
U.C. COOPERATIVE EXTENSION

SAMPLE COST TO ESTABLISH AND PRODUCE



CANTALOUPE

SLANT-BED, SPRING PLANTED

IMPERIAL COUNTY – 2000

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For an explanation of calculations used for the study refer to the attached General Assumptions or call the author, Keith S. Mayberry, at the Imperial County Cooperative Extension office, (619)352-9474 or e-mail at ksmayberry@ucdavis.edu.

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FOREWORD

We wish to thank growers, pest control advisors, seed companies, transplant producers, contract harvesters, fertilizer dealers, and equipment companies for providing us with the data necessary to compile this circular. Without them we could not have achieved the accuracy needed for evaluating the cost of production for the dynamic and important vegetable industry in Imperial County.

The information presented herein allows one to get a "ballpark" idea of vegetable production costs and practices in the Imperial County. They do not reflect the exact values or practices of any grower or shipper, but are rather an amalgamation of countywide prevailing costs and practices. Exact costs incurred by individual growers depend upon many variables such as weather, land rent, seed, choice of agrichemicals, location, etc. No exact comparison with individual grower practice is possible or intended. The budgets do reflect, however, the prevailing industry trends within the region.

Overhead usually includes secretarial and office expenses, supplies, donations, utilities, transportation, accountants, insurance, safety training, permits, etc. In most of the crop guidelines contained in this circular we used 13% of the total of land preparation, growing costs and land rent to estimate overhead. For crops that require additional labor or extra operations (i.e. leaf lettuce) we used 17% overhead to account for the additional expenses.

Since all of the inputs used to figure production costs are impossible to document in a single page, we have included extra expense in man-hours or overhead to account for such items as pipe setting, motor grader, water truck, shovel work, etc. Whenever possible we have given the costs of these operations per hour.

Not included in these production costs are expenses resulting from management fees, loans, supervision, or return on investments. The crop budgets also do not contain expenses encumbered for cleanup discing, road and ditch maintenance, perimeter weed control. If all the above items were taken into account, the budget may need to be increased by 7-15%.

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**2000-2001 VEGETABLE CROPS PREVAILING RATES
IMPERIAL COUNTY**

**HEAVY TRACTOR WORK & LAND
PREPARATION**

<u>OPERATION</u>	<u>\$/ACRE</u>
Plow.....	27.75
Subsoil, 2 nd gear.....	38.75
Subsoil, 3 rd gear.....	32.75
Landplane.....	12.00
Triplane.....	11.00
Chisel 15".....	24.75
Wil-Rich chisel.....	14.75
Big Ox.....	21.25
Slip plow.....	39.00
Pull/disc borders.....	6.00
Make cross checks (taps).....	6.00
Break border.....	5.75
Disc, stubble.....	21.75
Disc, regular.....	11.50
List 40" beds.....	13.50
Float.....	10.00
Disc, borders.....	11.25
Laser (acre).....	34.00-38.00
Dump (scraper) borders.....	14.00

**PLANTING, CULTIVATING & LIGHT
TRACTOR WORK**

	<u>\$/HR</u>
Power mulch dry.....	23.00
Power mulch with herbicide.....	27.00
Shape 40" beds.....	9.50
Precision plant 40" beds.....	17.50
Cultivate 4-row 40" beds.....	13.00
Spike 40" beds.....	9.75
Spike and furrow 4-rows 40" beds.....	10.25
Furrow out 40-42" beds.....	9.75
Lilliston 40" beds.....	10.75
Lilliston 40" beds with/herbicides.....	14.50
Inject fertilizer and furrow out 40" beds.....	13.50
Fertilize dry and furrow out 40" beds.....	13.50
Broadcast dry fertilizer >300lb/a.....	7.00
Broadcast dry fertilizer <300lb/a.....	6.00
Ground spray 4-row.....	10.00
Ground spray 8-row.....	9.00
Layby herbicide.....	22.00

PREVAILING RATES BY THE HOUR

	<u>\$/HR</u>
Motor grader.....	50.00
Backhoe.....	42.50
Water truck.....	39.00
Wheel tractor.....	32.00
Scraper.....	27.00
Versatile.....	53.00
D-6.....	46.50
D-8.....	65.00
Burn ditches.....	28.00
Buck ends of field.....	30.00
Pipe setting (2 men).....	33.00
Laser.....	70.00
Work ends.....	40.00

IRRIGATION

Sprinkler irrigate.....	\$125-160.00/acre
1 acre-foot of water.....	14.56
Sprinkler irrigate carrots.....	155.00

*Note – Cultural rates for specific crop operations listed on crop budgets.

CANTALOUPE CULTURE 2000-20001

Annual acreage, yield, and value of slant-bed spring cantaloupe in Imperial County, CA (1995-1999)

Year	Acres	Yield/Acre*	Value/Acre
1999	14,664	380	\$2,315
1998	14,087	513	\$3,180
1997	13,605	434	\$2,918
1996	15,137	436	\$3,016
1995	14,473	366	\$3,075

* 38 lb cartons

Source: I.C. Agricultural Commissioner's Reports 1995-1999

PLANTING-HARVESTING DATES Spring cantaloupes are planted from late December under plastic through mid-March. Slant beds are used for roughly 60 percent of the acreage; plastic mulched mid-bed trench system is used on the rest. Harvesting begins in May and continues through mid- July.

The fall crop is generally planted from mid-July through late August for harvest in mid-October until the first frost. The silverleaf whitefly has caused extensive damage on fall planted melons and the acreage is low compared to a decade ago.

VARIETIES Popular cantaloupe varieties include: *Primo Novartis*; *Goldmine Harris Moran*; *Impac Asgrow*; *Oro Rico Harris Moran*; *Pacstart Asgrow*; *Laredo Peto*; *Mission Asgrow*; *Hymark Peto*; *Cruiser Harris Moran*; *Sol Real Novartis*; *Sol Dorado Novartis* and *Gold Rush Harris Moran*.

PLANTING INFORMATION Slant-bed or "Yuma-bed" culture was developed to orient the south face of the bed toward the winter sun. The sun's rays strike the soil surface at a nearly perpendicular angle, converting light energy into heat. Flatter beds reflect a greater portion of the incoming radiation and are therefore cooler. Maximum bed heating is achieved when the bed angle is roughly 35-37 degrees from horizontal.

Seed is planted ½ inch deep on 80 inch beds. Custom-built, slant-bed planters using random flow seeding units are common. Air planters may be used for precision planting. Seed lines are located midway up the slope. Care must be taken to locate the correct seed line position as the beds will be reworked and reformed during the season. Forming a bed with a depression at the crown will increase the incidence of fruit and root rotting fungi.

After the melons are thinned to approximately 12 inches in-row, the beds are worked to relocate the seed line. Soil is shaved off the top of the beds and into the furrow. After several passes with small tractor-mounted discs, the field is virtually flat with seed lines 80 inches apart. Sidedress fertilizer is applied and new furrows are made for irrigation.

The melons are direct seeded on alternate N-S oriented 40-inch flat beds to minimize excessive heat to the seed lines. Later the off beds are split and the planted beds are reformed to a full 80-inch bed.

The mid-bed trench system involves the use of a bed shaper to produce a trench or groove in the center of an 80-inch wide bed. The shape of the trench varies from grower to grower, but normally they are 6-10 inches wide at the bottom, 20 inches wide at the top, and 12 inches deep. Trenches are seeded at the bottom using either a random flow planter or an air-type, vacuum precision planter. Pre-emergence herbicide is sprayed in the trench. A tractor-mounted, plastic-mulch laying machine is used to stretch a 40-inch wide sheet of 1-1½ mm plastic sheet over the trench and to secure the edges with soil.

Fall planted melons emerge rapidly after the initial irrigation. When the plants have 3 to 4 true leaves, they are thinned to 5-7 inches within-row.

SOILS Well-drained soils are preferred. Sandy or silt loams are sometimes selected for the earliest crop. Heavier soils are preferred because of their greater water holding capacity which slows the onset of vine collapse. Beds should be left cloddy to allow for maturing melons to develop with minimal soil contact and good aeration.

Fields located in the northern portion of the valley near the Salton Sea are preferred for the early melon crops. This area is less subject to freezing due to the influence of the sea. Spring cantaloupes are also planted in Winterhaven (eastern Imperial county).

IRRIGATION Slant-bed cantaloupes are usually furrow irrigated. Sprinkling tends to cool the soil and cantaloupes do not respond well to prolonged or frequent irrigation.

After planting, the tops of the beds are shaved to fill the furrows and bring the furrow water closer to the seed lines. The beds are then irrigated and water is "subbed" (moved by capillary action) past the seed line. This may take several days.

Following emergence, water is often withheld for several weeks. This is done to maintain soil warmth and promote early growth. The last irrigation is normally scheduled one week prior to harvest. Excessive moisture during harvest may increase ground spotting, rotted fruit, and soft fruit.

FERTILIZERS Most growers apply liquid 10-34-0 in the beds at planting or broadcast 11-52-0 prior to listing the beds. Up to 150 pounds of nitrogen may be sidedressed. Normally UAN32 or AN20 is used.

POLLINATION At least one colony of bees per acre is recommended and 1½ colonies are better. The bees should be distributed on at least two sides of a 40-acre field; distribution of bees within fields is even better. Research has indicated that yields are increased with heavy bee saturation.

Flowers that are bisexual (i.e., fruit-producing flowers) are only open for one day. On the average, a well-pollinated flower will receive at least 15 bee visits during this time. If poorly pollinated, the flower aborts.

The highest quality, earliest maturing, and largest fruit are produced near the crown of the plant. For this reason it is important that an adequate supply of bees be delivered to the field when the first male blossoms develop.

PEST CONTROL Spring cantaloupes are subject to a number of insect problems including cutworms, aphids, mites, loopers, silverleaf whiteflies, leafhoppers, and leafminers.

The silverleaf whitefly can cause yellowing, wilting and death of plants. They remove a large quantity of plant sap during feeding. The excrement from whiteflies called "honeydew" falls on the fruit and foliage. Black-colored fungi develop on the nutrient-rich excrement causing an undesirable appearance of the fruit. Field packing becomes nearly impossible as the fruit need to be washed to remove the discoloration.

Sudden wilt caused by *Pythium* sp. is a serious problem affecting melons after fruit set. The problem is lessened by using alternate furrow irrigation, which allows for a portion of the root zone to remain dry.

Mosaic viruses including zucchini yellow mosaic (ZYMV), watermelon mosaic II (WMV), papaya ringspot (PRSV), and cucumber mosaic (CMV) are vectored by various aphid species during the spring. There is no control.

Powdery mildew, caused by *Sphaerotheca fuliginea* or *Erysiphe cichoracearum*, is a foliar disease favored by warm weather and moisture. Dusting sulfur and agrichemicals are used for control. Other diseases of lesser importance include charcoal rot caused by *Macrophomina phaseolina*, root rots caused by *Fusarium* spp., *Pythium* spp., and *Rhizoctonia solani*, and gummy stem blight caused by *Didymella bryonia*.

Melon vine decline (*Monosporascus cannonballus*) can cause serious damage at harvest. Other than soil fumigation by methyl bromide, there is no control.

Fusarium fruit rot, caused by *F. roseum*, can cause severe damage. Control measures must be applied as a preventative (i.e., before disease occurs) in order to be effective. Otherwise, control measures are useless.

Weeds are serious problems in spring cantaloupes. Herbicides have not been successful, therefore growers rely on hand weeding and cultivation during the bed reconstruction process to kill unwanted weeds.

HARVESTING Most of the crop is field-harvested on tractor-pulled platforms that span 12 beds. The basic harvest crew consists of 14 to 17 people including a field supervisor. A harvesting crew can harvest 50 to 60 cartons per hour.

The decision to "break" a field is determined by many factors: market price, sugar content of the fruit, weather, and anticipated yield.

Cantaloupes should have at least 10 percent soluble solids (sugar) for good dessert quality. However, the minimum legal standard is 8 percent. High quality, crown-set fruit may have 14 percent soluble solids or more. While cantaloupes ripen and soften after harvest, they do not increase in sugar content.

The preferred shape for a cantaloupe is round and symmetrical. Triangular-shaped melons are difficult to pack and rattle in the box.

Picking is done according to melon background color. However, pure, full-slip, straw-colored melons are no longer the industry standard. Greenish cast cantaloupe hybrid varieties are acceptable provided they contain sufficient sugar.

First impressions of the fruit coming from a district are important in establishing a good report with buyers. This makes it important to pack a good carton at the beginning of the season.

Rough handling resulting in scuffing or bruising of the net and puncturing or cracking of the fruit will increase the incidence of decay and dehydration.

Culling and sizing is done by the packers who throw 3 to 15 percent of the fruit (off-sizes and blemished fruit) back into the field. Sizing is by "feel" with packed sizes being 9, 12, 15, 18, 23, or 30 fruit per carton. Carton weight is approximately 40 pounds. Most of the time there are no 30's shipped. Presentation is important in establishing repeat melon sales. Care should be taken to pack high quality melons free of defects and sunburn.

Cartons are stacked 42 per pallet and 12 to 14 pallets per trailer. It takes 2 to 2.5 hours to fill a trailer. Filled trailers are taken to pressure or "forced air" type coolers to remove field heat. Hydrocooling is also used, but only with shed packed fruit, not field pack.

One method of circumventing the need for pressure cooling in remote areas is to harvest at night, using lights or packing early in the morning before the melons heat up. Cool melons are placed under refrigeration.

Major losses of potentially harvestable fruit occur from mechanical damage and sunburn. Vine coverage has a lot of influence on the incidence of sunburned fruit. Once the roots quit pumping moisture to the fruit, the melons will heat and burn.

POSTHARVEST HANDLING Cantaloupes may be stored for roughly two weeks at 36-41°F and 95 percent relative humidity. At lower temperatures, chilling injury may occur.

Hot water dips of 135 to 140 °F for three minutes reduce surface decay organisms. When hot water dips are used and fruit are stored in poly bags, cantaloupes have preserved well up to 30 days.

For more information see "Cantaloupe Production in California", DANR Publication 7218 available from the Imperial County Cooperative Extension Office or for a free download from the internet go to <http://anrcatalog.ucdavis.edu/specials.ihtml>

SPRING SLANT BED CANTALOUPE PROJECTED PRODUCTION COSTS 2000-2001

Hand labor at \$7.75 per hour (\$5.75 plus SS, unemployment insurance, and transportation, supervision and fringe benefits).
 Yield--450 cartons per acre. Slant bed culture Hybrid variety

OPERATION	Cost	Materials		Hand Labor		Cost Per acre
		Type	Cost	Hours	Dollars	
LAND PREPARATION						
Stubble disc 1x	21.75					21.75
Disc 2x	11.50					23.00
Landplane	12.00					12.00
Border, cross check and break borders	17.75					17.75
Flood		Water 1 ac-ft	14.56	1	7.75	22.31
Disc 2x	11.50					23.00
List and re-run beds	36.00					36.00
TOTAL LAND PREPARATION						155.81
GROWING PERIOD						
Shape beds and plant	22.00	Hybrid seed 20M	219.00			241.00
Systemic insecticide	10.00	Admire	75.00			85.00
Spray herbicide	12.00	Prefar	16.50			28.50
Back fill furrow	10.00					10.00
Thin				6	45.00	45.00
Move bed top 1st time	18.00					18.00
Cultivate/move beds 3x	15.00					45.00
Center beds	16.00					16.00
Work bed tops and spike	12.75					12.75
Spike 1x	10.00					20.00
Sidedress fertilizer	12.50	80 lb. N @ .35	28.00			40.50
Hand weed 1x				6	46.50	46.50
Furrow out	8.00					8.00
Layby herbicide	22.00	Treflan	4.00			26.00
Pollination		1 1/2 hives @ \$25/hive				37.50
Irrigate 5x		Water 3 3/4 ac/ft	54.60	8	62.00	116.60
Water-run fertilizer		40 lb. N @ .35	14.00			14.00
Insect control 4x	9.50	Insecticides	120.00			158.00
Disease control 2x	10.00	Fungicides	30.00			50.00
Stubble disc	21.75					21.75
TOTAL GROWING PERIOD						1040.10
GROWING PERIOD & LAND PREPARATION COSTS						1195.91
Land Rent (net acres)						200.00
Cash Overhead-----	13 % of preharvest costs & land rent					181.47
TOTAL PREHARVEST COSTS						1577.38
HARVEST (field pack)						
Pick, pack, haul, cool, and sell		450 cartons @		4.00 per carton		1800.00
TOTAL OF ALL COSTS						3377.38

PROJECTED PROFIT OR LOSS PER ACRE

		Price/ 38 lb.carton (dollars)					Break-even dollars/ carton
		5.00	6.00	7.00	8.00	9.00	
cartons per acre	400	-1177	-777	-377	23	423	7.94
	450	-1127	-677	-227	223	673	7.51
	500	-1077	-577	-77	423	923	7.15
	550	-1027	-477	73	623	1173	6.87
	600	-977	-377	223	823	1423	6.63

* Harvest costs vary with the shipper, the field conditions and the market value.