

**U.C. COOPERATIVE EXTENSION**

**SAMPLE COST TO ESTABLISH AND PRODUCE**

***ASPARAGUS***



**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](mailto:ksmayberry@ucdavis.edu).

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

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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 <sup>nd</sup> 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 <sub>3</sub> .....	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 <sup>st</sup> time .....	40.00/acre
Combine bermudagrass seed 2 <sup>st</sup> 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

## ASPARAGUS CULTURE 2002-2003

Annual acreage, yield, and value of asparagus  
in Imperial County, CA (1997-2001)

Year	Acres	Yield/Acre*	Value/Acre
2001	4,557	174	\$4,881
2000	5,575	109	\$2,872
1999	5,006	141	\$3,991
1998	4,548	162	\$5,937
1997	4,900	132	\$4,634

\* 30 lb carton equivalent;

(Source: I.C. Agricultural Commissioner's Reports 1997-2001).

**PLANTING-HARVESTING DATES** Asparagus is a perennial crop. Once established the crop may be harvested in the early fall if market conditions warrant, or harvested in late winter and early spring. The harvest continues until the price starts to fall and the crop loses quality to opening of the tips and toughening of the spears.

**VARIETIES** The main varieties grown are UC Hybrid 157<sub>F1</sub> (various), Ida Lea (various) and Brock Imperial (Brock). Grande, Apollo, and Atlas are from California Asparagus Seed and Transplants, Inc.

**PLANTING INFORMATION** Asparagus may be established by three methods: direct seeding, transplanting, or planting of field-or greenhouse-grown, one-year-old crowns. Production costs presented here were determined based on the use of 10-week-old transplants because this method is becoming more popular despite its higher cost. Transplants can be planted anytime during the year, but October through March is recommended. Bed width varies from 40-60 inches depending upon grower preference. Plant spacing is usually 6-inches in-row. There is normally one row per 60-inch bed for a population of roughly 17,000 plants per acre.

Due to lower asparagus returns in recent years many fields have been installed at the least possible cost. When production dwindles the field is taken out.

**SOILS** Well-drained sandy loams and loams are best for asparagus production. The warmer the soil, the earlier the production will be. For this reason, some fields are located in the warmer zones of the valley. Careful attention should be given to field selection because the land will be tied up in production for 8-10 years. Fields that are known to have bermudagrass or nutsedge

problems are poor choices for asparagus because cultural practices allow these grasses to grow virtually unchecked and there are no effective control measures.

**IRRIGATION** Fifteen or more irrigations per year are not unusual. The irrigation interval during the summer is from 10 to 15 days. Because the harvesting period lasts 30-60 days, it is necessary to continue irrigation during harvesting. This makes both timing and method of water application very important. Frequent irrigation of alternate rows during harvesting maintains even production while allowing harvesting crews entrance to fields. Crews are encouraged to walk in dry furrows rather than on bed tops where they might damage emerging spears.

**FERTILIZERS** Between 100-200 pounds of phosphate and 200-400 pounds of actual nitrogen are used on most plantings. All of the phosphate and at least one-third of the nitrogen are applied in winter before the cutting season. The remaining nitrogen is applied during and after the harvest season.

**PEST CONTROL** Weeds can become a serious problem in established asparagus. A pre-emergence herbicide should be applied after the fern is chopped and burned, but before harvest. During the harvesting period, spot treatments with an herbicide may be necessary. An herbicide application after cutting and before fern regrowth is common. Avoid planting in fields that have bermudagrass or nutsedge infestations.

Western yellow striped armyworm, beet armyworm, and bean thrips have been traditional pests requiring several insecticide treatments annually. The European asparagus aphid is a serious pest requiring several additional insecticide treatments. Asparagus miner may periodically need to be controlled.

Asparagus rust (*Puccinia asparagi*) and Cercospora stem and leafspot (*Cercospora asparagi*) may require control in some years, especially on new plantings. Asparagus root rot (*Fusarium oxysporum* and *F. moniliforme*) are problems present during the mid-to late-years of stand life.

Asparagus crown and spear rot (*Phytophthora megasperma* var. *sojae*) occur in soils with poor drainage and those with excessive irrigation. Asparagus purple spot (*Stemphylium vesicarium*) may occur during cool, wet weather at harvest.

**HARVESTING** Mature 5-foot-tall ferns are either chopped or windrowed with a swather. After drying, ferns are usually burned. Fern chopping occurs from late November to early December. Following chopping, the planting beds are reworked to loosen the surface soil, re-shaped, fertilized, and irrigated prior to the first harvest which usually occurs mid-to late-January.

Irrigation is scheduled so that alternate furrows remain dry. This allows continuous field access for harvesting crews. Workers must avoid stepping on the tips of emerging spears because this mechanical damage will cause distortion as the spear elongates, making it unmarketable.

Newly emerging spears are hand-cut from mid-January through mid-April at 1 to 3 day intervals depending upon temperature and growth rate. Early in the season, fields are harvested every two or three days, but during warm weather fields are cut daily. Spears are cut at an angle and just below the soil surface with an asparagus knife. Spindly or otherwise deformed spears are cut and discarded to allow for growth of marketable spears. Cut spears must be approximately 10 inches long to allow for a trim to 9 inches during packing. Harvested spears are placed on the beds in bunches, gathered and placed in field boxes, carried out of the field on makeshift wheel barrows, and hauled to sheds for grading, trimming, packing, and cooling.

Asparagus is packed in various containers including: 30-pound loose, 28 bunches per crate (28-lb. net wt), and 11 bunches per crate (11 lb. net wt). Sizes for these packs are Large (7/16"), Standard (5/16"), and Small (3/16"). Diameter is measured at the widest point of the spear.

Another commonly used container holds six 2.25 lb. bunches (net weight 13.5 lb.) often used for international shipment. Sizes for this pack include Colossal (no more than 14 spears per bunch), Jumbo (15-20 spears), Large (21-28 spears), and Standard (29-42 spears).

Some of the product is packed out in 30-pound wood crates chiefly for Japanese export. There are also 27-pound cartons (12- 2.25 lb. bunches) for domestic and export, 15-pound cartons of asparagus tips for domestic use, and some 15-pound cartons packed loose for export mostly to Europe. Some asparagus may be trimmed to 5½-7 inches in length and packed as tips in 15-pound cartons.

Defects and loss of production can occur for various reasons. Wind will cause spears to curve because they can grow 3-6 inches per day depending on temperature. Trampling of emerging spears, inadvertent cutting of spears during harvest, or high temperatures will cause misshapen spears. High temperatures will also cause flowering or premature break of the bracts, especially in small spears. This condition is commonly referred to as "feathering" because of the featherlike appearance of flowering spears. Flattened spears ("flats") are the result of certain varietal characteristics. Thrips feeding can cause significant reduction in the cosmetic appeal of spears.

Freezing temperatures during spear emergence can cause "frosting" or discoloration of green spears. Frosted spears may still be marketable, however, at a reduced value. If spears are cut while still frozen, damage is usually too severe to yield a marketable product. Sometimes ice formation is difficult to see because the ice is clear. This condition is known as "black ice." A field with black ice will appear darker green overall than what is normally observed.

Excessive harvesting will lead to a decline in production and a proliferation of small spears. During the third year, harvesting may be continued the full season (i.e. about 60 days).

Fields in their second year of production may be harvested, but the harvesting period should be limited to 2-4 weeks and should only be done in the most vigorous plantings. Asparagus fields should give good yields for 8-10 years. Asparagus is capable of a much longer production life, but it is usually limited in later years by weed infestations and *Fusarium* infections. A common rotation crop used after asparagus is wheat because it will do well despite weed infestations and *Fusarium*.

**POSTHARVEST HANDLING.** Asparagus is an extremely perishable product. It must be cooled quickly after harvest. Local packing sheds hydrocool spears to remove the field heat after packing. Cooled water (approximately 38°F) is drenched over the packed cartons for approximately 15 minutes. Asparagus needs to be stored at 32-36°F with  $\geq 95\%$  relative humidity.

At high temperatures, asparagus spears will lose natural sugar, flavor, and vitamin C, and become tough, and start to decay. If rapidly cooled and held at 36°F, asparagus may be kept for about 3 weeks. Desiccation can occur rapidly if asparagus spears are not placed on wet pads, since spears continue to elongate after harvest.

Bacterial soft rot will occur at either the spear tips or butts if they are not quickly brought to optimum storage temperature and humidity.

Storing asparagus in non-ventilated containers will result in spear toughening.

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For more information see “Asparagus Production in California”, UC Publication 7234 available from our office or on the Internet at <http://anrcatalog.ucdavis.edu/specials.ihtml>

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**ASPARAGUS PROJECTED PRODUCTION COST 2002-2003**

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

Yield--150-30-lb. pyramid crates (4,500 lbs/ac.)		8-10 year crop life				
OPERATION	Cost	Type	Materials Cost	Hand Labor Hours	Dollars	Cost Per Acre
<b>LAND PREPARATION</b>						
Subsoil 2nd gear	39.00					39.00
Disc 2x	12.50					25.00
Triplane 1x	11.25					11.25
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	11.25					11.25
Laser level	70.00					70.00
Fertilizer, spread	7.00	500 lb. 11-52-0	58.75			65.75
List	15.00					15.00
Shape beds	9.50					9.50
<b>TOTAL LAND PREPARATION</b>						<b>316.00</b>
<b>GROWING PERIOD</b>						
Install transplants		Transplants	500.00	40	370.00	870.00
Move beds 3X	14.00					42.00
Cultivate 2x	14.00					28.00
Spike 2x	11.00					22.00
Fertilize & furrow out 2x	14.00	200 lb. N @ .32	64.00			92.00
Lilliston 1x	13.00					13.00
Irrigate 10x		4 ac/ft	64.00	6	55.50	119.50
Insect control 6x	10.00	Insecticides	55.00			115.00
<b>TOTAL GROWING PERIOD COSTS (FIRST YEAR)</b>						<b>1301.50</b>
<b>GROWING PERIOD &amp; LAND PREPARATION COSTS (FIRST YEAR)</b>						<b>1617.50</b>
Land Rent (net acres)						250.00
Cash Overhead----		13 % of preharvest costs & land rent				242.78
<b>TOTAL FIRST YEAR COSTS</b>						<b>2110.28</b>
<b>STAND MAINTENANCE (8-10 YEAR LIFE)</b>						
Chop or swath fern 1x	25.00					25.00
Spread fern for burning				4	31.00	31.00
Burn fern	3.00					3.00
Flail scalp	13.00					13.00
Rotovate-shape beds 1x	27.00					27.00
Spike 1x	12.00					12.00
Cultivate 2x	14.00					28.00
Fertilize and furrow out 2x	13.00	300 lb. N @ .32	96.00			122.00
Water-run fertilizer		200 lb. N @ .18	36.00			36.00
Herbicide 2x	12.00	diuron/lorox	47.00			71.00
Irrigate 15x		8 ac/ft	128.00	10	92.50	220.50
Disease control 2x	10.00	Fungicides	20.00			40.00
Insect control 6x	10.00	Insecticide	40.00			100.00
<b>TOTAL ANNUAL COSTS</b>						<b>728.50</b>
<b>GROWING PERIOD COSTS</b>						
Land Rent						250.00
Overhead		15 % land rent and preharvest costs				146.78
Amortization		14 % of first year costs (excluding land rent & overhead)				226.45
<b>TOTAL PREHARVEST COSTS</b>						<b>1351.73</b>
<b>HARVEST COSTS</b>						
Cut, haul, pack, cool, and sell		150 -30 lb. crates @	26.00		per crate	3900.00
<b>TOTAL OF ALL COSTS</b>						<b>5251.73</b>

**PROJECTED PROFIT OR LOSS PER ACRE**

		Price/ 30-lb. crate (dollars)					Break-even \$/carton
		28.00	30.00	32.00	34.00	36.00	
Crates per acre	100	-1152	-952	-752	-552	-351.73	39.52
	125	-1102	-852	-602	-352	-101.73	36.81
	150	-1052	-752	-452	-152	148.28	35.01
	175	-1002	-652	-302	48	398.28	33.72
	200	-952	-552	-152	248	648.28	32.76

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