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# COSTS AND PROFITABILITY ANALYSIS FOR CELERY PRODUCTION IN THE OXNARD PLAIN, VENTURA COUNTY, 2012-13

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# UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION
# COSTS AND PROFITABILITYANALYSIS
# FOR CELERY PRODUCTION IN THE OXNARD PLAIN, VENTURA COUNTY

**Based on data collected in 2012/2013**

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The authors wish to express their appreciation to those cooperators who provided data and review in the development of this study. To simplify information, trade names of some products have been used in this report. No endorsement of name product is intended, nor did criticism imply of similar products that are not mentioned.

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## ABSTRACT

Ventura County has 36.53% of celery production in 2011 and ranks second in California. Production costs and profitability analysis have been the fundamental tools for growers and investors to do investment analyses and make decisions, conduct business transactions, and develop risk management strategies. In this study, we provide up to date benchmark costs and profitability indicators for evaluating the viability and sustainability of celery production. This study is based on assumptions of celery production practices including regulatory requirements in the county. Data regarding production practices, inputs and prices and regulations were collected from cooperating growers, the University of California Cooperative Extension (UCCE) farm advisors, agricultural institutions, governmental agencies and supply and equipment dealers. While this study makes every effort to model celery production based on real world practices, it cannot fully represent financial, agronomic, and market risks, which affect the profitability and economic viability of all producers. We suggest that growers use this model as a guide to estimate costs and evaluate their profitability.


## INTRODUCTION

Celery is a top value commodity in Ventura County and in California. In 2011, Ventura County had approximately 10,600 acres, or 36.53% of California's total celery acreage with crop value of $154 million. The growing period for celery crop depends on the time of transplanting. We based this study on one crop in the Oxnard Plain, Ventura County with approximate growing period from land preparation to harvesting being 5 months. We based the study on 500 acres operation with 2 cropping (1,000 acres per year). This study serves as a guideline for production practices and costs of production and profitability to be used by growers, prospective growers, agriculture lenders, educators and all who are involved or have interest with celery production in Ventura County.

## PRODUCTION PRACTICES

The discussions in these sections include production practices: inputs, rates, operational frequency, and methods of operation. Input costs, contract fees and services expenses are based on 2012/2013 prices. We present this study on a per acre basis for one crop taking five months from land preparation to harvest.

**Land Preparation.** Land preparation and the type of tillage system used vary between fields and management preferences. In this study, we used traditional tillage which is the typical practice used for vegetable crop production in Ventura County. Traditional tillage incorporates most crop residues and leaves less than 30 percent of the surface covered by residues and uses an average of 15 to 18 land preparation operations (Mitchell, et al., 2009). The sequence and frequency of land preparation operations will vary among growers. In this study, based on the data we collected from cooperating growers, we used four discing, two subsoiling, five rolling, three leveling, and then broadcast fertilizer and chisel plowing once before beds are listed and shaped. Depending on speed and width of implements (disc, subsoiler, roller, landplane, fertilizer spreader, chisel, lister, and bed shaper) used for land preparation; equipment field time will vary among growers. In this study, based on the equipment complement we developed from our growers' interview, we estimate average tillage field time takes approximately 2.7 hours per acre per crop.

**Stand Establishment.** Growers develop transplanting schedule in order to let crop mature at different times for harvest. In this study, we estimated costs based on one acre transplanted once in August to be harvested in November. The commonly grown varieties in Ventura County are Command, Mission, and Challenger which are resistant to many races of Fusarium yellows. Conquistador, Matador, and Sonora are also popular varieties. Some proprietary cultivars such as T & A Special are also grown. All varieties have similar cultural, harvesting, and marketing requirements. Transplanting rates vary depending on

spacing. In this study, we used an approximate rate of 45,000 transplants per acre on 40" beds with two rows of transplants 14" apart, and transplants 9" apart within rows. Custom transplanting costs about $400 per acre and plants cost about $0.021 each based on bulk purchase price in 2013.

**Fertilization.** Celery fertilization in the Oxnard Plain takes approximately 300 pounds of nitrogen (N) per acre. Fertilizer is applied to provide N at about 30 pounds at pre-plant and 270 pounds post-plant. An application of 188 pounds per acre of ammonium phosphate 16-20-0 (30 lbs. N) is broadcasted once during land preparation. Depending on the speed and width of implement used, field time may vary among growers. Based on the equipment complement used, the tractor and fertilizer spreader takes about 20 minutes per acre per crop to broadcast ammonium phosphate. After transplanting, one application of 186 pounds per acre of 15-15-15 fertilizer is used for sidedressing. Based on the equipment complement used, the tractor and fertilizer spreader takes about 20 minutes per acre per crop to sidedress 15-15-15 fertilizer. Weekly N applications begin a week after sidedressing. Urea ammonium nitrate (UAN32%) is applied 5 times through the drip irrigation system; about 5.40 gallons of UAN32% (19.11 lbs. of N) per application per acre for a total of 27 gallons of UAN32% (95.56 lbs. of N) per acre per crop. Afterwards, calcium ammonium nitrate (CAN17%) is applied 5 times through the drip irrigation system; about 8.89 gallons of CAN17% (19.11 lbs. of N) per application per acre is applied for the first 3 applications and about 20.74 gallons of CAN17% (44.60 lbs. of N) per application per acre is applied for the last 2 applications (for a total of 68.16 gallons of CAN17%) to help mature celery for harvest.

Fertilizer prices may vary between regions and supply companies. In this study, fertilizer prices are based on bulk purchases from local suppliers in Ventura County. Ammonium phosphate 16-20-0 costs about $0.49 per pound, 15-15-15 costs about $0.47 per pound, UAN32% costs about $4.50 per gallon, and CAN17% costs about $3.80 per gallon.

**Irrigation System.** Celery irrigation in Ventura County uses a combination of sprinkler and drip systems. The cost of developed wells and permanent irrigation system are part of the land rental. However, we assumed growers purchase the portable system parts such as sprinklers, pipes, and drip tapes. The sprinkler system is estimated to costs about $500 per acre and last up to 10 years. The drip tapes are estimated to costs about $320 per acre based on one line for 40" bed centers and can be used for approximately 2 crops. We allocated $160 per acre for one celery crop.

The sprinkler system is setup prior to transplanting. Setup time is estimated to take about 2 hours per acre per crop on a two-man (1 hour per person) crew using one trailer. The sprinkler system is removed once the plants have set. Removal is estimated to take 2 hours per acre per crop on a two-man crew using one trailer. After the sprinkler system is removed, the drip system is setup.

We assumed that a single line of drip tape is used per bed and is placed between two rows of plants. Drip tapes are anchored by a farm worker at the beginning of each row, followed by the drip layer implement installing the drip tapes on the surface, and then the worker cut the drip tapes at the end of the rows in order to connect the drip tapes to the water supply line. Machine and manual labor for anchoring, installing, cutting, and connecting the drip tapes are estimated to take about 25-30 minutes per acre (Zhu, Butts, Lam & Blankenship, 2004). In celery production, the drip tapes are removed before harvest. Drip tapes are removed by disconnecting the couplers from the water supply line and then the lifter with winder implement coils the drip tapes onto the spools. Machine and manual labor hours to disconnect, lift and coil drip tapes, and secure and replace-filled spools are estimated to take about 30-35 minutes per acre (Zhu, Butts, Lam & Blankenship, 2004).

These irrigation methods, sprinkler and surface drip irrigation are used for warm season plantings. However, all surface drip irrigation is increasingly common for other seasons. In cases where sprinklers

are not use for plant settings, drip tapes are installed after final bedding to pre-irrigate soil prior to transplanting and to activate pre-plant herbicide.

**Irrigation Applications.** Water cost for irrigation varies in Ventura County and depends on whether district or well water is used. During our data collection, we were told that growers may use well and district water. However, we did not get sufficient information on the number of wells available for use or the depth of the well for pumping calculation. Therefore, we used the price of district water at $170 per acre-foot ($14.17 per acre-inch) to estimate water costs. Water extraction fees from the district and state were also factored into the costs of water.

Based on interview data, irrigation is done once per acre per week after transplanting for a total of 13 irrigations and 2 acre-feet of water for one celery crop season. Six acre-inches (2 ac-in per irrigation per week for 3 weeks) of water is applied through the sprinkler system to set the plants and eighteen acre-inches (1.8 ac-in per irrigation per week for 10 weeks) of water is applied through the drip system for the remaining season. Labor to switch the water on and off, inspections, and maintenance is estimated to take about 30 minutes per irrigation for a total of 6.5 hours per acre per crop.

**Pest Management.** The most harmful insect pests include serpentine leafminer, aphid, and beet armyworm. Most of these insect pests are treated at larval stage. Insect pests are controlled with insecticides. The most harmful diseases include late blight, pink rot, and Fusarium yellows. Late blight is managed by using pathogen free seed and fungicides. Pink rot is a soil borne fungal disease and managed by fungicides. Control for Fusarium yellows is using resistant and tolerant cultivars.

A contract pest control advisor (PCA) monitors and scouts the fields throughout the crop season for insect pests, diseases, beneficial insects, and agronomic problems to determine if control measures are necessary. The PCA consultation fee for celery crop may vary by location; however, we used an average of $36 per acre per crop in this study based on interview data from growers and PCAs.

Pesticides applications may vary depending on types of insect pests and diseases infestation and recommendations from the PCA. Typically a mixed pesticide spray is applied to prevent and control insect pests and diseases. Pesticide materials are rotated after each application to slow and prevent resistance development. Depending on the production season and infestation level in the field, the PCA may recommend anywhere from three to four pesticide applications per acre per crop. Each application consists of a mixture of materials. Some of the materials used in the mixture could be Coragen (Chlorantraniliprole), Trigard (Cyromazine), Assail (Acetamiprid), Echo720 (Chlorothalonil), Tilt (propiconazole), and Botran (Dicloran) to control insect pests and diseases. In this study, the first pesticide application is applied after transplanting (August); the second application is applied during mid-season (September) and the third application is applied before harvest (October). If necessary and depending on infestation level, a fourth application may be applied.

We used custom pesticide treatment which cost approximately $120 per acre for application and material. Written recommendations are required for commercially applied pesticides by licenses pest control advisors. Pest control materials and label rates mentioned in this study are listed on the UCIPM website at http://ucipm.ucdavis.edu/PMG/selectnewpest.celery.html. For information on pesticide use permits, contact your County Agricultural Commissioner's office.

**Weed Management.** Growers in Ventura County use selective herbicides that can be applied either pre-plant or post-plant to control a wide range of grass and broadleaf weeds. Cultivation and hand weeding are also done during the growing season. In this study, herbicide is sprayed once after transplanting. Two-pint ($4 per pint) of Caparol (Prometryn) herbicide is sprayed (using tractor and sprayer) and takes about 10 minutes per acre. Caparol costs about $32 per gallon. Custom mechanical cultivation for weed

control costs about $15 per acre and is done once during mid-growing season. Custom hand weeding costs about $85 per acre and is done once before harvesting.

**Celery Free Period.** Ventura County enforces a celery-free period from July 15th to Aug 4th to control western celery mosaic disease (CeMV). According to the Ventura County Agriculture Commissioner's office, inspectors search for planted and wild celery in areas where it is typically found. If celery is found during the host free period it must be plowed under, hand pulled or sprayed with herbicides (2012).

**Food Safety Program.** Many growers of vegetable crops like celery incorporate and implement a Food Safety program. According to the United States Department of Agriculture – Agriculture Marketing Service (USDA-AMS), Good Agriculture Practice (GAP) guidelines were developed to educate and help growers reduce food safety hazards on farm operations for minimizing microbial contamination during the growing and harvesting seasons (2011). In this study, we assumed growers participate in annual GAP audit and certification. Growers also conduct two (one test for farm, one test for water reservoir) microbial water tests per month (total of 10 water test per acre from land preparation to harvest for one celery crop) as part of their Food Safety program.

There are many GAP certification programs in California. Each farm operation will be different; therefore growers should decide on the GAP certification program that best fit their needs. The cost of most third party GAP audit and certification programs are not public information. However, the United Fresh Produce Association pre-farm-gate matrix provided average fees for GAP certification. From the matrix, we chose to use in this study the fees charged by Primus Lab for GAP certification. Two types of audits are done for GAP certification through Primus Lab: farm and harvest crew audits. The farm audit costs about $550 per farm per year ($0.46 per acre for 5 months based on 500-acre farm). Two harvest crew audits costs about $390 per crop season ($0.78 per acre). Microbial water test costs about $34 per 250-milliliter sample. Two water samples are collected per month per farm operation. Therefore for the 5-month (land preparation to harvest) celery crop, the total costs of microbial water test will be $340 for the entire operation ($0.68 per acre for 5 months).

**Conditional Waiver Program.** The Federal Clean Water Act (CWA) and the Porter-Cologne Water Quality Control Act, authorize regulators (Regional Water Quality Control Boards) to control discharges into surface water and ground water. Historically, the regional water quality control boards waived the waste discharge requirements for irrigated farmlands. However, the 1999 Senate Bill 390 banned the waiver and set the waiver expiration date to 2003. The regional boards had to come up with an alternate method to regulate discharges from irrigated farmlands. According to the Farm Bureau of Ventura County, the Los Angeles regional board, which overseas Ventura County, adopted its first conditional waiver program to regulate discharges from irrigated farmlands in November 2005 and was renewed in October 2010.

The conditional waiver program requires dischargers to submit Notice of Intent (NOI) to comply with the program, annual site monitoring reports, assessment and mitigation plans, and fulfillment of a minimum of eight credit hours education for each group member and or individual non-member. Ventura County Agricultural Irrigated Land Group (VCAILG) was formed in March 2006 and approved in December 2006 to be a group discharger in order to comply with the conditional waiver program set by the Los Angeles regional board. VCAILG membership is voluntary. However, non-members must be in compliance with the conditional waiver program individually and follow the same requirements. The program is administered by the Ventura County Farm Bureau. The Farm Bureau provides staff support, maintain records, and oversee consultants, and handles correspondences between members and the Los Angeles regional board.

The program cost varies by year, watershed, and depends on the scope of work performed. Generally, the program cost covers monitoring, reporting, mitigation, state board fees and the farm Bureau administrative fee. There are four watersheds in Ventura County: Ventura River, Santa Clara River, Calleguas Creek, and Oxnard Plain watersheds. Based on interview data, the majority of the celery production falls within the Calleguas Creek watershed. The average cost for this watershed was $23 per acre per year in 2012 (Farm Bureau). Therefore, we used $9.58 per acre (for 5 months) to reflect cost for one crop in this study.

## HARVESTING AND MARKETING

**Table 1. Average Yield for Fresh Market Celery, Oxnard Plain, Ventura County, 2007-2011**

| Year | Yield/Acre |
|---|---|
| 2007 | 1,320 |
| 2008 | 1,270 |
| 2009 | 1,370 |
| 2010 | 1,440 |
| 2011 | 1,370 |
| **Average** | **1,350** |

*Based on Ventura County Agricultural Commissioner's Crop Reports, 2007-2011

Celery is hand-harvested and field packed into 50, 55, or 60 pound cartons (depending on market and handler requirement) by contract harvesters than haul, cooled, and sold. In this study in the staggering schedule, we assumed transplanting an acre to take place once therefore harvesting will also be done once. We based harvesting costs on 55-pound cartons. Based on interview data, harvesting costs estimate is about $4.99 per 55-pound carton.

**Yield and Price.** We used the California agriculture statistics average celery yield which is about 1,350 cartons (55-pound carton) per acre per crop for this study. We estimated gross returns based on $11 per carton price.

**California Celery Research Program Assessment**. The California Department of Food and Agriculture (CDFA) established an assessment rate of one and six-tenth cent per one hundred pounds ($0.016/cwt.) to be levied on all celery producers and remitted to first handler. Therefore, in this study, we used an assessment fee of $0.0088 per carton (55-pound carton).

**INTEREST ON OPERATING CAPITAL.** Interest on operating capital is calculated at an annual operating loan (short-term) rate of 5.75% provided by the Production Credit Association. The interest on operating capital reflects borrowing costs and or opportunity costs for money used in the operation for producing celery. An opportunity cost is the return foregone by choosing to produce celery instead of using the money on other alternative investment options.

**LABOR.** Labor wages are based on interview data, includes owner and hired services. The wage rates used for this study including benefits are $15.30 per hour (28% for benefits) for machine operators and $11.98 per hour (28% for benefits) for non-machine and irrigation labor.

**EQUIPMENT OPERATING COSTS.** Equipment operating cash costs for fuel, lubrication, and repairs are calculated using formulas and coefficients developed by the American Society of Agricultural Engineers (ASAE). Repair costs are based on purchase price, annual hours use, total hours of life, and repair coefficients formulated by the ASAE. Fuel and lubrication costs are also determined by ASAE equations based on machinery horsepower (maximum PTOHP) and the type of fuel used. We used average fuel prices of $3.84 per gallon for diesel and $4.08 per gallon for gasoline, obtained from the U.S. Energy Information Administration.

## CASH OVERHEAD COSTS

**Land Rent.** Land rental for row crop vary by region and depend on the availability of well water and permanent irrigation systems. The landowner typically maintains the well and permanent irrigation systems. Land rent for row crop in Ventura County costs about $2,800 per acre per year. We used $1,167 per acre for 5 months to reflect rental for one celery crop.

**Office Expenses.** Expenses in this category include office supplies, telephone services (mobile and landline), office machines, bookkeeping, accounting, legal fees, and so on. Based on interview data, office expenses average about $500 per acre per year; covering all crops produced on the farm. Therefore, we used $208 per acre for 5 months to reflect the cost for one celery crop.

**Farm Manager.** Vegetable crop production for a farm this size in the Oxnard Plain is managed by farm managers. A farm manager makes on average $200 per acre per year. Therefore we used $83 per acre for 5 months to reflect the cost for one celery crop.

**Sanitation Facility.** Sanitation facilities are required during transplanting, hand weeding, and harvesting for field workers. These operations are done by contractors who provide their own sanitation facilities therefore growers do not incur the costs.

**Liability and Property Insurance.** Liability insurance (to cover accidents on the entire farm) for a farm size specified in this study is about $1,188 per year. Therefore, the cost to cover one crop is $495 ($0.99 per acre for 5 months). In addition, property insurance is calculated at $8.17 per $1,000 valuation.

**Property Taxes.** Counties charge a base property tax rate of 1 percent on the assessed value of the property, including equipment, building, and improvements. Special assessment districts in some counties charge additional taxes on property. In this study, we calculated property taxes at the county base tax rate of 1 percent of the property value.

**Investment Repairs.** Repair costs are the annual maintenance costs for investments in non-cash overhead. The repairs are calculated as a percentage of the new cost distributed over the investment life. Annual repairs in this study are calculated as 2% of the new cost.

## NON-CASH OVERHEAD COSTS

**Farm Building.** We assumed that a steel farm building about 2,600 square-feet is used for this size farm. The value is estimated based on current market price per square-foot.

**Tools.** The farm shop includes various kinds of tools necessary for quick repair of farm machinery. The value of tools is estimated based on used and new prices.

**Sprinkler System.** The portable sprinkler system parts costs about $500 per acre and last up to 10 years before replacement.

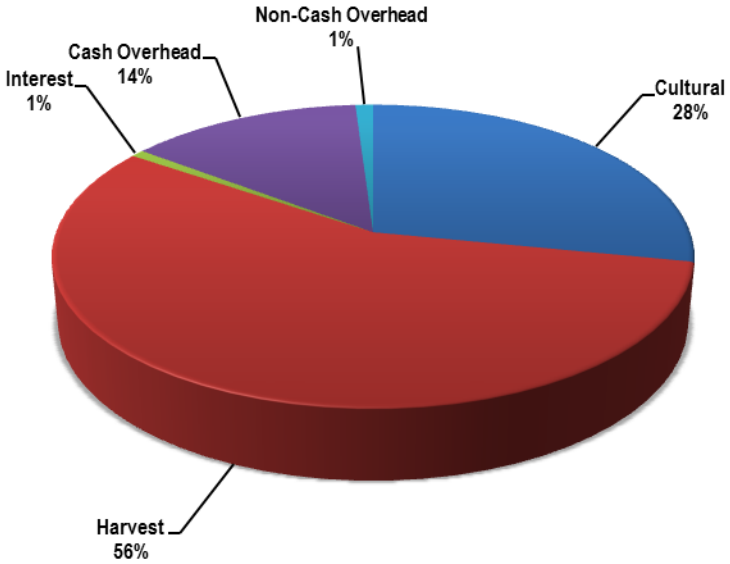
**Fuel Tank.** We assumed a farm this size will own at least one fuel tank, sizing 550 gallons.

**Ownership Cost of Equipment and Farm Investments.** We used the capital recovery method to calculate ownership costs of farm equipment and investments. This method allows growers to calculate an annual amount of money to charge the enterprise so that the value of assets will be recovered within a specific period at the designated interest rate. The interest we used to calculate ownership cost is 4.75%, which is California's long-term rate of return on agricultural production assets from current income. We valued the equipment complement at 60% of new prices to reflect the mix of old and new equipment complement.

## SUMMARY OF PRODUCTION COSTS

Production costs given our assumptions of farm size, production practices and 2012/2013 prices are presented in tables 1 and 2 by type of activity and by type of inputs, respectively. Our estimate of production costs for celery is $11,963 per acre. Figure 1 shows the breakdown of costs. It includes 28% ($3,361) accounted for by cultural practices (consisting of land preparation, transplanting, irrigation, fertilization, pest and weed control, equipment, and conditional waiver and food safety programs); 56% ($6,750) by harvesting (picking, packing, hauling, cooling, selling, and California Celery Research program assessment); 1% ($90.86) by interest on operating capital; 14% ($1,637) by cash overhead (land rent, office expenses, farm manager, drip tapes, insurances, taxes and investment repairs); and 1% ($124) by non-cash overhead (capital recovery of building, tools, sprinkler system, fuel tank, and equipment).

**Figure 1.** Proportion of Production Costs for Celery Production in Ventura County, 2012-2013




## PROFITABILITY ANALYSIS

We analyzed profitability using break-even costs and economic margins. A break-even cost is the cost of production per unit; that is the total cost of production per acre divided by the yield per acre. Break-even costs allow growers to compare expected market prices with the unit cost of production.

Gross margin (or returns above cash costs) is what growers often refer to as profit if there is no debt on the farming operation. It approximates the return to management and investment. If you deduct depreciation, it also approximates taxable income. Gross margin is calculated as gross returns (price multiplied by yield) minus cash costs production and overhead.

Economic profit (or returns above total cost, including management) is a very useful measure of how attractive the enterprise is for potential investors and entrants into the business. Economic profit can be positive or zero. A zero economic profit should not be alarming if all costs, including the owners labor and management costs, are included (and assumed paid) in the production cost. In this study, owner's labor is included but we did not include management charges, so the return after all costs are deducted

reflects returns to management. Returns to management are calculated as gross returns minus cash and non-cash costs of production.

Given the assumptions upon which we based this study, the break-even price for the average yield of 1,350 cartons (55-pound carton) per acre is estimated at about $8.77 per carton to cover all cash costs and $8.86 per carton to cover total costs. On the other hand, the break-even yield for the average price of $11 per carton (55-pound carton) is about 1,076 cartons per acre for cash costs and 1,088 cartons per acre for total costs. Break-even prices are calculated as the costs of production divided by yield per acre and break-even yields are calculated as the production costs divided by price per carton.

Crop yield and prices received by growers, however, may vary depending on location which could influence production practices and costs. We have provided range analyses of price and yield variations on profitability (Table 4) so that each grower can find the figures that best match his or her specific situation. The range analyses include break-even prices at various yields as well as gross margin and returns to management at various yield and price combinations. The gross margin and returns to management ranges are analyzed at increments of $0.50 per carton for prices and 50 cartons per acre for yield.

## REFERENCE


American Society of Agricultural Engineers. (1992). American Society of Agricultural Engineers Standard Yearbook. St. Joseph, MI: ASAE.

Boelje, M. D., & Eidman, V. R. (1984). *Farm Management*. New York: John Wiley and Sons.

California's Office of USDA's NASS, (2011). California National Agriculture Statistics Service. *Publications*. Retrieved from website: http://www.nass.usda.gov/Statistics_by_State/California/Publications/

Daugovish, O., Smith, R., Cahn, M., Koike, S., Smith, H., Aguiar, J., Quiros, C., Cantwell, M., & Takele, E. (2008). Celery production California. *Vegetable Production Series, 7220*. Retrieved from http://anrcatalog.ucdavis.edu/pdf/7220.pdf

Farm Bureau. (2013). *Farm Bureau of Ventura County, Water Issues*. Retrieved from http://www.farmbureauvc.com/water_quality.html

Hartz, T. (2000). *Drip Irrigation and Fertigation Management of Celery*. Retrieved from http://vric.ucdavis.edu/pdf/celery_dripirrigationandfertigation2000.pdf

Krist, J. (2012) Farm Bureau of Ventura County, the Independent Voice of Agriculture, Vol. XLIV, No. 7. Retrieved from: http://www.farmbureauvc.com/pdf_forms/newsletters/FB_News_July12.pdf

Mitchell, J. P., Pettygrove, G. S., Upadhyaya, S., Shrestha, A., Fry, R., Roy, R., Hogan, P., Vargas, R., & Hembree, K. (2009). *Classification of Conservation Tillage Practices in California Irrigated Row Crop Systems*. Retrieved from http://anrcatalog.ucdavis.edu/pdf/8364.pdf

Takele, E. (1999). Celery Production: Sample Costs and Profitability Analysis. *8028*, Retrieved from http://coststudies.ucdavis.edu/files/celery-8028.pdf

United Fresh Produce Association. (2011). *Pre-Farm Gate Matrix - United Fresh Produce Association*. Retrieved from http://www.unitedfresh.org/matrix2011/prefarmgate.html

University of California Statewide IPM Project. (2009). *Celery, UC IPM Pest Management Guidelines*. University of California, Davis, CA, Retrieved from http://www.ipm.ucdavis.edu/PDF/PMG/pmgcelery.pdf

United States Department of Agriculture, Agriculture Marketing Service (2011). *Good Agricultural Practices and Good Handling Practices Audit Verification Program, User's Guide.* Retrieved from http://www.ams.usda.gov/AMSv1.0/getfile?dDocName=stelprdc5097151

U.S. Energy Information Administration, (2012). *Weekly Retail Gasoline and Diesel Prices*. Retrieved from website: http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_nus_m.htm

Ventura County Agricultural Commissioner. (2007-2011). *Ventura County Agricultural Commissioner Crop Reports*. Retrieved from http://portal.countyofventura.org/portal/page/portal/AgComm/resources/cropreports

Ventura County Agriculture Commission. (2013). *Ventura County Agriculture Commissioner, Seed Inspection Program*. Retrieved from http://portal.countyofventura.org/portal/page/portal/AgComm/funding/seedinspection

Zhu, H., Butts, C. L., Lam, M. C., & Blankenship, P. D. (2004). An Implement to Install and Retrieve Surface Drip Irrigation Laterals. *Applied Engineering in Agriculture*, *20*(1), 17-23. Retrieved from http://naldc.nal.usda.gov/download/10034/PDF

**Table 1. Costs per Acre to Produce Celery in Ventura County, 2012/2013**

**UC COOPERATIVE EXTENSION**

| Operation | Operation Time (Hrs/A) | Cash and Labor Costs per Acre: Labor Cost | Fuel | Lube & Repairs | Material Cost | Custom/ Rent | Total Cost | Your Cost |
|---|---|---|---|---|---|---|---|---|
| **Land Prep:** | | | | | | | | |
| Disc (4x) | 0.41 | 7.54 | 33.32 | 11.18 | 0 | 0 | 52.05 | |
| Subsoil (2x) | 0.65 | 11.88 | 52.52 | 17.14 | 0 | 0 | 81.54 | |
| Roller (5x) | 0.37 | 6.75 | 29.83 | 8.38 | 0 | 0 | 44.96 | |
| Land Level (3x) | 0.46 | 8.36 | 36.94 | 12.66 | 0 | 0 | 57.95 | |
| Broadcast Fertilizer | 0.34 | 6.18 | 27.32 | 8.17 | 92.12 | 0 | 133.80 | |
| Chisel Plow | 0.12 | 2.23 | 9.85 | 3.27 | 0 | 0 | 15.35 | |
| List Beds | 0.08 | 1.41 | 6.25 | 1.99 | 0 | 0 | 9.65 | |
| Shape Beds | 0.28 | 5.09 | 22.48 | 7.16 | 0 | 0 | 34.72 | |
| **TOTAL Land Prep COSTS** | **2.7** | **49** | **219** | **70** | **92** | **0** | **430** | |
| **Transplanting:** | | | | | | | | |
| Sprinkler Irrigation Setup (machine) | 0.42 | 7.78 | 6.59 | 2.94 | 0 | 0 | 17.32 | |
| Sprinkler Irrigation Setup (labor) | 2 | 23.96 | 0 | 0 | 0 | 0 | 23.96 | |
| Transplant | 0 | 0 | 0 | 0 | 945 | 400 | 1,345 | |
| Herbicide Treatment | 0.12 | 2.26 | 1.92 | 1.04 | 8 | 0 | 13.22 | |
| Irrigation & System Inspection (3x) | 1.5 | 17.97 | 0 | 0 | 85.02 | 0 | 102.99 | |
| **TOTAL Transplant COSTS** | **4.04** | **52** | **9** | **4** | **1,038** | **400** | **1,502** | |
| **Growing:** | | | | | | | | |
| Sprinkler Irrigation Removal (machine) | 0.42 | 7.78 | 6.59 | 2.96 | 0 | 0 | 17.33 | |
| Sprinkler Irrigation Removal (labor) | 2 | 23.96 | 0 | 0 | 0 | 0 | 23.96 | |
| Drip Setup (machine) | 0.17 | 3.18 | 2.7 | 1.23 | 0 | 0 | 7.11 | |
| Drip Setup (labor) | 0.25 | 3 | 0 | 0 | 0 | 0 | 3 | |
| Sidedress - 15-15-15 | 0.34 | 6.18 | 5.24 | 2.8 | 87.42 | 0 | 101.64 | |
| Fertilization - UAN32% (5x) | 0 | 0 | 0 | 0 | 121.48 | 0 | 121.48 | |
| Pest Control Advisor | 0 | 0 | 0 | 0 | 0 | 36 | 36 | |
| Pesticide Treatment Appl. (3x) | 0 | 0 | 0 | 0 | 0 | 360 | 360 | |
| Weed Cultivation | 0 | 0 | 0 | 0 | 0 | 15 | 15 | |
| Fertilization - CAN17% (5x) | 0 | 0 | 0 | 0 | 258.99 | 0 | 258.99 | |
| Hand weeding | 0 | 0 | 0 | 0 | 0 | 85 | 85 | |
| Irrigation & System Inspection (10x) | 5 | 59.9 | 0 | 0 | 255.06 | 0 | 314.96 | |
| Conditional Waiver Program | 0 | 0 | 0 | 0 | 0 | 9.58 | 9.58 | |
| Microbial Water Test | 0 | 0 | 0 | 0 | 0 | 0.68 | 0.68 | |
| Food Safety Program | 0 | 0 | 0 | 0 | 0 | 1.24 | 1.24 | |
| Drip Irrigation Removal (machine) | 0.29 | 5.42 | 4.59 | 2.41 | 0 | 0 | 12.41 | |
| Drip Irrigation Removal (labor) | 0.25 | 3 | 0 | 0 | 0 | 0 | 3 | |
| Pickup Truck | 2 | 36.72 | 12.24 | 7.95 | 0 | 0 | 56.91 | |
| **TOTAL Growing COSTS** | **10.72** | **149** | **31** | **17** | **723** | **508** | **1,428** | |
| **Harvesting and Marketing:** | | | | | | | | |
| Cut, Pack, Haul, Cool, Sell | 0 | 0 | 0 | 0 | 0 | 6,738.12 | 6,738.12 | |
| California Celery Research Program Assessment | 0 | 0 | 0 | 0 | 0 | 11.88 | 11.88 | |
| **TOTAL Harvesting and Marketing COSTS** | **0** | **0** | **0** | **0** | **0** | **6,750** | **6,750** | |
| Interest on Operating Capital @ 5.75% | | | | | | | 90.86 | |
| **TOTAL OPERATING COSTS/ACRE** | **17.47** | **251** | **258** | **91** | **1,853** | **7,658** | **10,202** | |
| **CASH OVERHEAD:** | | | | | | | | |
| Land Rent | | | | | | | 1,167 | |
| Office Expenses | | | | | | | 208 | |
| Liability Insurance | | | | | | | 0.99 | |
| Farm Manager | | | | | | | 83 | |
| Drip Tapes | | | | | | | 160 | |
| Property Taxes | | | | | | | 5.36 | |
| Property Insurance | | | | | | | 6.71 | |
| Investment Repairs | | | | | | | 6.31 | |
| **TOTAL CASH OVERHEAD COSTS/ACRE** | | | | | | | **1,637** | |
| **TOTAL CASH COSTS/ACRE** | | | | | | | **11,839** | |
| **NON-CASH OVERHEAD:** | **Per producing Acre** | **Annual Cost Capital Recovery** | | | | | | |
| Building | | 46.8 | | 4.21 | | | 4.21 | |
| Tools | | 16 | | 1.44 | | | 1.44 | |
| Sprinkler System | | 250 | | 29.97 | | | 29.97 | |
| Fuel Tank 550 gallons | | 2.50 | | 0.23 | | | 0.23 | |
| Equipment | | 779.05 | | 87.85 | | | 87.85 | |
| **TOTAL NON-CASH OVERHEAD COSTS** | | **1,094** | | **124** | | | **124** | |
| **TOTAL COSTS/ACRE** | | | | | | | **11,963** | |

**Table 2. Costs and Returns per Acre to Produce Celery in Ventura County, 2012/2013**

**UC COOPERATIVE EXTENSION**

| | Quantity/ Acre | Unit | Price or Cost/Unit | Value or Cost/Acre |
|---|---|---|---|---|
| **GROSS RETURNS** | | | | |
| Celery | 1,350 | crtn | $11 | 14,850 |
| **TOTAL GROSS RETURNS** | **1,350** | **crtn** | | **14,850** |
| | | | | |
| **OPERATING COSTS** | | | | |
| **Custom:** | | | | **908** |
| Custom Transplanting | 1 | acre | 400 | 400 |
| Pest Control Advisor | 1 | acre | 36 | 36 |
| Pesticide Application | 3 | acre | 120 | 360 |
| Weed Cultivation | 1 | acre | 15 | 15 |
| Hand Weeding | 1 | acre | 85 | 85 |
| Conditional Waiver Program | 1 | acre | 9.58 | 9.58 |
| Microbial Water Test | 1 | acre | 0.68 | 0.68 |
| Food Safety - Farm Audit | 1 | acre | 0.46 | 0.46 |
| Food Safety - Harvest Crew Audits | 1 | acre | 0.78 | 0.78 |
| **Fertilizer:** | | | | **560** |
| 16-20-0 | 188 | lb | 0.49 | 92.12 |
| 15-15-15 | 186 | lb | 0.47 | 87.42 |
| UAN32% | 27.00 | gal | 4.5 | 121.48 |
| CAN17% | 68.16 | gal | 3.80 | 258.99 |
| **Herbicide:** | | | | **8** |
| Caparol (Prometryn) | 0.25 | gal | 32 | 8 |
| **Water:** | | | | **340** |
| District Water | 24 | ac-in | 14.17 | 340.08 |
| **Harvest:** | | | | **6,750** |
| Cut, Pack, Haul, Cool, Sell | 1350 | crtn | 4.99 | 6,738.12 |
| California Celery Research Program Assessment | 1350 | crtn | 0.0088 | 11.88 |
| **Planting Materials:** | | | | **945** |
| Celery Plant | 45000 | plant | 0.021 | 945 |
| **Labor:** | | | | **251** |
| Equipment Operator Labor | 7.76 | hrs | 15.3 | 118.76 |
| Irrigation Labor | 11 | hrs | 11.98 | 131.78 |
| **Machinery:** | | | | **350** |
| Fuel-Gas | 3 | gal | 4.08 | 12.24 |
| Fuel-Diesel | 64.10 | gal | 3.84 | 246.14 |
| Lube | | | | 38.76 |
| Machinery Repair | | | | 52.53 |
| Interest on Operating Capital (5.75%) | | | | 90.86 |
| **TOTAL OPERATING COSTS/ACRE** | | | | **10,202** |
| **TOTAL OPERATING COSTS/CRTN** | | | | **7.56** |
| **NET RETURNS ABOVE OPERATING COSTS** | | | | **4,648** |
| | | | | |
| **CASH OVERHEAD COSTS** | | | | |
| Land Rent | | | | 1,167 |
| Office Expenses | | | | 208 |
| Liability Insurance | | | | 0.99 |
| Farm Manager | | | | 83 |
| Drip Tapes | | | | 160 |
| Property Taxes | | | | 5.36 |
| Property Insurance | | | | 6.71 |
| Investment Repairs | | | | 6.31 |
| **TOTAL CASH OVERHEAD COSTS/ACRE** | | | | **1,637** |
| **TOTAL CASH OVERHEAD COSTS/CRTN** | | | | **1.21** |
| **TOTAL CASH COSTS/ACRE** | | | | **11,839** |
| **TOTAL CASH COSTS/CRTN** | | | | **8.77** |
| **NET RETURNS ABOVE CASH COSTS** | | | | **3,011** |
| | | | | |
| **NON-CASH OVERHEAD COSTS (Capital Recovery)** | | | | |
| Building | | | | 4.21 |
| Tools | | | | 1.44 |
| Sprinkler System | | | | 29.97 |
| Fuel Tank 550 gallons | | | | 0.23 |
| Equipment | | | | 87.85 |
| **TOTAL NON-CASH OVERHEAD COSTS/ACRE** | | | | **124** |
| **TOTAL NON-CASH OVERHEAD COSTS/CRTN** | | | | **0.09** |
| **TOTAL COST/ACRE** | | | | **11,963** |
| **TOTAL COST/ crtn** | | | | **8.86** |
| **NET RETURNS ABOVE TOTAL COST** | | | | **2,887** |

**Table 3. Monthly Cash Costs per Acre to Produce Celery in Ventura County, 2012/2013**

**UC COOPERATIVE EXTENSION**

| Beginning 07-12<br>Ending 11-12 | JUL<br>12 | AUG<br>12 | SEP<br>12 | OCT<br>12 | NOV<br>12 | TOTAL |
|---|---|---|---|---|---|---|
| **Land Prep:** | | | | | | |
| Disc (4x) | 52.05 | | | | | 52.05 |
| Subsoil (2x) | 81.54 | | | | | 81.54 |
| Roller (5x) | 44.96 | | | | | 44.96 |
| Land Level (3x) | 57.95 | | | | | 57.95 |
| Broadcast Fertilizer | 133.8 | | | | | 133.8 |
| Chisel Plow | 15.35 | | | | | 15.35 |
| List Beds | 9.65 | | | | | 9.65 |
| Shape Beds | 34.72 | | | | | 34.72 |
| **TOTAL Land Prep COSTS** | **430** | | | | | **430** |
| **Transplanting:** | | | | | | |
| Sprinkler Setup (machine) | | 17.32 | | | | 17.32 |
| Sprinkler Setup (labor) | | 23.96 | | | | 23.96 |
| Transplant | | 1,345 | | | | 1,345 |
| Herbicide Treatment | | 13.22 | | | | 13.22 |
| Irrigation & System Inspection (3x) | | 102.99 | | | | 102.99 |
| **TOTAL Transplant COSTS** | **0** | **1,502** | | | | **1,502** |
| **Growing:** | | | | | | |
| Sprinkler Irrigation Removal (machine) | | 17.33 | | | | 17.33 |
| Sprinkle Irrigation Removal (labor) | | 23.96 | | | | 23.96 |
| Drip Irrigation Setup (machine) | | 7.11 | | | | 7.11 |
| Drip Irrigation Setup (labor) | | 3 | | | | 3 |
| Sidedress - 15-15-15 | | 101.64 | | | | 101.64 |
| Fertilization - UAN32% (5x) | | | 97.19 | 24.3 | | 121.48 |
| Pest Control Advisor | | 36 | | | | 36 |
| Pesticide Treatment Appl. (3x) | | 120 | 120 | 120 | | 360 |
| Weed Cultivation | | | 15 | | | 15 |
| Fertilization - CAN17% (5x) | | | 33.78 | 225.21 | | 258.99 |
| Hand weeding | | | | 85 | | 85 |
| Irrigation & System Inspection (10x) | | 31.5 | 157.48 | 125.98 | | 314.96 |
| Conditional Waiver Program | | 9.58 | | | | 9.58 |
| Microbial Water Test | 0.14 | 0.14 | 0.14 | 0.14 | 0.14 | 0.68 |
| Food Safety Program | | 0.46 | | | 0.78 | 1.24 |
| Drip Irrigation Removal (machine) | | | | 12.41 | | 12.41 |
| Drip Irrigation Removal (labor) | | | | 3 | | 3 |
| Pickup Truck | 11.38 | 11.38 | 11.38 | 11.38 | 11.38 | 56.91 |
| **TOTAL Growing COSTS** | **12** | **362** | **435** | **607** | **12** | **1,428** |
| **Harvesting and Marketing:** | | | | | | |
| Cut, Pack, Haul, Cool, Sell | | | | | 6,738.12 | 6,738.12 |
| California Celery Research Program Assessment | | | | | 11.88 | 11.88 |
| **TOTAL Harvesting and Marketing COSTS** | **0** | **0** | **0** | **0** | **6,750** | **6,750** |
| Interest on Operating Capital (5.75%) | 3.97 | 16.76 | 3.91 | 5.46 | 60.77 | 90.86 |
| **TOTAL OPERATING COSTS/ACRE** | **446** | **1,881** | **439** | **613** | **6,823** | **10,202** |
| **CASH OVERHEAD** | | | | | | |
| Land Rent | 233 | 233 | 233 | 233 | 233 | 1,167 |
| Office Expenses | 41.6 | 41.6 | 41.6 | 41.6 | 41.6 | 208 |
| Liability Insurance | 0.99 | | | | | 0.99 |
| Farm Manager | 16.6 | 16.6 | 16.6 | 16.6 | 16.6 | 83 |
| Drip Tapes | | 160 | | | | 160 |
| Property Taxes | 5.36 | | | | | 5.36 |
| Property Insurance | 6.71 | | | | | 6.71 |
| Investment Repairs | 1.26 | 1.26 | 1.26 | 1.26 | 1.26 | 6.31 |
| **TOTAL CASH OVERHEAD COSTS** | **306** | **453** | **293** | **293** | **293** | **1,637** |
| **TOTAL CASH COSTS/ACRE** | **751** | **2,334** | **732** | **906** | **7,116** | **11,839** |

**Table 4. Range Analysis: Income and Costs Analyses to Produce Celery in Ventura County, 2012/2013**

**UC COOPERATIVE EXTENSION**

| | YIELD (crtns/acre) | | | | | | |
|---|---|---|---|---|---|---|---|
| | **1,200** | **1,250** | **1,300** | **1,350** | **1,400** | **1,450** | **1,500** |
| **OPERATING COSTS:** | | | | | | | |
| Land Prep | 430 | 430 | 430 | 430 | 430 | 430 | 430 |
| Transplant | 1,502 | 1,502 | 1,502 | 1,502 | 1,502 | 1,502 | 1,502 |
| Growing | 1,428 | 1,428 | 1,428 | 1,428 | 1,428 | 1,428 | 1,428 |
| Harvest | 6,000 | 6,250 | 6,500 | 6,750 | 7,000 | 7,250 | 7,500 |
| Interest on operating capital @ 5.75% | 84.12 | 86.37 | 88.61 | 90.86 | 93.11 | 95.35 | 97.60 |
| **TOTAL OPERATING COSTS/ACRE** | **9,445** | **9,697** | **9,949** | **10,202** | **10,454** | **10,706** | **10,958** |
| Total Operating Costs/crtn | 7.87 | 7.76 | 7.65 | 7.56 | 7.47 | 7.38 | 7.31 |
| CASH OVERHEAD COSTS/ACRE | 1,637 | 1,637 | 1,637 | 1,637 | 1,637 | 1,637 | 1,637 |
| **TOTAL CASH COSTS/ACRE** | **11,082** | **11,335** | **11,587** | **11,839** | **12,091** | **12,344** | **12,596** |
| Total Cash Costs/crtn | 9.24 | 9.07 | 8.91 | 8.77 | 8.64 | 8.51 | 8.40 |
| NON-CASH OVERHEAD COSTS/ACRE | 124 | 124 | 124 | 124 | 124 | 124 | 124 |
| **TOTAL COSTS/ACRE** | **11,206** | **11,458** | **11,710** | **11,963** | **12,215** | **12,467** | **12,719** |
| Total Costs/crtn | 9.34 | 9.17 | 9.01 | 8.86 | 8.72 | 8.60 | 8.48 |

**RETURNS PER ACRE ABOVE OPERATING COSTS AT VARIOUS YIELDS AND PRICE COMBINATION**

| **PRICE($/crtn)** | **YIELD(crtn/acre)** | | | | | | |
|---|---|---|---|---|---|---|---|
| **Celery** | **1200** | **1250** | **1300** | **1350** | **1400** | **1450** | **1500** |
| **$9.50** | 1,955 | 2,178 | 2,401 | 2,623 | 2,846 | 3,069 | 3,292 |
| **$10.00** | 2,555 | 2,803 | 3,051 | 3,298 | 3,546 | 3,794 | 4,042 |
| **$10.50** | 3,155 | 3,428 | 3,701 | 3,973 | 4,246 | 4,519 | 4,792 |
| **$11.00** | 3,755 | 4,053 | 4,351 | **4,648** | 4,946 | 5,244 | 5,542 |
| **$11.50** | 4,355 | 4,678 | 5,001 | 5,323 | 5,646 | 5,969 | 6,292 |
| **$12.00** | 4,955 | 5,303 | 5,651 | 5,998 | 6,346 | 6,694 | 7,042 |
| **$12.50** | 5,555 | 5,928 | 6,301 | 6,673 | 7,046 | 7,419 | 7,792 |

**RETURNS PER ACRE ABOVE OPERATING AND CASH COSTS AT VARIOUS YIELDS AND PRICE COMBINATION**

| **PRICE($/crtn)** | **YIELD(crtn/acre)** | | | | | | |
|---|---|---|---|---|---|---|---|
| **celery** | **1200** | **1250** | **1300** | **1350** | **1400** | **1450** | **1500** |
| **$9.50** | 318 | 540 | 763 | 986 | 1,209 | 1,431 | 1,654 |
| **$10.00** | 918 | 1,165 | 1,413 | 1,661 | 1,909 | 2,156 | 2,404 |
| **$10.50** | 1,518 | 1,790 | 2,063 | 2,336 | 2,609 | 2,881 | 3,154 |
| **$11.00** | 2,118 | 2,415 | 2,713 | **3,011** | 3,309 | 3,606 | 3,904 |
| **$11.50** | 2,718 | 3,040 | 3,363 | 3,686 | 4,009 | 4,331 | 4,654 |
| **$12.00** | 3,318 | 3,665 | 4,013 | 4,361 | 4,709 | 5,056 | 5,404 |
| **$12.50** | 3,918 | 4,290 | 4,663 | 5,036 | 5,409 | 5,781 | 6,154 |

**RETURNS PER ACRE ABOVE TOTAL COSTS AT VARIOUS YIELDS AND PRICE COMBINATION**

| **PRICE($/crtn)** | **YIELD(crtn/acre)** | | | | | | |
|---|---|---|---|---|---|---|---|
| **celery** | **1200** | **1250** | **1300** | **1350** | **1400** | **1450** | **1500** |
| **$9.50** | 194 | 417 | 640 | 862 | 1,085 | 1,308 | 1,531 |
| **$10.00** | 794 | 1,042 | 1,290 | 1,537 | 1,785 | 2,033 | 2,281 |
| **$10.50** | 1,394 | 1,667 | 1,940 | 2,212 | 2,485 | 2,758 | 3,031 |
| **$11.00** | 1,994 | 2,292 | 2,590 | **2,887** | 3,185 | 3,483 | 3,781 |
| **$11.50** | 2,594 | 2,917 | 3,240 | 3,562 | 3,885 | 4,208 | 4,531 |
| **$12.00** | 3,194 | 3,542 | 3,890 | 4,237 | 4,585 | 4,933 | 5,281 |
| **$12.50** | 3,794 | 4,167 | 4,540 | 4,912 | 5,285 | 5,658 | 6,031 |

**Table 5. Farm Investment for Producing Celery: Values and Annual Costs based on 1,000-Farmed Acres in Ventura County, 2012/2013**

**UC COOPERATIVE EXTENSION**

| | | | | Annual Investment Costs | | | |
|---|---|---|---|---|---|---|---|
| Description | Price | Yrs Life | Salvage Value | Capital Recovery | Insurance | Taxes | Total |
| 350 HP Tractor #1 | 207,300 | 16 | 37,129.03 | 17,187.13 | 998.49 | 1,222.15 | 19,407.77 |
| 350 HP Tractor #2 | 207,300 | 8 | 72,345.40 | 24,106.32 | 1,142.35 | 1,398.23 | 26,646.90 |
| 90 HP Tractor #1 | 49,500 | 12 | 12,375.65 | 4,717.56 | 252.76 | 309.38 | 5,279.70 |
| 90 HP Tractor #2 | 49,500 | 12 | 12,375.65 | 4,717.56 | 252.76 | 309.38 | 5,279.70 |
| Disc - 21ft #1 | 19,950 | 9 | 3,986.42 | 2,410.34 | 97.78 | 119.68 | 2,627.80 |
| Disc - 21ft #2 | 19,950 | 9 | 3,986.42 | 2,410.34 | 97.78 | 119.68 | 2,627.80 |
| Subsoiler #1 | 12,500 | 6 | 3,603.47 | 1,909.95 | 65.78 | 80.52 | 2,056.25 |
| Subsoiler #2 | 12,500 | 6 | 3,603.47 | 1,909.95 | 65.78 | 80.52 | 2,056.25 |
| Land plane #1 | 22,000 | 9 | 4,396.06 | 2,658.01 | 107.83 | 131.98 | 2,897.82 |
| Land plane #2 | 22,000 | 19 | 1,295.67 | 1,740.00 | 95.16 | 116.48 | 1,951.64 |
| Roller #1 | 6,000 | 5 | 1,954.42 | 1,020.81 | 32.49 | 39.77 | 1,093.08 |
| Fertilizer spreader #1 | 3,100 | 3 | 1,289.27 | 723.04 | 17.93 | 21.95 | 762.92 |
| Fertilizer spreader #2 | 3,100 | 3 | 1,289.27 | 723.04 | 17.93 | 21.95 | 762.92 |
| Chisel plow | 13,500 | 16 | 1,147.04 | 1,174.10 | 59.83 | 73.24 | 1,307.17 |
| Lister | 8,300 | 25 | 234.86 | 569.14 | 34.86 | 42.67 | 646.68 |
| Bed Shaper | 7,500 | 7 | 1,913.44 | 1,047.63 | 38.45 | 47.07 | 1,133.15 |
| Boom-type sprayer | 4,600 | 12 | 637.13 | 471.09 | 21.39 | 26.19 | 518.67 |
| Trailer #1 | 2,500 | 4 | 981.51 | 472.37 | 14.22 | 17.41 | 504.00 |
| Trailer #2 | 2,500 | 4 | 981.51 | 472.37 | 14.22 | 17.41 | 504 |
| Drip Layer | 2,000 | 11 | 313.01 | 215.30 | 9.45 | 11.57 | 236.32 |
| Tape Lifter & Winder | 5,445 | 6 | 1,569.67 | 831.97 | 28.65 | 35.07 | 895.7 |
| Truck: pickup #1 | 24,500 | 4 | 11,935.11 | 4,089.81 | 148.84 | 182.18 | 4,420.82 |
| Truck: pickup #2 | 24,500 | 4 | 11,935.11 | 4,089.81 | 148.84 | 182.18 | 4,420.82 |
| Truck: pickup #3 | 24,500 | 4 | 11,935.11 | 4,089.81 | 148.84 | 182.18 | 4,420.82 |
| Truck: pickup #4 | 24,500 | 4 | 11,935.11 | 4,089.81 | 148.84 | 182.18 | 4,420.82 |
| **TOTAL** | **779,045** | | **215,149** | **87,847** | **4,061** | **4,971** | **96,880** |
| 60% of new cost* | 467,427 | | 129,089 | 52,708 | 2,437 | 2,983 | 58,128 |

*Used to reflect a mix of new and used equipment

| | | | | Annual Investment Costs | | | | |
|---|---|---|---|---|---|---|---|---|
| Description | Price | Yrs Life | Salvage Value | Capital Recovery | Insurance | Taxes | Repairs | Total |
| INVESTMENT | | | | | | | | |
| Building | 46,800 | 15 | 4,680 | 4,211.95 | 210.3 | 257.4 | 936 | 5,615.65 |
| Tools | 16,000 | 15 | 1,600 | 1,439.98 | 71.9 | 88 | 320 | 1,919.88 |
| Sprinkler System | 250,000 | 10 | 25,000 | 29,973.32 | 1,000.83 | 1,375.00 | 5,000 | 37,349.15 |
| Fuel Tank 550 gallons | 2,500 | 15 | 250 | 225 | 11.23 | 13.75 | 50 | 299.98 |
| **TOTAL INVESTMENT** | **315,300** | | **31,530** | **35,850** | **1,294** | **1,734** | **6,306** | **45,185** |

**ANNUAL BUSINESS OVERHEAD COSTS FOR 1 CELERY CROP**

| Description | Units/ Farm | Unit | Price/ Unit | Total Cost |
|---|---|---|---|---|
| Land Rent | 500 | acre | 1167 | 583,500 |
| Office Expenses | 500 | acre | 208 | 104,000 |
| Liability Insurance | 500 | acre | 0.99 | 495 |
| Farm Manager | 500 | acre | 83 | 41,500 |
| Drip Tapes | 500 | acre | 160 | 80,000 |

**Table 6. Hourly Costs for Equipment used in Celery Production in Ventura County, 2012/2013**

**UC COOPERATIVE EXTENSION**

| | | | COSTS PER HOUR | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | Cash Overhead | | | Operating | | | |
| Description | Celery Hours Used | Total Annual Hours Used | Capital Recovery | Insurance | Taxes | Lube & Repairs | Fuel | Total Oper. | Total Costs/Hr. |
| 350 HP Tractor #1 | 493 | 987 | 17.41 | 1.01 | 1.24 | 19.69 | 73.77 | 93.45 | 113.12 |
| 350 HP Tractor #2 | 988 | 1977 | 12.19 | 0.58 | 0.71 | 20.30 | 73.77 | 94.07 | 107.55 |
| 90 HP Tractor #1 | 486 | 972 | 4.85 | 0.26 | 0.32 | 5.79 | 14.14 | 19.94 | 25.37 |
| 90 HP Tractor #2 | 491 | 981 | 4.81 | 0.26 | 0.32 | 5.83 | 14.14 | 19.97 | 25.35 |
| Disc - 21ft #1 | 103 | 206 | 11.70 | 0.47 | 0.58 | 5.24 | 0 | 5.24 | 17.99 |
| Disc - 21ft #2 | 103 | 206 | 11.70 | 0.47 | 0.58 | 5.24 | 0 | 5.24 | 17.99 |
| Subsoiler #1 | 162 | 324 | 5.89 | 0.20 | 0.25 | 4.78 | 0 | 4.78 | 11.13 |
| Subsoiler #2 | 162 | 234 | 8.16 | 0.28 | 0.34 | 4.20 | 0 | 4.20 | 12.99 |
| Land plane #1 | 152 | 304 | 8.74 | 0.35 | 0.43 | 5.50 | 0 | 5.50 | 15.03 |
| Land plane #2 | 76 | 152 | 11.45 | 0.63 | 0.77 | 5.41 | 0 | 5.41 | 18.25 |
| Roller #1 | 184 | 368 | 2.77 | 0.09 | 0.11 | 1.14 | 0 | 1.14 | 4.11 |
| Fertilizer spreader #1 | 168 | 338 | 2.14 | 0.05 | 0.06 | 1.95 | 0 | 1.95 | 4.20 |
| Fertilizer spreader #2 | 168 | 338 | 2.14 | 0.05 | 0.06 | 1.95 | 0 | 1.95 | 4.20 |
| Chisel plow | 61 | 122 | 9.62 | 0.49 | 0.6 | 4.63 | 0 | 4.63 | 15.35 |
| Lister | 39 | 78 | 7.3 | 0.45 | 0.55 | 3.44 | 0 | 3.44 | 11.73 |
| Bed Shaper | 139 | 276 | 3.80 | 0.14 | 0.17 | 3.52 | 0 | 3.52 | 7.62 |
| Boom-type sprayer | 62 | 124 | 3.80 | 0.17 | 0.21 | 2.05 | 0 | 2.05 | 6.23 |
| Trailer #1 | 212 | 424 | 1.11 | 0.03 | 0.04 | 0.58 | 0 | 0.58 | 1.76 |
| Trailer #2 | 212 | 424 | 1.11 | 0.03 | 0.04 | 0.58 | 0 | 0.58 | 1.76 |
| Drip Layer | 87 | 174 | 1.24 | 0.05 | 0.07 | 0.70 | 0 | 0.70 | 2.05 |
| Tape Lifter & Winder | 147 | 296 | 2.81 | 0.10 | 0.12 | 1.75 | 0 | 1.75 | 4.78 |
| Truck: pickup #1 | 250 | 500 | 8.18 | 0.30 | 0.36 | 3.98 | 6.12 | 10.10 | 18.94 |
| Truck: pickup #2 | 250 | 500 | 8.18 | 0.30 | 0.36 | 3.98 | 6.12 | 10.10 | 18.94 |
| Truck: pickup #3 | 250 | 500 | 8.18 | 0.30 | 0.36 | 3.98 | 6.12 | 10.10 | 18.94 |
| Truck: pickup #4 | 250 | 500 | 8.18 | 0.30 | 0.36 | 3.98 | 6.12 | 10.10 | 18.94 |

**Table 7. Operations with Equipment for Celery Production in Ventura County, 2012/2013**

**UC COOPERATIVE EXTENSION**

| Operation | Operation Month | Tractor | Implement | Labor Type/ Material | Rates/ acre | Unit |
|---|---|---|---|---|---|---|
| Dsic | July | 350 HP Tractor #1 | Disc - 21ft #1 | Equip. Op. Labor | 0.12 | hour |
| Disc | July | 350 HP Tractor #1 | Disc - 21ft #1 | Equip. Op. Labor | 0.12 | hour |
| Disc | July | 350 HP Tractor #2 | Disc - 21ft #2 | Equip. Op. Labor | 0.12 | hour |
| Disc | July | 350 HP Tractor #2 | Disc - 21ft #2 | Equip. Op. Labor | 0.12 | hour |
| Subsoil | July | 350 HP Tractor #1 | Subsoiler #1 | Equip. Op. Labor | 0.39 | hour |
| Subsoil | July | 350 HP Tractor #2 | Subsoiler #2 | Equip. Op. Labor | 0.39 | hour |
| Roller | July | 350 HP Tractor #1 | Roller #1 | Equip. Op. Labor | 0.09 | hour |
| Roller | July | 350 HP Tractor #1 | Roller #1 | Equip. Op. Labor | 0.09 | hour |
| Roller | July | 350 HP Tractor #1 | Roller #1 | Equip. Op. Labor | 0.09 | hour |
| Roller | July | 350 HP Tractor #1 | Roller #1 | Equip. Op. Labor | 0.09 | hour |
| Roller | July | 350 HP Tractor #1 | Roller #1 | Equip. Op. Labor | 0.09 | hour |
| Land Level | July | 350 HP Tractor #2 | Land plane #1 | Equip. Op. Labor | 0.18 | hour |
| Land Level | July | 350 HP Tractor #2 | Land plane #1 | Equip. Op. Labor | 0.18 | hour |
| Land Level | July | 350 HP Tractor #2 | Land plane #2 | Equip. Op. Labor | 0.18 | hour |
| Broadcast Fertilizer | July | 350 HP Tractor #2 | Fertilizer spreader #1 | Equip. Op. Labor | 0.4 | hour |
| | | | | 16-20-0 (pre-plant) | 188 | lbs |
| Chisel Plow | July | 350 HP Tractor #2 | Chisel plow | Equip. Op. Labor | 0.15 | hour |
| List Beds | July | 350 HP Tractor #2 | Lister | Equip. Op. Labor | 0.09 | hour |
| Shape Beds | July | 350 HP Tractor #2 | Bed Shaper | Equip. Op. Labor | 0.33 | hour |
| Sprinkler Irrigation Setup (machine) | July | 90 HP Tractor #1 | Trailer #1 | Equip. Op. Labor | 0.51 | hour |
| Sprinkler Irrigation Setup (labor) | July | | | Irrigation Labor | 2 | hours |
| Transplant | Aug | | | Custom Transplanting | 1 | acre |
| | | | | Celery plant | 45,000 | plant |
| Herbicide Treatment | Aug | 90 HP Tractor #1 | Boom-type sprayer | Equip. Op. Labor | 0.15 | hour |
| | | | | Caparol | 0.25 | gal |
| Irrigation & System Inspection | Aug | | | Irrigation Labor | 0.5 | hour |
| | | | | District Water | 2 | ac-in |
| Irrigation & System Inspection | Aug | | | Irrigation Labor | 0.5 | hour |
| | | | | District Water | 2 | ac-in |
| Irrigation & System Inspection | Aug | | | Irrigation Labor | 0.5 | hour |
| | | | | District Water | 2 | ac-in |
| Sprinkler Irrigation Removal (machine) | Aug | 90 HP Tractor #2 | Trailer #2 | Equip. Op. Labor | 0.51 | hour |
| Sprinkle Irrigation Removal (labor) | Aug | | | Irrigation Labor | 2 | hours |
| Drip Irrigation Setup (machine) | Aug | 90 HP Tractor #2 | Drip Layer | Equip. Op. Labor | 0.21 | hour |
| Drip Irrigation Setup (labor) | Aug | | | Irrigation Labor | 0.25 | hour |
| Fertilization - sidedress | Aug | 90 HP Tractor #1 | Fertilizer spreader #2 | Equip. Op. Labor | 0.4 | hour |
| | | | | 15-15-15 | 186 | lbs |
| Fertilization | Sept | | | UAN32% | 5.40 | gal |
| Fertilization | Sept | | | UAN32% | 5.40 | gal |
| Fertilization | Sept | | | UAN32% | 5.40 | gal |
| Fertilization | Sept | | | UAN32% | 5.40 | gal |
| Fertilization | Oct | | | UAN32% | 5.40 | gal |
| Pest Control Advisor | Aug | | | PCA - celery | 1 | acre |
| Pesticide Treatment Appl. | Aug | | | Pesticide Application | 1 | acre |
| Pesticide Treatment Appl. | Sept | | | Pesticide Application | 1 | acre |
| Pesticide Treatment Appl. | Oct | | | Pesticide Application | 1 | acre |
| Weed Cultivation | Sept | | | Cust. Mech. Cultivation | 1 | acre |
| Fertilization | Sept | | | CAN17% | 8.89 | gal |
| Fertilization | Oct | | | CAN17% | 8.89 | gal |
| Fertilization | Oct | | | CAN17% | 8.89 | gal |
| Fertilization | Oct | | | CAN17% | 20.74 | gal |
| Fertilization | Oct | | | CAN17% | 20.74 | gal |
| Hand Weeding | Oct | | | Custom Hand Weeding | 1 | acre |
| Irrigation & System Inspection | Aug | | | Irrigation Labor | 0.5 | hour |
| | | | | District Water | 1.8 | ac-in |
| Irrigation & System Inspection | Sept | | | Irrigation Labor | 0.5 | hour |
| | | | | District Water | 1.8 | ac-in |
| Irrigation & System Inspection | Sept | | | Irrigation Labor | 0.5 | hour |
| | | | | District Water | 1.8 | ac-in |
| Irrigation & System Inspection | Sept | | | Irrigation Labor | 0.5 | hour |
| | | | | District Water | 1.8 | ac-in |
| Irrigation & System Inspection | Sept | | | Irrigation Labor | 0.5 | hour |
| | | | | District Water | 1.8 | ac-in |
| Irrigation & System Inspection | Sept | | | Irrigation Labor | 0.5 | hour |
| | | | | District Water | 1.8 | ac-in |
| Irrigation & System Inspection | Oct | | | Irrigation Labor | 0.5 | hour |
| | | | | District Water | 1.8 | ac-in |
| Irrigation & System Inspection | Oct | | | Irrigation Labor | 0.5 | hour |
| | | | | District Water | 1.8 | ac-in |
| Irrigation & System Inspection | Oct | | | Irrigation Labor | 0.5 | hour |
| | | | | District Water | 1.8 | ac-in |
| Irrigation & System Inspection | Oct | | | Irrigation Labor | 0.5 | hour |
| | | | | District Water | 1.8 | ac-in |
| Conditional Waiver Program | Aug | | | Conditional Waiver | 1 | acre |
| Microbial Water Test | July-Nov | | | Microbial Water Test | 1 | acre |
| Food Safety Program | Aug | | | Farm Audit | 1 | acre |
| Food Safety Program | Nov | | | Harvest Crew Audit | 1 | acre |
| Drip Irrigation Removal (machine) | Oct | 90 HP Tractor #2 | Tape Lifter & Winder | Equip. Op. Labor | 0.35 | hour |
| Drip Irrigation Removal (labor) | Oct | | | Irrigation Labor | 0.25 | hour |
| Pickup Truck | July-Nov | | Truck: pickup #1 | Equip. Op. Labor | 0.6 | hour |
| Pickup Truck | July-Nov | | Truck: pickup #2 | Equip. Op. Labor | 0.6 | hour |
| Pickup Truck | July-Nov | | Truck: pickup #3 | Equip. Op. Labor | 0.6 | hour |
| Pickup Truck | July-Nov | | Truck: pickup #4 | Equip. Op. Labor | 0.6 | hour |
| Harvest | Nov | | | Cut, Pack, Haul, Cool, Sell | 1,350 | crtn |
| | Nov | | | California Celery Research Program Assessment | 1350 | crtn |

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