

U.C. COOPERATIVE EXTENSION
SAMPLE COST TO ESTABLISH AND PRODUCE

SUGAR BEETS

IMPERIAL COUNTY – 2003

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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, chemical applicators and dealers, custom farm operators, fertilizer dealers, seed companies, contract harvesters, equipment companies, and the Imperial County Agricultural Commissioners office 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 field crop industry in Imperial County.

The information presented herein allows one to get a "ballpark" idea of field crop production costs and practices in the Imperial County. They do not reflect the exact values or practices of any one grower, but are rather an average 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, time of planting, 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, general farm supplies, communications, utilities, farm shop, transportation, moving farm equipment, 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.

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, bird and rodent control, etc. Whenever possible we have given the costs of these operations per hour listed on the cultural operations page.

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

Where applicable we have used terminology that is commonly used in the agricultural industry. These terms are compiled in a glossary at the end of the circular. We feel that an understanding of these terms will be useful to entry-level growers, bankers, students and visitors.

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**2002-2003 Field/Vegetable Prevailing Rate for Field Operations
IMPERIAL COUNTY**

**HEAVY TRACTOR WORK & LAND
PREPARATION**

<u>OPERATION</u>	<u>\$/ACRE</u>
Plow.....	30.50
Subsoil, 2 nd gear.....	39.00
Landplane	12.75
Triplane	11.25
Chisel 15".....	25.00
Wil-Rich chisel.....	16.00
Big Ox	24.00
Slip plow.....	41.00
Pull/disc borders	6.75
Make cross checks (taps).....	6.25
Break border	6.00
Disc, stubble	21.00
Disc, regular.....	12.50
Corrugate	11.00
Disc, regular with ring roller.....	13.50
List 30" beds 12-row	15.00
List 40" beds 8-row	15.00
Float.....	10.00
Disc, borders.....	7.00
Dump (scraper) borders	14.50

LIGHT TRACTOR WORK

Power mulch dry.....	25.00
Power mulch with herbicide	28.00
Shape 30" 6 row	10.75
Shape 40" 4 row	10.75
Plant 30" beds nonprecision	20.00
Plant 40" beds nonprecision	18.00
Precision plant 30" beds	22.00
Precision plant 40" beds	20.00
Mulch plant wheat	19.50
Plant alfalfa (corrugated).....	17.50
Plant bermudagrass (flat).....	13.75
Plant sudangrass.....	14.75
Cultivate 30" beds 4-row	16.00
Cultivate 40" beds 4-row	14.00
Spike 30" beds 4-row.....	13.25
Spike 40" beds 4-row.....	11.25
Spike and furrow out 30" 4-row	14.00
Spike and furrow out 40" 4-row	12.00
Furrow out 30" beds 4-row.....	13.25
Furrow out 40" beds 4-row.....	11.25
Lilliston 30" beds 6-row	13.00
Lilliston 40" beds 4-row	13.00
Lilliston 30" beds with/herbicides 6-row.....	15.00

Lilliston 40" beds with/herbicides 4 -row.....	15.00
Inject fertilizer & furrow out 30" beds 4-row	15.00
Inject fertilizer & furrow out 40" beds 4-row	13.00
Fertilize dry & furrow out 30" beds.....	17.00
Fertilize dry & furrow out 40" beds.....	15.00
Flat inject fertilizer NH ₃	15.00
Broadcast dry fertilizer	7.00
Ground spray 40" 8-row	12.00
Ground spray 30" 8-row	14.00
Chop cotton stalks.....	13.75

HARVEST COSTS Field Crops

	<u>BY UNIT</u>
Combine alfalfa seed	41.75/acre
Windrow alfalfa seed	17.50/acre
Rake bermudagrass	5.00/acre
Swath bermudagrass	13.50/acre
Swath sudangrass.....	11.25/acre
Rake sudangrass.....	5.25/acre
Swath alfalfa	8.00/acre
Rake alfalfa.....	4.50/acre
Bale (all types of hay- small bale)	0.65/bale
Haul & stack hay – small bale	0.25/bale
Bale (large bale 4X4).....	10.00/bale
Bale (large bale Jr. 3X4).....	9.00/bale
Stack & load large bale.....	6.00/bale
Dig sugar beets	2.60/clean ton
Haul sugar beets.....	2.45/clean ton
Combine wheat 15 per acre + 0.55 /cwt over 1 ton	
Haul wheat.....	5.50/ton
Combine bermudagrass seed 1 st time	40.00/acre
Combine bermudagrass seed 2 st time	25.00/acre
Haul bermudagrass seed (local).....	175/load
Haul bermudagrass seed (Yuma).....	300/load

MISCELLANEOUS OPERATIONS BY THE HOUR

Motor grader.....	48.00
Backhoe	45.00
Water truck	40.00
Wheel tractor	35.00
Scraper.....	36.00
Versatile.....	56.00
D-6.....	56.00
D-8.....	70.00
Buck ends of field.....	28.00
Pipe setting (2 men)	37.00
Laser	88.00
Work ends (disc out rotobucks).....	35.00

IMPERIAL COUNTY SUGAR BEET CULTURE 2002-2003

Annual acreage, yields, and value of sugar beets in
Imperial County, CA for five consecutive years

Year	Acres	Yield/Acre (tons)	Value/Acre
2001	26,300	41.6	\$1443
2000	31,475	38.6	\$1432
1999	33,386	40.7	\$1774
1998	34,258	36.1	\$1516
1997	37,731	34.6	\$1441

(Source: I.C. Agricultural Commissioner's Reports).

YIELD: Sugar beet yields and sugar levels have begun to increase due to better varieties and management practices. The current record in the Imperial Valley is 20,717 lbs sugar on 65.27 tons per acre at 15.87 % sugar.

SEEDING RATE: Sugar beets are grown primarily on 30-inch single row with limited acreage on 40-inch double-row beds. Some early season fields are precision planted at a 2-3-inch spacing; others are planted with seed spaced 4-5 inches apart later in the season. Seed is now sold in units of 100,000 seed. Seed prices depend upon fungicide and insecticide treatments, seed size, seed quality, variety and quick prime treatment. Precision planting improves overall stand by reducing the need for thinning and increases overall plant uniformity and population. Field observations indicate that yield is reduced more by too few plants than too many plants per acre. Planting depth is normally $\frac{1}{4}$ to $\frac{1}{2}$ inch. Many kinds of planters are used including vacuum planters.

Early plantings during extremely hot weather will require a higher seeding rate to achieve the proper stand. Planting when soil temperatures are high greatly increases the incidence of seed rot and damping-off. However, new seed treatments have reduced the problem significantly.

PLANTING / HARVEST DATE: The planting season begins in September and continues until mid-October. Harvest starts roughly April 15 and continues into late July. Late-planted fields tend to be more expensive due to additional costs for irrigation, additional pest control, and for losses due to root rots and sugar beet cyst nematode. However, some times the greater expenses on late fields are often offset by higher beet yields.

VARIETIES: There are several sugar beet varieties approved by a seed evaluation committee for use in Imperial Valley. "Phoenix" performs well for early plantings and "Beta 4430" is commonly

planted for the remainder of the season. Varieties should be tolerant to *rhizomania*, a destructive viral disease.

FERTILIZATION: All phosphate fertilizer should be applied before listing the beds. Apply 1/3 of the required nitrogen fertilizer with phosphate preplant, 1/3 at thinning and the final 1/3 before December 1st. Late applications of nitrogen will reduce sugar percentage and purity. Many types of nitrogen fertilizer are used for sugar beet production.

With vegetable rotations, sugar content and purity are lower and root rot is higher than with other rotations. Also land formerly in vegetable crops tends to have high residual nitrogen.

IRRIGATION: The crop is normally furrow irrigated up initially and may require watering back within 4 to 5 days to get a stand. Never allow the crop to wilt or suffer from shortage of water. Ten to 15 irrigations may be required during the season depending on soil type. Beets should not be irrigated so frequently that prolonged periods of soil saturation occur, as this practice will encourage root rot organisms. The last irrigation should be applied at least 30 days prior to harvest in April, 25 days in May, 20 days in June, and 15 days in July. Sugar company agronomists suggest early evening irrigations on a 7-9 day schedule will be successful if used in late June and July on quarter-mile irrigation runs.

Additional hourly irrigation costs have been added to account for pipe setting, grading ditches and other miscellaneous costs not shown in the budget.

PEST CONTROL: Pest populations vary from year to year and pest control costs varies accordingly. A number of insects and diseases may be a problem during the growing season. Growers planting extremely early should exercise all caution against insect damage by inspecting fields frequently and carefully. Crickets, flea beetles, cutworms, and armyworms occur as seedling pests and are especially damaging in early plantings. From January to March the green peach aphid is a primary pest. Spider mites and leafhoppers occur as late-season pests. Armyworms can increase the incidence of *Rhizopus* root rot (*Rhizopus stolonifer*) by creating points of entry for the fungus.

Sugar beet cyst nematode (*Heterodera schachtii*) is a serious pest that once threatened destruction of the Imperial Valley sugar beet industry. The following practices have proven effective for managing this pest. Nematode-infested fields must be rotated to non-host crops. Crops that should not be rotated with sugar beets are members of the cabbage family such as broccoli or cauliflower for a minimum of 3 years. Growers should carefully clean all nematode-infested machinery when moving between beet fields. As a matter of prevention, sugar beets cannot be grown on any one field more than 4 out of 10 years.

Rhizomania is a viral disease caused by Beet Necrotic Yellow Vein Virus and vectored by a soilborne fungus (*Polymyxa betae*). The disease reduces sugar production significantly. The only control is to use rhizomania-resistant varieties and to meticulously clean all equipment coming into fields. Good rhizomania-resistant varieties are available.

Various types of fungal root rots (*Phytophthora drechsleri*, *Pythium aphanidermatum* and *P. ultimum*) are prevalent on sugar beets. Bacterial vascular necrosis and rot (*Erwinia carotovora*) is also very common. Root rots are extremely prevalent in late season beets and as much as 10 percent of the beet roots may be affected. Varieties with higher rot tolerance should be planted for late July harvest. Proper water management is extremely important in combating root rots. *Rhizoctonia solani* causes damping-off, as well as root and crown rot. Powdery mildew (*Erisiphe polygoni*) is a common foliar disease that can be effectively controlled with fungicides.

WEED CONTROL: UpBeet, a Dupont herbicide is universally used by ground for the first weed control operation. UpBeet in combinations with other herbicides depending on the problem is used for the second application. Hand weeding is no longer affordable. Pre-irrigation, cultivation and herbicides are relied on for weed control. The cost of herbicides is higher on double-row sugar beet beds as there is more material per acre needed to treat the seed lines.

HARVEST: Pinch-wheel beet harvesting machines recover 1-2 tons of beets more per acre than spike-wheel harvesters due to the method of root extraction. Also pinch-wheel harvesters can be used to harvest fields a few days earlier after the last irrigation than spike wheel harvesters can.

Pasturing sugar beet tops with cattle was once common practice, however, with new harvesting techniques only the leaves remain. The sugar beet crowns are taken with the sugar crop. As a result, pasturing is no longer profitable.

IMPERIAL COUNTY SUGAR BEET PRODUCTION COSTS 2002-2003

80 acre field

Mechanical operations at prevailing rates. Labor at \$9.25 /hr (\$6.75 plus SS, unemployment, workman's compensation and fringe benefits)

Yield--42.0 tons per acre. 30-inch beds

OPERATION	Prevailing Rate	MATERIALS		HAND LABOR		COST Per Acre
		Type/Amount	Cost	Hours	Dollars	
LAND PREPARATION						
Subsoil	39.00					39.00
Disc 2x	12.50					25.00
corrugate	11.00					11.00
Flood		Water 1.0 ac-ft	16.00	1	9.25	25.25
Disc 2x	12.50					25.00
Fertilize	7.00	250 lb 11-52-0	29.38			36.38
Triplane 2x	11.25					22.50
List	15.00					15.00
TOTAL LAND PREPARATION COSTS						199.13
GROWING PERIOD						
Precision plant & shape	22.00	Seed 3" spacing	41.00			63.00
Herbicide 3x ground	12.50	Herbicide	50.00			75.00
Cultivate 2x	16.00					32.00
Mechanical thin	12.50					12.50
Fertilize 2x inject	15.00	160 lb N(am-nitrate)	51.20			81.20
Insecticide 4x(2air,2 grd)	8.50	Pesticide	48.00			82.00
Disease control 2x grd	12.50	Fungicide	8.00			33.00
Irrigate 12x		Water 5 ac-ft	80.00	5	46.25	126.25
Work ends 2x	5.00					10.00
TOTAL GROWING PERIOD COSTS						514.95
GROWING PERIOD & LAND PREPARATION COSTS						714.08
PREHARVEST COSTS						
Land rent (net acres)						175.00
Cash overhead		13 % of growing period, land prep & land rent				115.58
TOTAL PREHARVEST COSTS						1004.65
HARVEST COSTS						
Digging	2.60	per clean ton	Yield -	42 tons/acre		109.20
Hauling	2.45	per clean ton				102.90
TOTAL HARVEST COSTS						212.10
TOTAL ALL COSTS						1216.75

In order to determine the value of a ton of sugar beets, several variables must be known:

- 1) percent sugar
- 2) sugar price to grower (varies with % sugar)
- 3) contracted harvest date (premium price for early dig; price reduction for late dig),
- 4) variable trucking charges due to distance, and
- 5) grower agreements on digging pools