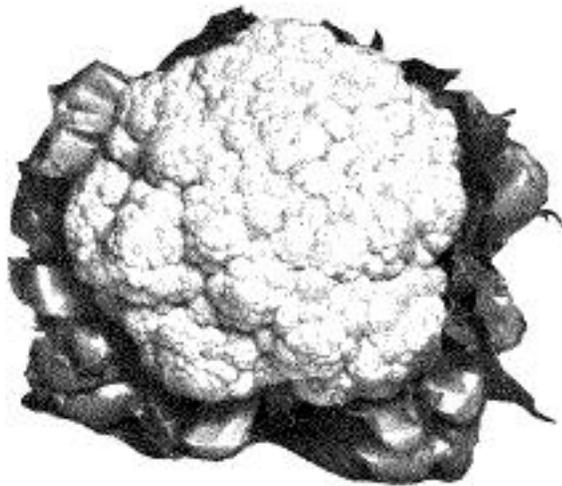

U.C. COOPERATIVE EXTENSION

SAMPLE COST TO ESTABLISH AND PRODUCE

CAULIFLOWER



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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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%.

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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.

CAULIFLOWER CULTURE 2000-2001

Annual acreage, yield, and value of fresh market cauliflower in
Imperial County, CA (1995-1999)

Year	Acres	Yield/Acre*	Value/Acre
1999	4,353	559	\$4,386
1998	3,313	597	\$5,922
1997	3,461	572	\$3,927
1996	3,710	519	\$4,009
1995	3,237	520	\$4,512

* 23 lb cartons

Source: Imperial County Agricultural Commissioner's Reports 1995-1999

PLANTING-HARVESTING DATES Planting starts in August and continues through early December (transplants). Cauliflower is usually grown with a single seed line on 40-or 42-inch beds. Transplants may be grown as greenhouse plugs or field-grown, bare-root seedlings. Several companies will custom install transplants. The transplant machines place seedlings into pre-moistened beds. Sprinklers are started as soon as the machines move to an adjacent area. Early season transplants are subject to "melting" by the fungus *Pythium aphanidermatum*. A chemical drench at transplanting alleviates the problem.

Natural seed is planted 2 to 3 inches apart at a $\frac{1}{2}$ inch depth using a precision planter such as a Stanhay or one of the various air planters. Seedlings are thinned to 12 to 18 inches between plants. Some late-season varieties are grown using double seed lines on 40 to 42 inch beds. Check with your seed dealer for recommendations.

The major competing areas for marketing winter cauliflower production are western Arizona, coastal California, and Texas.

VARIETIES Several cauliflower varieties are needed to produce a continuous supply throughout the season. Commonly used varieties include: Snow Crown *Takii*; Casa Blanca *Pybas*; Shasta *Novartis* ; Guardian *Peto*; Rushmore *Peto*; Ravella *Peto*; Incline *Sakata*; Cumberland *Peto*; Yukon *Sakata*; Minuteman *Peto*; Fargo *Bejo*; Chieftan *Peto*.

Seed is priced per units of one thousand. At a 3-inch spacing, one would need approximately 50,000 seed per acre (M's). Price per acre will vary greatly depending upon variety.

Black rot is a seed-borne bacterial disease caused by *Xanthomonas campestris*. The disease is very destructive. Hot water treatment is often used by seed companies to treat for black rot. The process is not 100 percent effective. Seed known to have black rot, or hot water treatment, should never be used for growing transplants. Seed is only hot-water treated if it has been found to be infested with *X. campestris* bacteria since hot water treatment reduces seed viability.

Proper varietal selection keyed to specific planting dates is crucial for cauliflower production. Varieties have internal clocks based on plant age and ambient temperature which trigger the curd to develop at a specific time. Depending on the variety, the period of adaptation may be only a couple of weeks or more than a month. Varieties grown out-of-slot will not develop satisfactorily.

Ricing, yellowing, light weight curds, and breaking apart of the florets are common defects which occur when a mistake is made in choosing the appropriate planting period for a given variety, or when the crop grows during adverse weather.

SOILS AND IRRIGATION Cauliflower performs well on medium- to medium-heavy soils provided there is adequate drainage. On sandy soils, extreme care must be taken not to stress the plants for water or premature heading may occur. Cauliflower is normally sprinkler irrigated for seedling emergence and then converted to furrow irrigation. Transplants are sprinkled until the new roots are established.

FERTILIZER A 500 pound broadcast application of 11-52-0 before listing is normal practice. Some cauliflower varieties require more nitrogen (N) than others. The standard practice is to apply 200 pounds or more actual N per acre during the growing season to promote vegetative growth of the outer jacket leaves in order to protect the curds from solar yellowing.

Many types of nitrogen fertilizer may be used for sidedress applications: dry or liquid ammonium nitrate (34-0-0), AN20 (20-0-0), UAN 32 liquid, and occasionally CAN 17 liquid.

INSECTS, DISEASES AND MISCELLANEOUS PROBLEMS Cabbage loopers, armyworms, flea beetles and aphids must be controlled. Flea beetles and worms are very active in late summer and early fall. These insects can destroy a stand in one day if not controlled.

Silverleaf whitefly will cause delayed and irregular maturity if not controlled. There are currently systemic materials for preplant application which work well on whiteflies.

Cauliflower should not be planted after sugar beets or in the same field for more than three consecutive years due to the possible infestation of sugar beet cyst nematode (*Heterodera schachtii*). Broccoli and cabbage are also hosts for sugar beet cyst nematode.

Wind whip causes girdling and death of small seedlings. Later, surviving plants may wilt and fail to make a curd. The stems of affected plants become very brittle at the soil level. Seedlings are more susceptible to wind whip after thinning or weeding due to decrease wind impedance. Check the weather forecasts to avoid wind whip injury.

Field mice may be a problem near harvest. Once the mice have become established in a field they are nearly impossible to control. Pre-bait around and destroy grassy areas around the perimeter of the field.

Sooty mold or curd smudge (*Cladosporium* sp.) is a surface curd contaminant which frequently occurs near harvest. It is held in check by the use of chlorinated water sprays before packing. Washing also helps to remove dust and debris from the curds.

Blind bud is a condition where there is no curd formation. The cause may be due to mechanical injury or a genetic defect. Insect chewing and bird feeding are common causes.

Black rot (*Xanthomonas campestris* pv. *campestris*) occurs occasionally in Imperial County. Plant disease-free seed or transplants.

Downy mildew (*Peronospora parasitica*) is a foliar fungal disease. Treat only when necessary to protect the leaf canopy.

HARVESTING All cauliflower is field harvested using tractor towed harvesting platforms. Each platform requires a crew of 18 to 21 people. Fields are normally harvested 2 to 4 times or more depending upon the market. Mature curds (6" or larger) are hand-harvested and trimmed. The field workers trimming curds say they are making a "corona" or crown cut. The curds are placed on the tables of field harvesting machines. Cauliflower should never be allowed to roll over and to touch the white curd on the table. Scuffed curds are subject to decay and browning.

The packing crew wraps curds in plastic bags, tapes the butt ends to seal and place-packs the curds according to size. Nine curds/carton (9's), 12's, 16's, and 20's are used, but shippers pack mostly 12's.

Some cauliflower is cut into florets for the food service trade. Cartons containing two 3-lb bags of 1½-3 inch florets are common.

Yields of 500 to 600 cartons per acre are possible with good fields. Market demand often drives yields up; the higher the market, the more product will be harvested per acre.

POSTHARVEST HANDLING Cauliflower is extremely perishable and should be stored for very short periods of time. The storage temperature should be 32°F and 95+ percent relative humidity. Storage at high temperature rapidly causes deterioration of cauliflower quality and shelf life. For example, at 32°F cauliflower can be stored 3 to 4 weeks, at 38°F the shelf life is two weeks, at 41°F it is 7 to 10 days, at 50°F it is 5 days, and at 59°F only 3 days! When there is an oversupply, cauliflower is often stored at too high a temperature and too low a humidity. Long term or improper storage results in bad arrivals, price adjustments and poor quality product at retail markets.

For more information on cauliflower, see “Cauliflower Production in California”, DANR Publication 7219 available from the Imperial County Cooperative Extension Office or for a free download from the Internet go to <http://anrcatalog.ucdavis.edu/specials.ihtml>

DIRECT SEED CAULIFLOWER PROJECTED PRODUCTION COSTS 2000-2001

Hand labor at \$7.75per hour (\$5.75 plus SS,unemployment insurance, and transportation, supervision and fringe benefits).
 Yield--500 23-lb. cartons Direct Seed Hybrid Variety

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					24.00	
Landplane 2x	12.00						
Border,cross check & break borders	17.75					17.75	
Flood irrigate		Water 1 ac/ft.	14.56	1	7.75	22.31	
Disc 2x	11.50					23.00	
Triplane 1x	11.00					11.00	
Fertilize (double spread)	8.00	500 lb. 11-52-0	63.75			71.75	
List 40" beds	13.50					13.50	
TOTAL LAND PREPARATION						266.81	
GROWING PERIOD							
Precision plant	17.50	Hybrid Set 44M	225.00			242.50	
Preplant whitefly control	10.00	Admire	75.00			85.00	
Apply herbicide	12.00	Prefar	24.00			36.00	
Sprinkler Irrigate	155.00					155.00	
Insect control via sprinkler		Insecticide	20.00			20.00	
Thin				10	77.50	77.50	
Cultivate 3x	13.00					39.00	
Spike 2x	9.75					19.50	
Fertilize & furrow out 2x	13.50	150 lb. N @ .35	52.50			79.50	
Water-run fertilizer 2x		40 lb. N @ .35	14.00			14.00	
Hand weed				4	31.00	31.00	
Irrigate 8x		4 ac/ft	58.24	8	62.00	120.24	
Gated pipe	53.00					53.00	
Insect control 2x	9.50	Insecticides	60.00			126.50	
Disease control 1x	10.00	Fungicide	20.50			30.50	
Stubble disk	21.75					21.75	
TOTAL GROWING PERIOD COSTS						908.49	
GROWING PERIOD & LAND PREPARATION COSTS						1175.30	
Land Rent (net acres)						200.00	
Cash Overhead----		13 % of preharvest costs & land rent					178.79
TOTAL PREHARVEST COSTS						1554.09	
HARVEST (Field pack)							
Custom harvest, pack, haul, cool, and :		500 -23 lb. cartons @	4.75	per carton		2375.00	
TOTAL OF ALL COSTS						3929.09	

PROJECTED PROFIT OR LOSS PER ACRE
 price/ 23 lb. carton (dollars)

Cartons per acre		price/ 23 lb. carton (dollars)					Break-even \$/carton
		7.00	8.00	9.00	10.00	11.00	
300		-879	-579	-279	21	321	9.93
400		-654	-254	146	546	946	8.64
500		-429	71	571	1071	1571	7.86
600		-204	396	996	1596	2196	7.34
700		21	721	1421	2121	2821	6.97

* Harvest varies with the shipper, the field conditions, and the market.