U.C. COOPERATIVE EXTENSION

SAMPLE COST TO ESTABLISH AND PRODUCE

BELL PEPPERS

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.

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

OPERATION	$/ACRE
Plow	27.75
Subsoil, 2nd gear	38.75
Subsoil, 3rd 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

	$/HR
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

	$/HR
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.

BELL PEPPER CULTURE 2000-2001

ACREAGE AND YIELD In 1996 there were roughly 600 acres of bell peppers ("bells") grown in Imperial Valley. A good yield of bells is 1,000 cartons per acre or more.

PLANTING DATES The majority of the bell pepper acreage is planted using greenhouse-grown transplants. Typically, transplants are about 50-to 60-days old when taken to the field. Fields are planted in late January to mid-February in order to harvest between mid-April and early June.

PLANTING INFORMATION Most bells are grown using drip irrigation and plastic mulch. Drip tape is installed on 60 to 66 inch beds. Normally two drip lines are used. A layer of black plastic film is laid over the bed top for weed control. Holes (4" diameter) are burned into the plastic mulch to allow for transplanting. Drip tape is usually buried about 6 inches deep.

Transplants are spaced roughly 12 inches within rows and 11 inches between rows. In the Coachella Valley, some bells are grown early season on a 14 inches within rows and 16 inches between rows. This increased plant spacing allows greater light penetration into the canopy, producing more uniform color development in fruit.

VARIETIES Green bell varieties commonly used include: Indra *Novartis;* Ivan *Enza* ;Valiant *Peto;* Wizard *Peto* and Galaxy *Novartis*; Jupiter OP *Novartis*. Red bell varieties include: Maccabi *Hazera.* A popular yellow bell is Matador *Novartis* and Zarco *Novarti*s. Grande *Novartis* and Mitla *Peto* are popular hot jalapeño peppers.

DRIP IRRIGATION AND FERTILIZER Some growers apply phosphorous as P_2O_5 (300 lb actual phosphate /acre) during the growing season. Some phosphorus may be applied prior to listing. Nitrogen (N) rates of up to 1,000 pounds actual N per acre have also been used. The intent is to keep a vigorous, leafy plant canopy that will support high yields and minimize sunburn. Research in the San Joaquin Valley by the University of California has shown that pepper yields may be reduced when nitrogen fertilizer rates exceed 250 pounds actual nitrogen per acre.

Careful fertilizer monitoring and management should substantially reduce the amount of fertilizer needed. There are plant nutrient test meters, which may be used on fresh plant sap. As a rule-of-thumb, apply 10-15 pounds N per acre per week.

Chlorination and purging drip lines with acidifying materials is necessary to keep lines functioning properly. White phosphoric acid is often used for both fertilizing and cleaning lines.

Peppers should never be stressed for water. Any factor causing a reduction in growth rate will increase sunburn even on fruit located deep within the leaf canopy.

DISEASES AND PESTS Peppers are susceptible to the following aphid-transmitted virus diseases: alfalfa mosaic virus (AMV), tobacco mosaic virus (TMV), pepper mottle virus (PeMV), tobacco etch virus (TEV), potato virus "Y" (PVY), and cucumber mosaic virus (CMV). There is no control of most virus diseases. TMV can be mechanically transmitted by handling peppers after handling TMV-contaminated tobacco products. For this reason, transplant crews and greenhouse workers should refrain from smoking when handling pepper plants.

Powdery mildew of peppers caused by the fungus, *Odiopsis taurica*, is extremely destructive on peppers, causing rapid defoliation of the plants followed closely by sunburn of fruit. Sulfur dust may be used as a preventative treatment. However, other fungicides are needed to reduce the affect of established infections. *Phytophthora* root rot caused by *Phytopthora capsici* is occasionally found.

Insect pests of peppers include thrips, flea beetles, darkling ground beetles, cutworms, aphids, grasshoppers, seed corn maggots, leafminers, cabbage loopers, beet armyworms, and potato psyllid.

HARVESTING Most bell peppers are hand-harvested and loaded into trailers for transport to a nearby packing shed. In more mechanized harvesting operations, a belt loader is used to straddle beds and convey the picked fruit to a tractor-drawn trailer. Some trailers have high-walled sides, others use bins stacked on flat beds.

Normally peppers are taken to a packing shed for grading, sizing, and packing. With green bells, any discolored or ripening fruit are usually rejected. Thirty (30) pound, 1.1 bushel cartons are packed in the following sizes: Extra Large (40-45 count), Large (55-65), Mediums (70-80), Small (90-100), and Choice (full box, no count). Sometimes Choice size is called "Choppers". Peppers are sometimes washed and waxed prior to packing.

Cooling of peppers is usually done by forced air, although hydrocooling or vacuum cooling is possible.

POST HARVEST HANDLING Peppers should be stored at 45-55°F and 90-95 percent relative humidity. Bells are subject to chilling injury at temperatures below 45°F. At temperatures above 55°F, peppers ripen quickly making them more susceptible to decay. Peppers should not be stored with apples, pears, melons or tomatoes as the ethylene given off by these fruits during ripening will cause premature aging in peppers.

Peppers have a short shelf life (usually two weeks or less). Decayed peppers should be removed from the store display to prevent spread to sound fruit.

For more information see "Bell Pepper Production in California", DANR Publication 7217 available from the Imperial County Cooperative Extension Office or for a free download from the Internet go to http://anrcatalog.ucdavis.edu/specials.ihtml

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BELL PEPPER PROJECTED PRODUCTION COSTS 2000-2001

Hand labor at $7.75per hour ($5.75 plus SS,unemployment insurance, and transportation, supervision and fringe benefits).
Yield-- 1000 30-lb. cartons Green bell types

OPERATION	Cost	Materials		Hand Labor		Cost
		Type	Cost	Hours	Dollars	Per Acre
LAND PREPARATION						
Subsoil	38.75					38.75
Disc 2x	11.50					23.00
Landplane	12.00					12.00
Border, cross check & break borders	17.75					17.75
Flood irrigate		Water 1 ac/ft	14.56			14.56
Fertilizer double-spread	8.00	500 lb. 11-52-0	63.75			71.75
Disc 2x	11.50					23.00
Triplane	11.00					11.00
List beds	13.50					13.50
TOTAL LAND PREPERATION						**225.31**
GROWING PERIOD						
Drip system & tape		Drip system	700.00	20	155.00	855.00
Install plastic mulch	55.00	Plastic mulch	110.00			165.00
Metam sodium via drip		Metam sodium	100.00	4	31.00	131.00
Transplanting		17 M plants	850.00	40	310.00	1160.00
Fertilizer (via drip)		400 lb. N @ .35	140.00			140.00
		350 lb. phosphorus	91.00			91.00
Drip maintenence		Chemicals	30.00			30.00
Irrigate 20x		Water 4 ac/ft	58.24	16	124.00	182.24
Insect control 7x & 3x drip	9.00	Insecticides	280.00			343.00
Remove drip tape & plastic				20	155.00	155.00
Disc out beds	11.50					11.50
TOTAL GROWING PERIOD						**3263.74**
GROWING PERIOD & LAND PREPARATION COSTS						3489.05
Land Rent (net acres)						225.00
Cash Overhead--	17 % of preharvest costs & land rent					631.39
TOTAL PREHARVEST COSTS						**4345.44**
HARVEST COST						
Pick, haul, pack, cool, and sell	1000 cartons/acre @		4.40	per carton		4400.00
TOTAL OF ALL COSTS						**8745.44**

PROJECTED INCOME ABOVE COSTS (PER ACRE)

		Price/ 30 lb. carton (dollars)					
		7.00	8.00	9.00	10.00	11.00	**Break-even $/carton**
	900	-2005	-1105	-205	695	1595	9.23
Cartons	1000	-1745	-745	255	1255	2255	8.75
per	1100	-1485	-385	715	1815	2915	8.35
acre	1200	-1225	-25	1175	2375	3575	8.02
	1300	-965	335	1635	2935	4235	7.74

* Harvest cost depends upon the shipper, the field condition and the market.