost.
- ✘ Planting cost for seedless watermelon is about \$ 355 per acre more than that of seeded watermelon.
- ✘ When seeded watermelon yield is 20 tons per acre, the breakeven price has to be no less than \$ 98.80 per ton (¢ 4.9 per pound). Conversely, to breakeven at ¢ 5 per pound, 20 tons per acre are required.
- ✘ When seedless watermelon yield is 18 tons per acre (including pollinator), the breakeven price is \$ 98.90 per ton (¢ 4.9 per pound). Conversely, at ¢ 5 per pound, 23 tons per acre are needed.

Figure 3. Break-even Analysis of Seeded Watermelon Production at Various Prices and Yields, Western Riverside, 1989



Price per pound (\$)					
—●—	—+—	—*—	—□—	—x—	—◇—
.03	.04	.05	.06	.07	.08

Figure 4. Break-even Analysis of Seedless Watermelon Production at Various Prices and Yields, Western Riverside, 1989





APPENDICES

Appendix Table A. Equipment Complement for a 200 acre farm with 20 acres of watermelon
Western Riverside, 1989

Machinery	Size	Purchase Price*	Years to Trade	Annual Hours	Fixed Costs Per Hour				Variable Costs Per Hour				Total Cost/Hour	
					Depr.	Intr.**	TIH	Tot. FC	Repair	Fuel	Lube	Tot.VC		
					\$/Hour									
Tractor	120.00	HP	13845.00	10.00	1100.00	1.13	.80	.14	2.07	1.38	4.75	.71	6.85	8.92
Pickup	.75	TON	3600.00	10.00	200.00	1.62	1.14	.20	2.96	1.24	2.61	.39	4.24	7.20
Sprayer	100.00	GAL	490.50	15.00	100.00	.29	.31	.05	.66	.18	.00	.00	.18	.84
Plow	4.00	FT	2100.00	15.00	100.00	1.26	1.33	.23	2.82	.99	.00	.00	.99	3.81
Planter	4.00	ROW (40")	2604.00	15.00	100.00	1.56	1.65	.29	3.50	1.23	.00	.00	1.23	4.73
Disc	12.00	FT	2040.00	15.00	100.00	1.22	1.29	.22	2.74	.96	.00	.00	.96	3.70
Ripper	7.00	FT	960.00	15.00	100.00	.58	.61	.11	1.29	.45	.00	.00	.45	1.74
Other Tools			750.00	10.00	54.00	1.25	.88	.15	2.28	.74	.00	.00	.74	3.02
Irrigation***		Drip	5000.00	15.00	2800.00	.11	.10	.02	.23	.12	.00	.00	.12	.35
TOTAL			31389.50			9.03	8.10	1.41	18.53	7.31	7.36	1.10	15.78	34.31

*Estimated Value for a relatively older machinery complement. 1989 purchase price of new equipment reduced to 30 percent.

**Interest on Investment is calculated at 11.5%.

***Value of Irrigation system includes installation.

Appendix Table B1. Per Acre Operation Schedule and Costs of Seeded Watermelon Production; Western Riverside, 1989

Based on : 200 acres farm with 20 acres of watermelon
 Production Period equals 4 months (approximately 120 days)
 Yield = 20 tons/acre

Hourly costs	Labor	4.25	5.00	Tract.	2.07	10.08	Plow	2.82	3.31	Disc	2.74	3.22
	Spryr	.66	.61	Ripper	1.29	1.51				Shaper	.66	.61
	Irrig	.23	.35	Layer	.66	.61	Planter	3.50	4.11	Pickup	2.96	7.14
	Misc.tool	2.28	2.46									

Operation	Tooling	Month	MHRS	HLHRS	TMFC	OFC	TMVC	MLHRS	MLC	HLC	CC	MAT.	TVC	IOPC	TAC
Rip (2x)	120 HP,Rippe	April	1.18		3.96		13.68	1.30	6.49				20.17	.77	24.90
Plow	120 HP,Plow	April	.50		2.44		5.04	.55	2.75				7.79	.30	10.53
Disc 4x	120 HP,Disc	April	1.32		6.34		17.56	1.45	7.26				24.82	.95	32.11
Beds-80", 40"-41" wide	120 HP, shap	April	.50		1.36		5.35	.55	2.75				8.10	.31	9.77
Irrigation Tape	120 HP,layer	April	1.00		2.72		10.69	1.10	5.50			45.00	61.19	2.35	66.26
Irrigation-Blue Transm.		April			.00		.00	.00	.00			27.92	27.92	1.07	28.99
Chicken Manure	Custom Appl.	April			.00		.00	.00	.00		40.00		40.00	1.53	41.53
Weed Cont.-Prefer	120 HP, Spry	April	.33		.90		.70	.36	1.82	.00		39.60	42.11	1.61	44.63
Weed Cont.-alanap	120 HP, Spry	April	.33		.90		.70	.36	1.82	.00		4.29	6.80	.26	7.96
Seed-open pollinated	120 Hp,plant	April	.23		1.28		3.26	.25	1.27	.00		21.00	25.53	.98	27.79
Irrigation 4.3x	Drip. system	April	35.00		8.05		12.25	2.15	10.75	.00		86.40	109.40	4.19	121.64
Weed Cont.	Hand	May		10.00	.00		.00	.00	.00	42.50			42.50	1.22	43.72
Irrigation 4.3x		May	35.00		8.05		12.25	2.15	10.75	.00		76.80	99.80	2.87	110.72
Fert-Nit.	Irrig.	May1			.00		.00	.00	.00	.00		28.60	28.60	.82	29.42
Fert-Nit.	Irrig.	May15			.00		.00	.00	.00	.00		16.80	16.80	.48	17.28
Weed Cont.-Treflan	120 HP,Spryr	May	.33		.90		3.53	.36	1.82	.00		16.00	21.34	.61	22.86
Insecticide.-Vydate	120 HP,Spryr	May	.33		.90		3.53	.36	1.82	.00		32.53	37.87	1.09	39.86
Thinning	Hand	May									22.00		22.00	.63	22.63
Irrigation 4.3x		June	35.00		8.05		12.25	2.15	10.75	.00		86.40	109.40	2.10	119.55
Irrigation 4.3x		July	35.00		8.05		12.25	2.15	10.75	.00		86.40	109.40	1.05	118.50
Harvest		July									860.00		860.00	8.24	868.24
Misc. (off., legal, misc. tools, etc)		Season	1.00		2.28		2.46		.00			20.00	22.46	.86	25.60
Land Rent		Season							.00		100.00		100.00	11.50	111.50
Taxes						.00			.00				.00	.00	.00
Management						.00			.00				.00	.00	.00
Pickup			2.00		5.92		14.28	2.20	11.00				25.28	.73	31.92
Total			149.05	10.00	62.11	.00	129.77	17.46	87.28	42.50	1042.00	567.74	1869.28	46.54	1977.92

Note:-MHRS=machinery hours; HLHRS=hand labor hours; TMFC=total machinery fixed costs; OFC=other fixed costs; TMVC= total machinery variable costs
 MLHRS= machinery labor hours; MLC=machinery labor cost; HLC= hand labor cost; CC=custom cost
 MAT=material cost; TVC=total variable cost; IOPC=interesting on operating capital; TAC=total all costs

Appendix Table B2. Seeded Watermelon Production Cost Per Acre
Western Riverside, 1989

Based on: 200 acres farm with 20 acres melon

Labor wages/hour: Manual 4.25 Machine 5.00

I. VARIABLE/OPERATING COSTS

	Input Unit	Input Amount	Price/ Unit(\$)	Cost/ Acre(\$)	Your Cost Per Acre(\$)

A. Cultural Costs					
Irrigation Tape	Foot*	6531.00	.01	45.06	-----
Irrigation 'Blue Transmission'	Foot**	67.00	1.25	27.92	-----
Chicken Manure (Custom application)	Acre	1.00	40.00	40.00	-----
Herbicide- Prefar	Gallon	1.00	39.60	39.60	-----
Herbicide- Alanap	Gallon	.33	13.00	4.29	-----
Seed-open pollinated	Pound	1.50	14.00	21.00	-----
Fertilizer- 16-16-16	Pound	130.00	.22	28.60	-----
Fertilizer- UN32 (5x)	Gallon	15.00	1.12	16.80	-----
Weed Control-Hand weeding	Hour	10.00	4.25	42.50	-----
Herbicide- Treflan	Pound	20.00	.80	16.00	-----
Insecticide-Vydate	Gallon	.50	65.06	32.53	-----
Thinning- Hand Labor	Acre	1.00	22.00	22.00	-----
Irrigation- Water	Acre Foot	1.40	240.00	336.00	-----
Land Rent	Acre	1.00	100.00	100.00	-----
Misc. Office, Legal, etc.	Acre	1.00	20.00	20.00	-----
B. Machinery Costs					
Repair, Fuel and Lube	Acre	1.00	129.77	129.77	-----
Labor- Machine	Hour	17.46	5.00	87.30	-----
C. Interest on Operating Cap.					
	Acre	1.00	46.54	46.54	-----
TOTAL PREHARVEST VARIABLE COSTS					1055.91
D. Harvest- Custom Operation					
	Ton	20.00	43.00	860.00	-----
TOTAL VARIABLE COSTS (PREHARVEST + HARVEST)					1915.91
II. FIXED/OWNERSHIP COSTS					
Depreciation-Machine & Irrig.Equip.				31.25	-----
Invest. Int.-Machine & Irrig. Equip.				25.77	-----
Taxes, Ins. Housing-Machine & Irrig.Equip.				5.00	-----
TOTAL FIXED OR OWNERSHIP COSTS					62.02
III. TOTAL OF ALL COSTS EXCLUDING MANAGEMENT					1977.93

* Tape lasts for two years. Therefore cost of tape is divided into two.

**Irrigation 'Blue Transmission' lasts for three years. Therefore cost is divided into three years.

Appendix Table B3. Per Acre Operation Schedule and Costs of Seedless Watermelon Production; Western Riverside, 1989

Based on : 200 acres farm with 20 acres of watermelon
 Production Period equals 4 months (approximately 120 days)
 Yield = 18 tons/acre

Hourly costs	Labor	4.25	5.00	Tract.	2.07	10.08	Plow	2.82	3.31	Disc	2.74	3.22
	Spryr	.66	.61	Ripper	1.29	1.51				Shaper	.66	.61
	Irrig	.23	.35	Layer	.66	.61	Planter	3.50	4.11	Pickup	2.96	7.14
	Misc.tool	2.28	2.46									

Operation	Tooling	Month	MHRS	MLHRS	TMFC	OFC	TMVC	MLHRS	MLC	MLC	CC	MAT.	TVC	IOPC	TAC
Rip (2x)	120 HP,Rip.	April	1.18		3.96		13.68	1.30	6.49				20.17	.77	24.90
Plow	120 HP,Plow	April	.50		2.44		5.04	.55	2.75				7.79	.30	10.53
Disc 4x	120 HP,Disc	April	1.32		6.34		17.56	1.45	7.26				24.82	.95	32.11
Beds-60", 40"-41" wide	120 HP, shap	April	.50		1.36		5.35	.55	2.75				8.10	.31	9.77
Irrigation Tape	120 HP,layer	April	1.00		2.72		10.69	1.10	5.50			56.35	72.54	2.78	78.05
Irrigation-Blue Transm.		April			.00		.00	.00	.00			27.92	27.92	1.07	28.99
Chicken Manure		April			.00		.00	.00	.00		40.00		40.00	1.53	41.53
Weed Cont.-Prefer	120 HP, Spry	April	.33		.90		.70	.36	1.82	.00		39.60	42.11	1.61	44.63
Weed Cont.-Alanap	120 HP, Spry	April	.33		.90		.70	.36	1.82	.00		4.29	6.80	.26	7.96
Plant	120 Hp,plant	April		11.00	.00		.00	.00	.00	46.75		275.88	322.63	12.37	335.00
Plant-Pollinator	120 Hp,plant	April		5.00	.00		.00	.00	.00	21.25		59.16	80.41	3.08	83.49
Irrigation 4.3x	Drip. system	April	35.00		8.05		12.25	2.15	10.75	.00		86.40	109.40	4.19	121.64
Weed Cont.	Hand	May		10.00	.00		.00	.00	.00	42.50			42.50	1.22	43.72
Irrigation 4.3x		May	35.00		8.05		12.25	2.15	10.75	.00		76.80	99.80	2.87	110.72
Fert-Mit.	Irrig.	May1			.00		.00	.00	.00	.00		28.60	28.60	.82	29.42
Fert-Mit.	Irrig.	May15			.00		.00	.00	.00	.00		16.80	16.80	.48	17.28
Weed Cont.-Treflan	120 HP,Spryr	May	.33		.90		3.53	.36	1.82	.00		16.00	21.34	.61	22.86
Insecticide.-Vydate	120 HP,Spryr	May	.33		.90		3.53	.36	1.82	.00		32.53	37.87	1.09	39.86
Irrigation 4.3x		June	35.00		8.05		12.25	2.15	10.75	.00		86.40	109.40	2.10	119.55
Irrigation 4.3x		July	35.00		8.05		12.25	2.15	10.75	.00		86.40	109.40	1.05	118.50
Harvest		July									774.00		774.00	7.42	781.42
Misc. (off.,legal,misc.tools,etc)		Season	1.00		2.28		2.46		.00		20.00		22.46	.86	25.60
Land Rent		Season							.00		100.00		100.00	11.50	111.50
Taxes						.00			.00				.00	.00	.00
Management						.00			.00				.00	.00	.00
Pickup			2.00		5.92		14.28	2.20	11.00				25.28	.73	31.92
Total			148.82	26.00	60.83	.00	126.50	17.20	86.01	110.50	934.00	893.13	2150.14	59.99	2270.95

Note:-MHRS=machinery hours; MLHRS=hand labor hours; TMFC=total machinery fixed costs; OFC=other fixed costs; TMVC= total machinery variable costs
 MLHRS= machinery labor hours; MLC=machinery labor cost; HLC= hand labor cost; CC=custom cost
 MAT=material cost; TVC=total variable cost; IOPC=interesting on operating capital; TAC=total all costs

Appendix Table B4. Seedless Watermelon Production Cost Per Acre
Western Riverside, 1989

Based on: 200 acres farm with 20 acres melon

Labor wages/hour: Manual 4.25 Machine 5.00

I. VARIABLE/OPERATING COSTS

	Input Unit	Input Amount	Price/ Unit(\$)	Cost/ Acre(\$)	Your Cost Per Acre(\$)
A. Cultural Costs					
Irrigation Tape	Foot*	8167.00	.01	56.35	-----
Irrigation 'Blue Transmission'	Foot**	67.00	1.25	27.92	-----
Chicken Manure (Custom Application)	Acre	1.00	40.00	40.00	-----
Herbicide- Prefar	Gallon	1.00	39.60	39.60	-----
Plant	Piece	1452.00	.19	275.88	-----
Plant-Pollinator	Piece	580.00	.10	59.16	-----
Labor-Planting	Hour	16.00	4.25	68.00	-----
Herbicide- Alanap	Gallon	.33	13.00	4.29	-----
Fertilizer- 16-16-16	Pound	130.00	.22	28.60	-----
Fertilizer- UN32 (5x)	Gallon	15.00	1.12	16.80	-----
Weed Control-Hand weeding	Hour	10.00	4.25	42.50	-----
Herbicide- Treflan	Pound	20.00	.80	16.00	-----
Insecticide-Vydate	Gallon	.50	65.06	32.53	-----
Irrigation- Water	Acre Foot	1.40	240.00	336.00	-----
Land Rent	Acre	1.00	100.00	100.00	-----
Misc. Office, Legal, etc.	Acre	1.00	20.00	20.00	-----
B. Machinery Costs					
Repair, Fuel and Lube	Acre	1.00	131.16	126.50	-----
Labor- Machine	Hour	17.20	5.00	86.00	-----
C. Interest on Operating Cap.					
	Acre	1.00	59.99	59.99	-----
TOTAL PREHARVEST VARIABLE COSTS					1436.12
D. Harvest- Custom Operation					
	Ton	18.00	43.00	774.00	-----
TOTAL VARIABLE COSTS (PREHARVEST + HARVEST)					2210.12
II. FIXED/OWNERSHIP COSTS					
Depreciation-Machine & Irrig.Equip.				31.02	-----
Invest. Int.-Machine & Irrig. Equip.				25.08	-----
Taxes, Ins. Housing-Machine & Irrig.Equip.				4.75	-----
TOTAL FIXED OR OWNERSHIP COSTS					60.85
III. TOTAL OF ALL COSTS EXCLUDING MANAGEMENT					2270.97

* Tape lasts for two years. Therefore cost of tape is divided into two.

**Irrigation 'Blue Transmission' lasts for three years. Therefore cost is divided into three years.