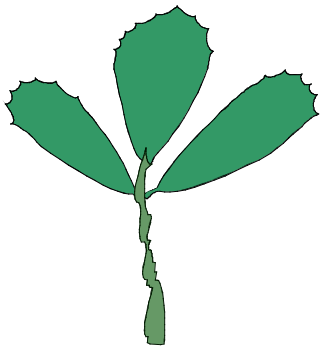
# U.C. COOPERATIVE EXTENSION

## SAMPLE COST TO ESTABLISH AND PRODUCE

# *ALFALFA HAY*



## HAY PRODUCTION

## 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 |

# IMPERIAL COUNTY ALFALFA CULTURE 2002-2003

Annual acreage, yields, and value of alfalfa in Imperial County, CA for five consecutive years

| Year | Acres | Yield/Acre (tons) | Value/Acre |
|---|---|---|---|
| 2001 | 184,126 | 8.11 | $786 |
| 2000 | 182,451 | 8.10 | $666 |
| 1999 | 172,771 | 8.04 | $687 |
| 1998 | 178,517 | 7.65 | $716 |
| 1997 | 165,922 | 7.56 | $891 |

(Source: I.C. Agricultural Commissioner's Reports). Does not include cubed or green chopped.

**SOIL PREPARATION:** A uniform seedbed is prerequisite to a good stand. High and low spots in the field cause uneven irrigation, resulting in poor stands. A well-drained field is necessary to prevent problems with salinity, scald, and root rot. Many growers plow while others prefer to subsoil during preplant soil preparation. These operations improve drainage.

Laser leveling is helpful to reduce summer scald and allow for more uniform irrigation. The price of laser leveling is $85-90 per hour, which normally works out to be $40-45 per acre for light leveling. Prices vary according how much soil has to be moved.

Planting alfalfa on 40-inch beds on heavy soils is now common practice where poor drainage is a problem.

**PLANTING RATES:** One pound of seed per acre will provide 4-5 seeds per square foot. At a seeding rate of 25 pounds per acre, 100-125 seeds per square foot are sown. Growers plant 15-30 pounds of seed depending on the condition of their field, cost of seed, method of planting and time of planting. Approximately, the same amount of seed is used for alfalfa planted on 40-inch beds. There are 4-6 seed lines on bed-planted alfalfa. A rough-textured seedbed is preferred to a fine-textured seedbed. A fine-textured, powdery seedbed will crust over reducing seedling emergence.

Planting may be by broadcasting seed and rolling the soil with a ring roller, planted with a Brillion-type seeder flat or corrugated. The seed should be planted ¼ inch deep or less. Planting deeper may reduce seedling emergence. Some precision planting is done with bed culture.

**PLANTING DATES:** Late September and October are the preferred months for planting. December plantings often result in poor germination and heavy weed infestation. Spring plantings are occasionally made in February and March. Alfalfa plantings normally stay in production 3 to 5 years.

**VARIETIES:** "CUF 101" has been the most popular variety grown. Some other commercial varieties that are becoming popular with growers include "Mecca","Cibola", "Hiline", "Impalo", and "La Jolla". Impalo is the "whitefly" tolerant variety developed in the Imperial Valley. Varieties that have tolerance to the silver leaf whitefly, and resistance to the spotted alfalfa aphid and blue alfalfa aphid should be considered. Yields vary depending upon the variety and soil type. Consult your seed dealer for the best variety selections.

**FERTILIZATION:** Approximately 100 pounds of phosphate ($P_2O_5$) is removed from the soil for every 7-8 tons of alfalfa hay produced. This amount of phosphate must be replaced to maintain maximum hay production. A preliminary application of at least 100-150 pounds of phosphate per acre is recommended prior to planting. Additional annual applications of 100 pounds of phosphate are recommended during the early spring in split applications.

On soils low in nitrogen, the application of 20-30 pounds of actual nitrogen will stimulate seedling growth. A nitrogen deficiency may occur on virgin soils recently brought into production. In rare cases, it may be necessary to apply a bacterial inoculum (*Rhizobium meliloti*) to speed up the process of fixing atmospheric nitrogen. Very sandy soils usually benefit from the addition of the inoculum.

**IRRIGATION:** One or two irrigations (2-3 days apart) may be needed to establish at stand, depending upon soil type and weather. Some growers use sprinklers for alfalfa stand establishment. If sprinklers are used, the normal custom rate is $125-150 per acre.

Two to three irrigations per cutting are necessary depending on the soil type and time of year. During summer irrigations, increase the flow rate down each land and irrigate fewer lands to prevent scalding, a condition causing death of plants by suffocating the roots when temperatures exceed 104°F. No more than 4-6 hours should be required per set on quarter mile runs. Normally growers cut off the irrigation water when it is about 75-80 percent of the way down the length of the field to prevent over-irrigation of the ends of the field.

**PEST CONTROL:** The spotted alfalfa aphid can cause damage to nonresistant alfalfa. Control is often necessary for the Egyptian alfalfa weevil, the pea aphid, the blue alfalfa aphid and the cowpea aphid. These pests are most active in the winter and spring months. Leafhoppers may damage alfalfa from April through September. The potato leafhopper causes damage to hay in the late summer and fall. Alfalfa caterpillar and beet armyworm may require control in mid to late summer if numbers reach economic thresholds. Occasionally, cutworm outbreaks occur in fall and spring months. Alfalfa planted on beds is more susceptible to cutworm damage than flat-planted alfalfa.

Root rot caused by *Phytophthora* spp. can be a severe problem. Stem canker (*Rhizoctonia solani*) and anthracnose (*Colletotrichum trifolii*) can be severe problems as well.

**WEED CONTROL:** Weeds during stand establishment normally do not cause problems with long-term crop yield in most cases. Weeds add to total animal forage for the first *pasturing*, but often cause some yield reduction at the second harvest (compared to herbicide-treated fields). By the third cutting of a new stand, most weeds no longer have an effect on crop yield. However, weeds such as wild oats, canarygrass, and creeping wartcress can cause stand loss and consequent yield loss in new fields. Several herbicides are available for weed control in seedling alfalfa. Consult your pest control advisor or Weed Science Farm Advisor for the latest recommendations.

Summer annual grasses are a common problem in established alfalfa. Grasses invade areas where there has been alfalfa stand loss caused by wheel traffic, root diseases or scald. Herbicides are available to prevent or control these grasses. Laser leveling increases positive water management and reduces alfalfa stand loss.

**HARVESTING:** Alfalfa is normally baled from February through October. Some limited baling is done year round. During winter months, both sheep pasturing and green chopping are normally practiced. Pasturing may return from $40-50 per acre for the winter months. The value depends upon weed growth and weather conditions.

Maximum yield and high quality hay are seldom attainable at the same time. Hay quality decreases with increasing yield. A good compromise is to cut fields at roughly 10% bloom. Hay cut during the late afternoon or early evening produces higher quality than hay cut in the early morning. Hay should be baled with moisture content of 10-15%. Less moisture causes loss of leaves, thereby decreasing quality. Hay baled with more moisture may mold or overheat in the stack.

## IMPERIAL COUNTY PROJECTED ALFALFA HAY PRODUCTION COSTS 2002-2003

Mechanical operations at prevailing rates. Hand labor at $9.25/hr ($6.75 plus SS, workman's compensation, unemployment and fringe benefits).

8 ton average — **80 acre field flat**

| | Prevailing | MATERIALS | | HAND LABOR | | COST |
|---|---|---|---|---|---|---|
| **OPERATION** | **Rate** | **Type /Amount** | **Cost** | **Hours** | **Dollars** | **Per Acre** |
| *LAND PREPARATION* | | | | | | |
| Stubble disc | 21.00 | | | | | 21.00 |
| Subsoil | 39.00 | | | | | 39.00 |
| Disc 1x | 12.50 | | | | | 12.50 |
| Triplane 1x | 11.25 | | | | | 11.25 |
| Landplane | 12.75 | | | | | 12.75 |
| Corrugate 1x | 11.00 | | | | | 11.00 |
| Flood | | 1 ac-ft | 16.00 | 1 | 9.25 | 25.25 |
| Disc 1x with ring roller | 13.50 | | | | | 13.50 |
| Fertilize | 7.00 | 300 lb 11-52-0 | 35.25 | | | 42.25 |
| Disc 1x with ring roller | 13.50 | | | | | 13.50 |
| Triplane 2x | 11.25 | | | | | 22.50 |
| Dump borders | 14.50 | | | | | 14.50 |
| Run borders | 6.00 | | | | | 6.00 |
| **TOTAL LAND PREPARATION COSTS** | | | | | | **245.00** |
| *COST OF ESTABLISHMENT* | | | | | | |
| Plant | 17.50 | 20lb seed @ 1.50 | 30.00 | | | 47.50 |
| Irrigate 2x | | 1.0 ac-ft | 16.00 | 1.0 | 9.25 | 25.25 |
| Weed control 1x ground | 12.50 | Herbicide | 25.00 | | | 37.50 |
| Insect control 1x air | 6.50 | Insecticide | 10.00 | | | 16.50 |
| **COST OF ESTABLISHMENT** | | | | | | **126.75** |
| **TOTAL COST OF STAND ESTABLISHMENT** | | | | | | **371.75** |
| *ANNUAL COST OF HAY PRODUCTION (3-4 years)* | | | | | | |
| Weed control 2x ground | 12.50 | Herbicide | 32.00 | | | 57.00 |
| Irrigate 18x | | 6.5 ac-ft | 104.00 | 6 | 55.50 | 159.50 |
| Fertilize, water-run | | 100 lb P2O5 | 25.00 | | | 25.00 |
| Insect control 4x air | 6.50 | Insecticide | 40.00 | | | 66.00 |
| **TOTAL ANNUAL CULTURAL COSTS** | | | | | | **307.50** |
| Land rent (net acres) | | | | | | 170.00 |
| Amortization-- | 33 % of total cost of stand establishment | | | | | 122.68 |
| Cash overhead-- | 13 % of annual costs, land rent and amortization | | | | | 78.02 |
| **TOTAL PREHARVEST COSTS** | | | | | | **678.20** |
| *HARVEST COSTS* | | | | | | |
| Swather 8x | 8.00 | | | | | 64.00 |
| Rake 12x | 4.50 | | | | | 54.00 |
| Bale | 0.65 /bale | 128 bales (8 tons) | | | | 83.20 |
| Haul & stack | 0.25 /bale | 128 bales (8 tons) | | | | 32.00 |
| **TOTAL HARVEST COSTS** | | | | | | **233.20** |
| **TOTAL ALL COSTS** | | | | | | **911.40** |

### PROJECTED NET GAIN (PER ACRE)

| Yield | Price/ton ($) | | | | | | | Breakeven |
|---|---|---|---|---|---|---|---|---|
| **(tons/a)** | **70** | **80** | **90** | **100** | **110** | **120** | **130** | **($/ton)** |
| 7 | -407 | -337 | -267 | -197 | -127 | -57 | 13 | 128 |
| 8 | -351 | -271 | -191 | -111 | -31 | 49 | 129 | 114 |
| 9 | -296 | -206 | -116 | -26 | 64 | 154 | 244 | 103 |
| 10 | -240 | -140 | -40 | 60 | 160 | 260 | 360 | 94 |
| 11 | -185 | -75 | 35 | 145 | 255 | 365 | 475 | 87 |