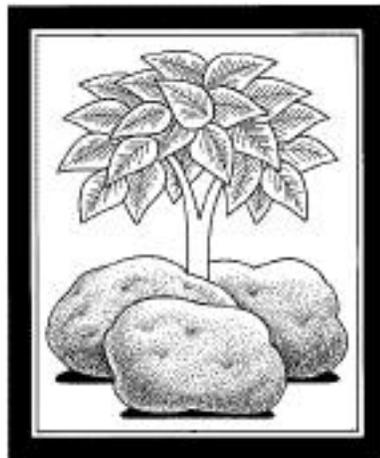

U.C. COOPERATIVE EXTENSION

SAMPLE COST TO ESTABLISH AND PRODUCE

POTATOES



IMPERIAL COUNTY – 2000

Prepared by:
Keith S. Mayberry **Farm Advisor, U.C. Cooperative Extension, Imperial County**

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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University of California and the United States Department of Agriculture cooperating.

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%.

Keith S. Mayberry
(Principal researcher and editor)
Farm Advisor
Vegetable Crops

Refugio A. Gonzalez
County Director

Tom Turini
Farm Advisor
Plant Pathology

Khaled M. Bali
Farm Advisor
Irrigation/Water Science

Eric T. Natwick
Farm Advisor
Entomology

Jose L. Aguiar
Farm Advisor
Vegetable Crops
Coachella Valley

Mark D. Stutes
C.E. Staff

August 2000

**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.

FRESH MARKET POTATO CULTURE 2000-2001

ACREAGE AND YIELD In 1999 there were 3,159 acres of potatoes grown in Imperial Valley with an average yield of 246 cwt (hundredweight) per acre. In 1998, there were 2,622 acres and a yield of 376 cwt.

Potatoes are often grown as a joint venture crop with a contract between a local grower and an established potato shipper. The details on each contract depend upon the grower and the shipper involved. Local shippers grow some potatoes and manage the crop from ground preparation through harvest.

Fields are planted in November. Harvest begins in the middle of March until the middle of May.

VARIETIES Red-skinned potatoes do well in the desert. Reds: Red La Soda, Cherry Red, and CalRed; Whites: CalWhite and White Rose; Yellows: Yukon Gold, Morning Gold, and German Butter Ball. Yellow and white potatoes are grown for specific markets, however the yield may be somewhat lower than with red varieties. Some white processing types are being grown on a limited acreage. The shippers to meet their marketing specifications often supply the potato varieties used for "planting seed".

PLANTING INFORMATION The shipper normally brings down the seed in bulk containers or sacks. Seed pieces may be cut and treated for disease control prior to planting. The shippers often planting in the local growers field. Sometimes the field is sprinkled 24 hours in advance of planting. Cup planters singulate seed pieces and place them down the row. Seed may be spaced between 6-to 8- inches depending upon variety of potato planted and the size of the seed pieces. Bed width may be 30- or 36- inches depending upon the equipment used by each company.

SOILS AND IRRIGATION Potatoes are grown on sandy soils in fields with good drainage. High beds are made and the crop is sprinkler irrigated throughout the season. With sandy soils, nematodes may be a problem. Fields are treated with metam sodium to control these pests.

About half the pest control chemical applications are made via the sprinkler system.

FERTILIZATION Preplant applications of 200 pounds P_2O_5 as 11-52-0 per acre are broadcast and listed into the beds. During the season, an additional 200-300 pounds actual nitrogen (N)/ac is often used. Commonly used nitrogen sources are liquid ammonium nitrate or UAN 32 solution.

INSECT PEST CONTROL Wireworms may attack seed pieces even before shoots emerge after planting. Just after new shoots emerge from newly planted seed potatoes, they are susceptible to damage from crickets, cutworms, earwigs, flea beetles, and sow bugs. Silverleaf

whitefly feed by sucking plant sap in the fall. During winter and spring, aphids (green peach aphid and potato aphid), leaf hoppers, and psyllids may attack the leaves sucking plant juices and injecting phytotoxic salivary fluids. Spider mites may become a problem on foliage any time during the growing season. Cabbage looper and alfalfa looper are occasional foliage feeding pests. Potato tuber worm feed on leaves and stems, but economic losses occur from feeding on tubers in the field and in storage.

DISEASES AND NEMATODES Common scab (*Streptomyces spp.*) and powdery scab (*Spongospora subterranea*) cause development of brownish, rough, raised growths on the surface of the tuber. Common scab can be suppressed when some soil amendments are applied before or at planting and by maintaining adequate soil moisture. Powdery scab incidence can be reduced with a pre-plant treatment of metam sodium.

Rhizoctonia solani can cause cankers on stems and stolons and can produce small, dark-brown, irregularly shaped fungal structures on the surface of the tubers. Fungicide treatment of seed tubers can reduce levels of seed-borne inoculum.

Dark brown, angular or circular lesions on the leaves and a dry rot on the tubers characterize early blight (*Alternaria solani*) symptoms. If the foliar lesions appear early in the season, fungicides applications are justified.

White mold (*Sclerotinia sclerotiorum*) appears as water-soaked lesions covered with white cottony fungal growth with irregularly shaped black fungal structures inside affected stems. Fungicide applications made when symptoms first appear may reduce disease severity if the canopy isn't too dense to get adequate coverage.

Verticillium wilt (*Verticillium dahliae*) causes a yellowing and wilting of lower leaves and the vascular tissue of stems become light brown.

Erwinia carotovora var. *carotovora*, and *E. chrysanthemi* cause a soft rot of the tuber or a black decay of the stem. *Pythium spp.* cause a wet, spongy internal rot of tubers that develops after harvest, although infection occurs in the field. Both tuber rot diseases favored by warm wet conditions.

Potatoes are susceptible to the following aphid-transmitted virus diseases: alfalfa mosaic virus (AMV), potato virus "A" (PVA), potato virus "Y" (PVY), potato leafroll virus (PLV) and cucumber mosaic virus (CMV). Potato virus "X" (PVX) can be transmitted mechanically but there is no known insect vector. Tobacco rattle virus (TRV) is transmitted by stubby root nematode. There is no control of most virus diseases.

Nematodes that are potentially injurious to potatoes include root knot (*Meloidogyne incognita*), lesion (*Pratylenchus penetrans* and *P. neglectus*) and stubby root (*Paratrichodorus sp.*). Pre-plant treatments with metam-sodium or 1,3-dichloropropene (Telone II) are used to reduce

nematode populations. Metam sodium applications are applied water-run in a flood irrigation prior to listing the beds or as a direct injection normally done by a custom applicator.

A few general disease control techniques can help reduce incidence of several of these diseases. Planting disease free seed tubers can reduce incidence of bacterial soft rot, powdery scab and *Rhizoctonia* potato diseases and using certified planting material can minimize the chances of introducing nematodes to a clean field. Crop rotations are effective in controlling common scab, powdery scab, *Rhizoctonia* potato diseases and *Verticillium* wilt. Avoiding over-irrigating can reduce severity of bacterial soft rot, water rot and powdery scab.

Most fungicides are applied through the sprinkler system. Insecticides, when needed, are normally applied by air.

HARVESTING Prior to harvest the vines are killed using an N-pHuric spray at 15-20 gpa with an equivalent amount of water. The field is sprinkled 1-2 days before digging and the beds are rolled. The diggers may be supplied by a joint venture shipper or owned by a local grower. The potatoes are taken to a shed for washing, sizing, grading and packing. Most of the potatoes are taken to Bakersfield for packing.

Potatoes are packed in 50-pound cartons according to size and grade, or in sacks of 50 or 100 pounds. Smaller sacks containing 5,10 or 20 pounds are also packed. Size A or B potatoes are standard sizes, while other sizes are creamers or bakers. Fifty-pound cartons contain potatoes by count ranging from 60 to 100 per container.

FRESH MARKET POTATOES PROJECTED PRODUCTION COSTS 2000-2001

Hand labor at \$7.75per hour (\$5.75 plus SS,unemployment insurance, and transportation, supervision and fringe benefits).

Yield-- 350- 375 cwt (hundred weight equivalents) Estimate of grower's cost-of-production in joint venture

OPERATION	Cost	Materials		Hand Labor		Cost Per acre
		Type	Cost	Hours	Dollars	
LAND PREPARATION						
Stubble disc	21.75					21.75
Subsoil	38.75					38.75
Disc 2x	11.50					23.00
Landplane 2x	12.00					24.00
Border, cross check & break borders	17.75					17.75
Flood		Water 1 ac/ft.	14.56	1	7.75	22.31
Disc 1x	11.50					11.50
Metam sodium application	30.00	Material	146.25			176.25
Disc 1x	11.50					11.50
Triplane 1x	11.00					11.00
Fertilize, double spread	8.00	500 lb. 11-52-0	63.75			71.75
List 30" beds	13.50					13.50
TOTAL LAND PREPARATION						443.06
GROWING PERIOD						
Lilliston beds	10.75					10.75
Apply systemic insecticide	9.50	Systemic insecticide	80.00			89.50
Plant seed pieces	by shipper	Seed pieces or whole				See Note
Spray herbicide/planter		Herbicide	28.00			28.00
Sprinkler irrigate	200.00	Pump	50.00			250.00
Cultivate 2x	13.00					26.00
Spike 2X	9.75					19.50
Water-run fertilizer		300 lb. N @ .35	105.00			105.00
Hand weed 1x				10	77.50	77.50
Irrigate- water and labor		Water 4 ac/ft.	58.24	7	54.25	112.49
Disease control 8x via sprinkler		Fungicides	80.00			80.00
Insect control 4x	8.50	Insecticides	60.00			94.00
Kill vines1x	18.00	N-pHuric acid	34.00			52.00
Roll beds	6.00					6.00
TOTAL GROWING PERIOD						944.74
GROWING PERIOD & LAND PREPARATION COSTS						1387.80
Land Rent (net acres)						200.00
Cash Overhead-----	13 % of preharvest costs & land rent					206.41
TOTAL PREHARVEST COSTS						1794.21
HARVEST COST						
Harvest by shipper		375 cwt				See Note
TOTAL ALL COSTS						1794.21