U.C. COOPERATIVE EXTENSION

SAMPLE COST TO ESTABLISH AND PRODUCE

LEAF LETTUCE

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.

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

OPERATION	$/ACRE
Plow	30.50
Subsoil, 2nd 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

	BY UNIT
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 1st time	40.00/acre
Combine bermudagrass seed 2st 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

LEAF LETTUCE CULTURE 2002-2003

Annual acreage, yield, and gross value of leaf lettuce per acre in Imperial County, CA (1997-2001)

Year	Acres	Yield/Acre*	Gross Value/Acre
2001	7,627	920	$7,102
2000	7,688	895	$5,415
1999	10,498	833	$4,599
1998	8,018	931	$6,984
1997	8,460	854	$6,217

*25 lb cartons (leaf and butter), 40 lb cartons (Romaine)
Source: Imperial County Agricultural Commissioner's Reports 1997-2001

YIELDS The term "leaf lettuce" includes greenleaf, redleaf, butter, and romaine (cos) types. Some lettuce growers plant endive, escarole, nappa and bok choy in the same fields as leaf lettuce. Each type has a different yield potential, but yields of 500 to 1300 cartons per acre are normal.

ADDITIONAL PRODUCTS In addition to leaf lettuce shipped in cartons, in 2001 Imperial County Ag. Statistics list 33.3 million pounds of salad products with a gross value of $15.6 million dollars. Spring Mix is another category with 1,981 acres with a gross value of $10.7 million dollars. Spring Mix may consists of various mixtures of baby redleaf lettuce, baby greenleaf lettuce, baby romaine, mizuna, kale, arugula, beet tops, baby spinach, mustard, endive, tat-soi, frisee, chard and numerous other salad greens.

VARIETIES Royal Green *Seminis*; Shining Star *Seminis*; Green Vision *Central Valley Seeds;* Waldman's Green *Various*; and Two Star *Orsetti* .

Redleaf varieties are Deep Red *Harris Moran*; Big Red *Seminis*; New Red *Synergene*; Red Tide *Seminis*; Red Rage Pybas and Vulcan *Sakata.*

Butterhead varieties are Dark Green Boston *various*; Crosby *Sunseeds;* Connick *Sunseeds;* Optima *Vilmorin;* Baja *Seminis;* Esmeralda *Seminis*; Encore *Seminis*

Romaine varieties are Paris Island Cos *various*; King Henry *Progeny;* Conquistador *Seminis;* Green Forrest *Central Valley;* Triton *Harris Moran;* Apache *Greengenes*; DF-7 *Greengenes;* King Louie *Paragon*; Darkland Cos *Central Valley* and Green Towers *Harris Moran*

PLANTING INFORMATION Some growers plant September 15 to December 5, while others concentrate mostly on October plantings. The crop is harvested December through February. The seed is normally planted at a 2- to 3-inch spacing within rows on 40- to 42-inch beds. There are two seed lines per bed normally spaced 13 inches between lines. Lettuce is normally planted using pelleted seed and a precision planter. At a 2-inch spacing 157,000 (157 M) seed will be needed. Seed is planted ¼ inch deep or less and sprinkler irrigated to emergence. After emergence, the field is converted to furrow irrigation. Plants are thinned to 6- to10 inches within the row depending upon variety.

The weather may still be relatively hot during early October. Leaf lettuce varieties are often subject to thermodormancy problems under these conditions. Primed seed should be used to avoid the problem or the initial irrigation should be started late in the afternoon so that the seed imbibe water and start to germinate during the cooler nighttime hours. Lettuce seed should not be planted into moist soil unless the sprinklers are started soon after planting. A delay of 10 to12 hours may cause germination to start and the seed to die before irrigation is applied.

FERTILIZERS Five-hundred pounds of ammoniated phosphate 11-52-0 per acre are broadcast prior to listing the beds. Nitrogen is sidedressed just after thinning and during later growth stages. Early season lettuce requires less nitrogen than later planted lettuce. About 150 pounds of nitrogen (N) are used for the early season crop and 200 to 250 pounds N for late-season lettuce.

SOILS Silt loams and sandy soils are preferred. The lighter soils provide better drainage during cold weather and warm up more readily. Lettuce has a moderately low degree of salt tolerance. Excess salinity results in poor seed germination and small heads.

IRRIGATION Most growers use sprinkler irrigation for the first 5 to 7 days or until the seedlings emerge and the grower can "green line" the seed rows. The field is then converted to furrow irrigation for the remainder of the season.

Care must be taken not to oversaturate beds when growing early-season lettuce. Excess moisture favors the development of bottom rot (*Rhizoctonia solani*).

Gated pipe is also used, especially near harvest. The major benefits of gated pipe is to allow for uniform application of water down furrows and to maintain a dry head basin so that harvesting equipment can turn around on hard ground.

FERTILIZERS Five hundred pounds of 11-52-0 are usually broadcast prior to listing. Nitrogen is sidedressed just after thinning and during later growth. Early season lettuce requires less N than that grown in January and February. About 150 pounds N/ac are used early, while 200 to 250 pounds N/Ac are applied during cold weather.

Lettuce is very sensitive to overdoses of ammoniacal fertilizers. Seedling injury will be expressed by root burn, yellowing of the leaves, and even dead plants. Fertilizer injury later in the season is expressed by wilting of the outer leaves and a rusty reddish discoloration in the middle of the plant root.

PEST AND DISEASE CONTROL Insect pests include crickets, cutworms, leafminers, salt marsh caterpillars, and beet armyworms. Cabbage loopers can be especially serious after thinning. Aphids and thrips are late-season insect pests that should be controlled.

Silverleaf whitefly can cause delayed maturity. A preplant application of systemic insecticide applied at planting is used for control.

Insects and their damage are more visible in the mixed lettuce types and may cause poor quality and bad arrivals.

Pest control is more difficult to manage when growing leaf lettuce as compared with growing head lettuce. Leaf lettuce is often planted in small, 8 to 20 bed blocks. There are often several plantings made on different dates in the same fields. Pesticide drift onto non-target crops is a difficult problem to manage.

The most serious diseases affecting leaf lettuce are lettuce big vein virus (LBVV), bottom rot (*Rhizoctonia solani*), grey mold (*Botrytis cinerea*) lettuce drop (*Sclerotinia sclerotiorum* and *S. minor*). Use mosaic-free seed (i.e., no virus in 30,000 seed) to prevent lettuce mosaic virus (LMV).

Powdery mildew (*Erysiphe cichoracearum)*may need to be controlled with sulfur applications to avoid economic damage.

Freeze injury on mature lettuce will be expressed as blistering and peeling of the epidermis, followed by browning of the tissues.

Tipburn is a physiological disorder caused by the lack of mobility of calcium in the leaves during warm weather and rapid growing conditions. There is presently no control of this condition.

All currently registered herbicides can also cause lettuce crop injury under certain conditions. Avoid high rates on sandy soils during hot weather.

HARVESTING Harvesting is done with ground pack crews (no machines). Leaf lettuce is hand-cut and harvested with 24 heads per carton. Weights per carton vary according to lettuce type. Redleaf, greenleaf, and butter lettuce weighs 25 pounds, and romaine cartons weigh 40 pounds. One-dozen count cartons are also offered. Romaine is occasionally packed in a "WGA crate" which contains 30 plants.

Leaf lettuce is almost always harvested to fill an order. A day's shipments would often include cartons of each lettuce type; hence, the word "mixed" is sometimes used to describe the operation. Napa, bok choy, endive, and escarole are often grown in the same fields.

The cartons are vacuum cooled or hydrovac processed and shipped to markets in refrigerated trucks.

POSTHARVEST HANDLING Leaf lettuce is even more perishable than head lettuce and should be cooled immediately after harvesting. Cooled cartons should be stored just above freezing at 98 percent relative humidity.

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For more information see “Leaf Lettuce Production in California”, DANR Publication 7216 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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LEAF LETTUCE PROJECTED PRODUCTION COSTS 2002-2003

Hand labor at $9.25per hour ($6.75 plus SS, unemployment insurance, transportation, workman's compensation, supervision and fringe benefits).

Yield--700 35-pound cartons per acre 90-120 days to maturity **Romaine**

OPERATION	Cost	Materials		Hand Labor		Cost
		Type	Cost	Hours	Dollars	Per acre
LAND PREPARATION						
Stubble disc	21.00					21.00
Subsoil 2nd gear	39.00					39.00
Disc 2x	12.50					25.00
Triplane 2x	11.25					22.50
Border, cross check & break borders	19.00					19.00
Flood irrigate		Water 1 ac/ft	16.00	1	9.25	25.25
Disc 2x	12.50					25.00
Triplane 1x	11.00					11.00
Fertilizer, spread	7.00	500# 11-52-0	58.75			65.75
List	15.00					15.00
TOTAL LAND PREPARATION						**268.50**
GROWING PERIOD						
Power mulch beds 1x	25.00					25.00
Precision plant and	20.00	Coated seed 157M	134.00			229.00
Whitefly control		Admire @ 16 oz.	75.00			
Spray herbicide	12.50	Kerb	35.00			47.50
Sprinkler irrigate	160.00					160.00
Thin				17	157.25	157.25
Cultivate 2x	14.00					28.00
Spike 2x	11.25					22.50
Fertilize & furrow out 2x	15.00	120 lb. N @ .32	38.40			68.40
Water-run fertilizer		120 lb. N @ .32	38.40			38.40
Hand weed 1x				14	129.50	129.50
Irrigate 6x		Water 3 ac/ft	48.00	7	64.75	112.75
Gated pipe	55.00					55.00
Insect control 6x	10.00	Insecticides	175.00			235.00
Stubble disc	21.00					21.00
TOTAL GROWING PERIOD						**1329.30**
GROWING PERIOD & LAND PREPARATION COSTS						1597.80
Land Rent (net acres)						225.00
Cash Overhead-----		15 % of preharvest costs & land rent				273.42
TOTAL PREHARVEST COSTS						**2096.22**
HARVEST COSTS						
Cut, pack, haul, cool and sell		700 cartons @	4.50	per carton		3150.00
TOTAL OF ALL COSTS						**5246.22**

PROJECTED PROFIT OR LOSS PER ACRE

		Price/ 35 lb. carton					
		4.00	5.00	6.00	7.00	8.00	Break-even $/carton
	500	-2346	-1846	-1346	-846	-346	8.69
Cartons	600	-2396	-1796	-1196	-596	4	7.99
per	700	-2446	-1746	-1046	-346	354	7.49
acre	800	-2496	-1696	-896	-96	704	7.12
	900	-2546	-1646	-746	154	1054	6.83

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