

**University of California**  
Agriculture and Natural Resources

**COSTS AND PROFITABILITY ANALYSIS  
FOR BELL PEPPER PRODUCTION IN THE  
OXNARD PLAIN, VENTURA COUNTY, 2012-13**  
**Fresh Bell Pepper Production**



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**UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION  
COSTS AND PROFITABILITY ANALYSIS  
FOR BELL PEPPER PRODUCTION  
OXNARD PLAIN, VENTURA COUNTY  
Fresh Bell Pepper Production**

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

**TABLE OF CONTENTS**

ABSTRACT	1
INTRODUCTION	1
PRODUCTION PRACTICES	1
Land Preparation	1
Stand Establishment	1-2
Stakes and Twine	2
Fertilization	2
Plastic Mulch	2
Irrigation System and Applications	2-3
Plastic Mulch and Irrigation System Installation and Removal	3
Pest Management	3-4
Weed Management	4
Food Safety Program	4
Conditional Waiver Program	4-5
HARVESTING, MARKETING, and DISPOSAL OF CROP RESIDUES	5
INTEREST ON OPERATING CAPITAL	5
LABOR	6
EQUIPMENT OPERATING COSTS	6
CASH OVERHEAD COSTS	6
NON-CASH OVERHEAD COSTS	6-7
SUMMARY OF PRODUCTION COSTS	7
PROFITABILITY ANALYSIS	7-8
REFERENCE	9
TABLES	10-16

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 12.90% of bell pepper production in 2011 and ranks third in California. Production costs and profitability analysis has been the fundamental tool for growers and investors to do investment analyses and make decisions, conducting business transactions, and developing risk management strategies. In this study, we provided up to date benchmark costs and profitability indicators for evaluating the viability and sustainability of fresh bell pepper production. The study is based on assumptions of bell pepper production practices including fees for regulatory requirements in the county. Data regarding production practices, inputs and prices were collected from cooperating growers, the University of California Cooperative Extension (UCCE) farm advisors, agricultural institutions, and supply and equipment dealers. While this study makes every effort to model bell pepper 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

Bell Pepper is a top value commodity in Ventura County and in California. In 2011, Ventura County had approximately 2,630 acres, or 12.90% of California's total bell pepper acreage with crop value of \$41.7 million. In addition, bell pepper harvested for fresh market accounted for approximately 70% of total bell pepper value in California (California Pepper Commission, 2012). The growing period for bell pepper depends on 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 6 months. We based the study on a 100-acre fresh bell pepper operation on a 500-acre farm with 1.5 cropping (750 farmed 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 fresh market bell pepper production in Ventura County.

## PRODUCTION PRACTICES

The discussions in these sections include production practice: inputs, rates, operational frequency, and methods of operation. Input costs, contract fees and service expenses are based on 2012/2013 prices. We present this study on a per acre basis for one crop taking six 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 common 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, we assumed four discing, two subsoiling, three leveling, and then broadcast fertilizer and chisel plowing once before beds are listed and shaped. Herbicide is sprayed after bed-up. Depending on speed and width of implements (disc, subsoiler, roller, landplane, fertilizer spreader, chisel, lister, bed shaper, and boom-sprayer) used for land preparation; equipment field time will vary among growers. In this study, we developed equipment complement based on our interviews; we estimate that average tillage field time takes approximately 2.44 hours per acre per crop.

**Stand Establishment.** Growers develop transplanting schedule in order to let crops mature at different times for harvest. In this study, we estimated costs based on one acre transplanted once in April to be harvested in August. The commonly grown varieties in Ventura County are Bottom up, Moody, Baron, and Excalibur. All varieties have similar cultural, harvesting, and marketing practices. Transplanting

rates vary depending on spacing. In this study, we used an approximate rate of 18,700 transplants per acre on 60" beds with two rows of transplants 12" apart, and transplants 12-16" apart within rows. Custom hand transplanting costs about \$300 per acre, plants cost about \$0.024 each based on bulk purchase price in 2013. Growers also pay the seed costs for the transplant which is about \$625 per acre per crop.

**Stakes and Twine.** Stakes and twine are common for fresh market bell pepper production. The stakes and twine installation is done about 8-10 weeks after transplanting when the plants canopy have grown bigger. Stakes are about 3 feet tall and spaced at about 4 feet apart. Two lines of twine are interlaced around the stakes to train plants to an upright growth. In this study, we assume approximately 2,200 stakes per acre and about 3.5 rolls of twine per acre for two support lines.

We estimate stakes cost about \$722 per acre however; stakes are typically used more than once unless damaged by plant diseases. Stakes are used for 2 crops in this study; therefore the cost for one crop will be \$361 per acre. Twine is used for one crop season and cost about \$84 per acre (\$24 per roll of twine). Labor hours for stakes and twine installation is estimated to take about 62.6 hours per acre whereas labor for removal after harvest is estimated to take half the time at 31.30 hours per acre per crop.

**Fertilization.** Bell pepper fertilization in the Oxnard Plain includes approximately 275 pounds of nitrogen (N) per acre for fresh market. Fertilizer is applied to provide N at about 45 pounds at pre-plant and 230 pounds post-plant. An application of 280 pounds per acre of ammonium phosphate 16-20-0 (45 lbs. of 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, the tractor and fertilizer spreader takes about 20 minutes per acre per crop to broadcast ammonium phosphate. A few days after transplanting, potassium thiosulfate (KTS) at 5 gallons per acre is applied through the irrigation system. The N application is done weekly throughout the growing period beginning two or three days following the KTS to mature the bell peppers for harvest. The N sources include urea ammonium nitrate (UAN32%) at 3.34 gallons (11.82 lbs. of N) per application per acre applied through the irrigation system 11 times after transplanting for a total of 36.72 gallons (130 lbs. of N) per acre. Next, calcium ammonium nitrate (CAN17%) at 5.81 gallons (12.50 lbs. of N) per application per acre is applied through the irrigation system 8 times for a total of 46.52 gallons (100 lbs. of N) per acre. Before harvesting, KTS at 10 gallons per acre is applied to help mature the fresh bell peppers 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, UAN32% costs about \$4.50 per gallon, CAN17% costs about \$3.80 per gallon, and KTS costs about \$4.23 per gallon.

**Plastic Mulch.** Plastic mulch is used to modify soil temperatures, exclude light for weed control, conserve water, protect fruit from contact with soil moisture and pathogens, and repel insects (Schrader, 2000). Installation of plastic mulch is done simultaneously with the drip tape after bed up. Plastic mulch is purchased seasonally and cost about \$335 per acre for 60" beds.

**Irrigation System and Applications.** Bell pepper irrigation in Ventura County uses the drip system. The cost of developed wells and permanent irrigation system are part of the land rental. However, we assumed that growers purchase drip tapes. The drip tapes cost \$480 per acre based on 2 lines on 60" bed centers and can be used for approximately 2 crops. We allocated \$240 per acre for one fresh bell pepper crop.

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, irrigations are done 24 times for a total of 2 acre-feet of water for one crop of bell pepper produced for fresh market. Beginning right after transplanting, weekly irrigation of 1 acre-inch of water is applied throughout the growing period to mature bell peppers. Labor hours to switch water on and off, inspections, and maintenance is estimated to take about 30 minutes per irrigation for a total of 12 hours per acre per crop.

**Plastic Mulch and Drip Tape Installation and Retrieval.** Installation of plastic mulch and drip tape can be done separately or together depending on management preference. Based on interview data, plastic mulch and drip tape installation is done simultaneously with one pass. A farm worker anchors the drip tapes and plastic mulch, the mulch layer with drip attachment installs the plastic mulch and drip tapes, and then the drip tapes are cut and connected to the water supply line and the plastic mulch is cut and buried at the end of the row. Based on the equipment complement used (tractor and mulch and drip layer), we estimated about 1 hour for machine and manual labor to install plastic mulch and drip tapes in this study.

Plastic mulch and drip tapes are removed after harvesting. Upon completion of harvesting and before mowing plant residues, the plastic mulch and drip tapes are retrieved from the field. Plastic mulch is retrieved (tractor and mulch lifter and winder) and deposited at the end of the row for disposal and is estimated to take about 30 minutes per acre. Next, the surface drip tapes are retrieved using a drip tape retriever head placed at the end of the rows and is estimated to take about 30 minutes per acre.

**Pest Management.** There is a wide variety of pests that can affect bell pepper production. Major insect pests include flea beetles (*Epitrix and Phyllotreta spp.*), cut worms (*Agrotis and Peridroma spp.*), and wireworms (*Limoniusspp.*) during the early season. Aphid (*Myzus persicae*), beet armyworm (*Spodoptera exigua*), tomato fruit worm (*Heliothis zea*), pepper weevil (*Anthonomus eugenii*), psyllid (*Paratrioza cockerelli*), whitefly (*Trialeurodes vaporariorum*), and leafminer (*Liriomyza spp.*) can also cause serious damage during the season. Major diseases include phytophthora root rot (*P. capsici*), bacterial spot (*Xanthomonas campestris*), and powdery mildew (*Leveillula taurica*). Major viruses include cucumber mosaic virus (CMV), pepper mottle virus (PeMV), tobacco mosaic virus (TMV), and alfalfa mosaic virus (AMV). In addition, root knot nematodes (*Meloidogyne incognita* and *M. javanica*) can also be a serious issue.

A contract pest control advisor (PCA) monitors and scouts the fields throughout the crop season for insect pests, diseases, viruses, beneficial insects, and agronomic problems to determine if control measures are necessary. The consultation fee for bell pepper crop may vary by location; however, we used an average of \$44 per acre per crop 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. Pesticide applications can be a mixed spray of multiple materials or an individual material. 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 five to ten pesticide applications per acre per crop. Some of the materials used in the mixture would be Quadris Top (Azoxystrobin), Endura (Boscalid), and Dimilin 2L (Diflubenzuron) to control powdery mildew, target spot (*Corynespora cassiicola*), and weevil. In this study, the first pesticide application consist of 2 materials mixed together and the second pesticide application consist of 1 material and both are done in June one week apart about four weeks after

transplanting. In July, the third application consist of 2 materials, the fourth application consist of 3 materials, the fifth application consist of 2 materials, and the sixth application consist of 3 materials and all four applications are done one week apart; and the seventh application consist of 1 material and is done in August before harvesting. If necessary and depending on infestation level during the season, more applications may be applied for fresh bell pepper production.

We used custom pesticide treatment which cost approximately \$90 for 3 materials mixed application, \$65 for 2 materials mixed application, and \$45 for 1 material application in Ventura County. Written recommendations are required for commercially applied pesticides by licensed pest control advisors. Pest control materials and labor rates mentioned in this study are listed on the UCIPM website at <http://www.ipm.ucdavis.edu/PMG/selectnewpest.peppers.html>. For information on pesticide use permits, contact your County Agricultural Commissioner's Office.

**Weed Management.** Growers in Ventura County use selective herbicides to control a wide range of grass and broadleaf weeds. Hand weeding is also done during the growing season. In this study, herbicide is sprayed once after land preparation. One-pint (\$25.37 per pint) of Goaltender (Oxyfluorfen) herbicide is sprayed (using tractor and sprayer) and takes about 10 minutes per acre. Goaltender costs about \$203 per gallon. Custom hand weeding costs about \$80 per application and is done about 5 times (April to August) per acre throughout the growing period.

**Food Safety Program.** Many growers of vegetable crops like fresh bell pepper 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 12 water test per acre from land preparation to harvest for one crop of fresh bell pepper) 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 (\$0.55 per acre for 6 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. Therefore for the 6-month fresh bell pepper crop, the total costs of microbial water test will be \$408 for the entire farm (\$0.82 per acre for 6 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 oversees 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 bell pepper 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 \$11.50 per acre (for 6 months) to reflect cost for one crop in this study.

### **HARVESTING, MARKETING, and DISPOSAL OF CROP RESIDUES**

Bell Peppers produced for fresh market is hand-harvested and transported in bins to sheds for grading, packaging, and haul to sell. Weight of field pack carton can be 15-pound, 25-pound, 28-pound, and or other special package size depending on market and handler requirements. 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 carton weight of 25-pound. Average cost to pick, grade, pack, haul, and sell is estimated at about \$2.99 per carton. Based on our interview data, the first handler provides the packaging; therefore growers do not incur the cost.

**Yield and Price.** Based on our interview data, the average bell pepper yield for fresh market is about 1,800 cartons (25-pound cartons) per acre per crop and we estimated gross returns at \$11 per carton.

**California Pepper Commission Assessment.** The California Department of Food and Agriculture (CDFA) established an assessment rate of \$0.35 per ton to be levied on all pepper producers and remit to first handler. Therefore, in this study, we used an assessment fee of \$0.004 per carton (25-pound).

**Disposal of Crop Residues.** After harvesting, the stakes and twine is removed by hand before mowing (tractor and mower) the crop residues. After stakes and twine is removed, the plastic mulch and drip tapes are lifted from the ground. The drip tapes are stored for next use and the plastic mulch is disposed. Last, the field is disc (tractor and disc) twice to turn the soil. In this study, labor hour for disposal of crop residues (excluding plastic mulch, drip tapes, stakes, and twine removal) takes approximately 0.55 hour per acre.

**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 fresh bell pepper. An opportunity cost is the return foregone by choosing to produce fresh bell peppers 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 depends on the availability of well water and permanent irrigation systems. The landowner maintains the well and permanent irrigation systems. Land rent for row crops in Ventura County costs about \$2,800 per acre per year. We used \$1,400 per acre for 6 months to reflect rental for one bell pepper crop.

**Office Expense.** 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 \$250 per acre for 6 months to reflect the cost for one bell pepper 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 of the size specified in this study is about \$1,188 per year. Therefore, the cost to cover one crop (100-acre operation) is \$118.80 (\$1.19 per acre for 6 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.

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

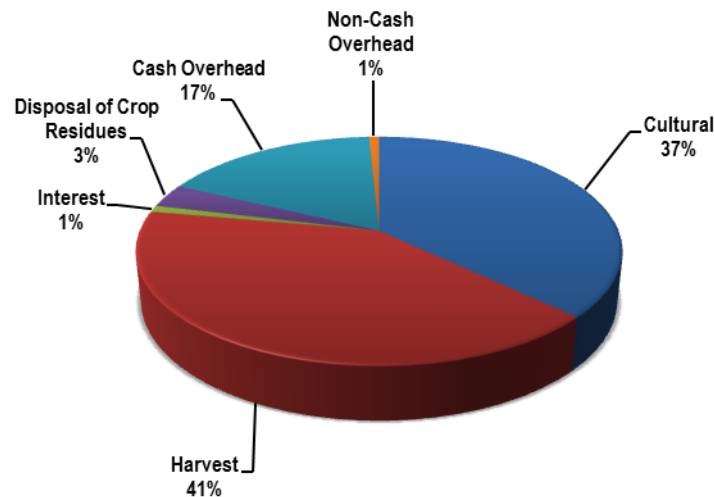


**Ownership Cost of Equipment and Farm Investments.** We used the capital recovery method to calculate ownership costs of farm equipment and investments. This method allows growers to calculate an annual amount of money to charge the enterprise so that the value of assets will be recovered within a specific 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 estimated the equipment complement value 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 fresh bell pepper is \$13,235 per acre. Figure 1 shows the breakdown costs. It includes 37% (\$4,903) accounted for by cultural practices (consisting of land preparation, transplanting, irrigation, fertilization, pest and weed control, equipment, and conditional waiver and food safety programs); 41% (\$5,400) by harvesting (picking, grading, packing, hauling, selling, and California Pepper Commission assessment); 1% (\$121) by interest on operating capital; 17% (\$2,265) by cash overhead (land rent, office expenses, drip tapes, stakes, insurances, and taxes, and investment repairs); 1% (\$104) by non-cash overhead (capital recovery of building, tools, fuel tank, and equipment); and 3% (\$442) by disposal of crop residues (stakes and twine removal, mowing, plastic mulch and drip tapes removal, and discing crop residues).

**Figure 1.** Proportion of Production Costs for Fresh Bell Pepper 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 of 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 1,800 cartons per acre is estimated at about \$7.30 per carton to cover all cash costs and \$7.35 per carton to cover total costs. On the other hand, the break-even yield for the average price of \$11 per carton (based on our interview) is about 1,194 cartons per acre for cash costs and 1,203 cartons per acre for total costs. Break-even prices are calculated as the cost of production divided by yield per acre and break-even yields are calculated as the production cost divided by price per ton.

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 100 cartons per acre for yield.

## REFERENCE

- American Society of Agricultural Engineers. (2003). 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/](http://www.nass.usda.gov/Statistics_by_State/California/Publications/)
- California Pepper Commission. (2013). *California Pepper Commission*. Retrieved from <http://www.calpeppers.com/>
- Farm Bureau. (2013). *Farm Bureau of Ventura County, Water Issues*. Retrieved from [http://www.farmbureauvc.com/water\\_quality.html](http://www.farmbureauvc.com/water_quality.html)
- Hartz, T., Cantwell, M., Lestrangle, M., Smith, R., Aguiar, J., & Daugovish, O. (2008). Bell Pepper Production in California. 7217, Retrieved from <http://anrcatalog.ucdavis.edu/pdf/7217.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](http://www.farmbureauvc.com/pdf_forms/newsletters/FB_News_July12.pdf)
- Schrader, W. L. (2000). *Plasticulture in California Vegetable Production*. Retrieved from <http://anrcatalog.ucdavis.edu/pdf/8016.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). Bell Pepper Production: Sample Costs and Profitability Analysis. 8026, Retrieved from <http://coststudies.ucdavis.edu/files/8026.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). *Pepper, UC IPM Pest Management Guidelines*. University of California, Davis, CA, Retrieved from <http://www.ipm.ucdavis.edu/PMG/selectnewpest.peppers.html>.
- 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](http://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_nus_m.htm)
- Ventura County Agricultural Commissioner. (2007-2012). *Ventura County Agricultural Commissioner Crop Reports*. Retrieved from <http://portal.countyofventura.org/portal/page/portal/AgComm/resources/cropreports>
- 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 Fresh Bell Peppers in Ventura County, 2012/2013

UC COOPERATIVE EXTENSION								
Operation	Operation Time (Hrs/A)	Cash and Labor Costs per Acre					Total Cost	Your Cost
		Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/ Rent		
<b>Land Prep:</b>								
Disc (4x)	0.41	7.54	33.32	11.12	0	0	51.98	
Subsoil (2x)	0.65	11.88	52.52	17.16	0	0	81.56	
Land Level (3x)	0.36	6.68	29.54	9.95	0	0	46.18	
Broadcast Fertilizer	0.34	6.18	27.32	8.01	137.2	0	178.71	
Chisel Plow	0.12	2.23	9.85	3.2	0	0	15.28	
List Beds	0.08	1.41	6.25	1.87	0	0	9.54	
Shape Beds	0.36	6.6	29.19	9.06	0	0	44.85	
Herbicide Treatment	0.12	2.26	10.01	2.94	25.37	0	40.58	
<b>TOTAL Land Prep COSTS</b>	<b>2.44</b>	<b>45</b>	<b>198</b>	<b>63</b>	<b>163</b>	<b>0</b>	<b>469</b>	
<b>Transplant:</b>								
Install Drip Tape & Mulch (machine)	0.40	7.43	6.3	3.02	335	0	351.75	
Install Drip Tape & Mulch (labor)	0.50	5.99	0	0	0	0	5.99	
Transplanting	0	0	0	0	1,073.80	300	1,373.80	
<b>TOTAL Transplant COSTS</b>	<b>0.90</b>	<b>13</b>	<b>6</b>	<b>3</b>	<b>1,409</b>	<b>300</b>	<b>1,732</b>	
<b>Growing:</b>								
Fertilizer - UAN32% (11x)	0	0	0	0	165.25	0	165.25	
Fertilizer - CAN17% (8x)	0	0	0	0	176.74	0	176.74	
Fertilizer - KTS (2x)	0	0	0	0	63.45	0	63.45	
Stakes & Twine Installation	62.6	749.95	0	0	84	0	833.95	
Hand Weeding (5x)	0	0	0	0	0	400	400	
Irrigation & System Inspection (24x)	12	143.76	0	0	340.08	0	483.84	
Pest Control Advisor	0	0	0	0	0	44	44	
Pest Management (7x)	0	0	0	0	0	465	465	
Conditional Waiver Program	0	0	0	0	0	11.5	11.5	
Food Safety Program	0	0	0	0	0	1.33	1.33	
Microbial Water Test	0	0	0	0	0	0.82	0.82	
Truck Use	2	36.72	12.24	7.77	0	0	56.73	
<b>TOTAL Growing COSTS</b>	<b>76.6</b>	<b>930</b>	<b>12</b>	<b>8</b>	<b>830</b>	<b>923</b>	<b>2,703</b>	
<b>Harvest and Marketing:</b>								
Pick, Grade, Pack, Haul, Sell	0	0	0	0	0	5,392.13	5,392.13	
California Pepper Commission Assessment	0	0	0	0	0	7.88	7.88	
<b>TOTAL Harvest and Marketing COSTS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5,400</b>	<b>5,400</b>	
<b>Disposal of Crop Residues:</b>								
Stakes & Twine Removal	31.3	374.97	0	0	0	0	374.97	
Mow Plant	0.34	6.31	5.35	3.05	0	0	14.7	
Remove Drip & Mulch (labor)	0.50	5.99	0	0	0	0	5.99	
Remove Drip Tape (machine)	0.18	3.38	2.87	1.26	0	0	7.51	
Remove Plastic Mulch (machine)	0.29	5.42	4.59	2.46	0	0	12.46	
Disc (2x)	0.21	3.77	16.66	5.56	0	0	25.99	
<b>TOTAL Disposal of Crop Residues COSTS</b>	<b>32.82</b>	<b>400</b>	<b>29</b>	<b>12</b>	<b>0</b>	<b>0</b>	<b>442</b>	
Interest on Operating Capital @ 5.75%							121.24	
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>112.76</b>	<b>1,388</b>	<b>246</b>	<b>86</b>	<b>2,401</b>	<b>6,623</b>	<b>10,866</b>	
<b>CASH OVERHEAD:</b>								
Land Rent							1,400	
Office Expenses							250	
Liability Insurance							1.19	
Drip Tapes							240	
Stakes							361	
Property Taxes							6.27	
Property Insurance							5.12	
Investment Repairs							1.74	
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>							<b>2,265</b>	
<b>TOTAL CASH COSTS/ACRE</b>							<b>13,131</b>	
<b>NON-CASH OVERHEAD:</b>								
		Per producing Annual Cost						
		Acre	Capital Recovery					
Building		62.4	5.61				5.61	
Tools		21.33	1.92				1.92	
Fuel Tank 550 gallons		3.33	0.30				0.30	
Equipment		935.07	95.85				95.85	
<b>TOTAL NON-CASH OVERHEAD COSTS</b>		<b>1,022</b>	<b>104</b>				<b>104</b>	
<b>TOTAL COSTS/ACRE</b>							<b>13,235</b>	

Table 2. Costs and Returns per Acre to Produce Fresh Bell Peppers in Ventura County, 2012/2013

UC COOPERATIVE EXTENSION				
	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre
<b>GROSS RETURNS</b>				
Fresh Bell Pepper	1,800	crtn	\$11	\$19,800
<b>TOTAL GROSS RETURNS</b>	<b>1,800</b>	<b>crtn</b>		<b>\$19,800</b>
<b>OPERATING COSTS</b>				
<b>Custom:</b>				<b>1,223</b>
Custom Transplanting	1	acre	300	300
Custom Hand Weeding	5	acre	80	400
Pest Control Advisor	1	acre	44	44
2 Material - Pesticide App	3	acre	65	195
1 Material - Pesticide App	2	acre	45	90
3 Material - Pesticide App	2	acre	90	180
Conditional Ag Waiver	1	acre	11.5	11.5
Food Safety - Farm	1	acre	0.55	0.55
Food Safety - Harvest	1	acre	0.78	0.78
Microbial Water Test	1	acre	0.82	0.82
<b>Fertilizer:</b>				<b>543</b>
16-20-0	280	lb	0.49	137.2
UAN32%	36.72	gal	4.5	165.25
CAN17%	46.512	gal	3.8	176.74
KTS	15	gal	4.23	63.45
<b>Water:</b>				<b>340</b>
District Water	24	ac-in	14.17	340.08
<b>Harvest:</b>				<b>5,400</b>
Pick, Grade, Pack, Haul, Sell	1800	crtn	2.996	5,392.13
California Pepper Commission Assessment	1800	crtn	0.004	7.88
<b>Planting Material:</b>				<b>1,493</b>
Plastic Mulch	1	acre	335	335
Plant	18700	plant	0.02	448.8
Seed	1	acre	625	625
Twine	3.5	roll	24	84
<b>Herbicide:</b>				<b>25</b>
Goaltender	0.125	gal	203	25.37
<b>Labor:</b>				<b>1,388</b>
Equipment Operator Labor	7.05	hrs	15.3	107.83
Irrigation Labor	12.5	hrs	11.98	149.75
Manual Labor	94.4	hrs	11.98	1,130.91
<b>Machinery:</b>				<b>332</b>
Fuel-Gas	3	gal	4.08	12.24
Fuel-Diesel	60.87	gal	3.84	233.75
Lube				36.9
Machinery Repair				49.54
Interest on Operating Capital (5.75%)				121.24
<b>TOTAL OPERATING COSTS/ACRE</b>				<b>10,866</b>
<b>TOTAL OPERATING COSTS/CRTN</b>				<b>6.04</b>
<b>NET RETURNS ABOVE OPERATING COSTS</b>				<b>8,934</b>
<b>CASH OVERHEAD COSTS</b>				
Land Rent				1,400
Office Expenses				250
Liability Insurance				1,188
Drip Tapes				240
Stakes				361
Property Taxes				6.27
Property Insurance				5.12
Investment Repairs				1.74
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>				<b>2,265</b>
<b>TOTAL CASH OVERHEAD COSTS/CRTN</b>				<b>1.26</b>
<b>TOTAL CASH COSTS/ACRE</b>				<b>13,131</b>
<b>TOTAL CASH COSTS/CRTN</b>				<b>7.30</b>
<b>NET RETURNS ABOVE CASH COSTS</b>				<b>6,669</b>
<b>NON-CASH OVERHEAD COSTS (Capital Recovery)</b>				
Building				5.61
Tools				1.92
Fuel Tank 550 gallons				0.30
Equipment				95.85
<b>TOTAL NON-CASH OVERHEAD COSTS/ACRE</b>				<b>104</b>
<b>TOTAL NON-CASH OVERHEAD COSTS/CRTN</b>				<b>0.06</b>
<b>TOTAL COST/ACRE</b>				<b>13,235</b>
<b>TOTAL COST/ CRTN</b>				<b>7.35</b>
<b>NET RETURNS ABOVE TOTAL COST</b>				<b>6,565</b>

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

UC COOPERATIVE EXTENSION							
Beginning 03-12	MAR	APR	MAY	JUN	JUL	AUG	TOTAL
Ending 10-12	12	12	12	12	12	12	
<b>Land Prep:</b>							
Disc (4x)	51.98						51.98
Subsoil (2x)	81.56						81.56
Land Level (3x)	46.18						46.18
Broadcast Fertilizer	178.71						178.71
Chisel Plow	15.28						15.28
List Beds	9.54						9.54
Shape Beds	44.85						44.85
Herbicide Treatment	40.58						40.58
<b>TOTAL Land Prep COSTS</b>	<b>469</b>						<b>469</b>
<b>Transplant:</b>							
Install Drip Tape & Mulch (machine)		351.72					351.75
Install Drip Tape & Mulch (labor)		5.99					5.99
Transplanting		1,373.80					1,373.80
<b>TOTAL Transplant COSTS</b>	<b>0</b>	<b>1,732</b>					<b>1,732</b>
<b>Growing:</b>							
Fertilizer - UAN32% (11x)		25.42	63.56	76.27			165.25
Fertilizer - CAN17% (8x)					88.37	88.37	176.74
Fertilizer - KTS (2x)		42.3				21.15	63.45
Stakes & Twine Installation				833.95			833.95
Hand Weeding (5x)		80	80	80	80	80	400
Irrigation & System Inspection (24x)		40.32	100.80	100.80	120.96	120.96	483.84
Pest Control Advisor		44					44
Pest Management (7x)			65	110	155	135	465
Conditional Waiver Program						11.5	11.5
Food Safety Program		0.55				0.78	1.33
Microbial Water Test						0.82	0.82
Truck Use	9.46	9.46	9.46	9.46	9.46	9.46	56.73
<b>TOTAL Growing COSTS</b>	<b>9</b>	<b>242</b>	<b>319</b>	<b>1,210</b>	<b>454</b>	<b>468</b>	<b>2,703</b>
<b>Harvest and Marketing:</b>							
Pick, Pack, Grade, Haul, Sell						5392.13	5,392.13
California Pepper Commission Assessment						7.88	7.88
<b>TOTAL Harvest and Marketing COSTS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5,400</b>	<b>5,400</b>
<b>Disposal of Crop Residues:</b>							
Stakes & Twine Removal						374.97	374.97
Mow Plant						14.7	14.7
Remove Drip & Mulch (labor)						5.99	5.99
Remove Drip Tape (machine)						7.51	7.51
Remove Plastic Mulch (machine)						12.46	12.46
Disc (2x)						25.99	25.99
<b>TOTAL Disposal of Crop Residues COSTS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>442</b>	<b>442</b>
Interest on Operating Capital (5.75%)	5.40	22.27	3.60	13.66	5.12	71.20	121.24
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>484</b>	<b>1,996</b>	<b>322</b>	<b>1,224</b>	<b>459</b>	<b>6,381</b>	<b>10,866</b>
<b>CASH OVERHEAD</b>							
Land Rent	233.33	233.33	233.33	233.33	233.33	233.33	1,400
Office Expenses	41.67	41.67	41.67	41.67	41.67	41.67	250
Liability Insurance	0.20	0.20	0.20	0.20	0.20	0.20	1.19
Drip Tapes		240					240
Stakes				361			361
Property Taxes					6.27		6.27
Property Insurance					5.12		5.12
Investment Repairs	0.29	0.29	0.29	0.29	0.29	0.29	1.74
<b>TOTAL CASH OVERHEAD COSTS</b>	<b>275</b>	<b>515</b>	<b>275</b>	<b>636</b>	<b>287</b>	<b>275</b>	<b>2,265</b>
<b>TOTAL CASH COSTS/ACRE</b>	<b>759</b>	<b>2,511</b>	<b>598</b>	<b>1,861</b>	<b>746</b>	<b>6,656</b>	<b>13,131</b>

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

UC COOPERATIVE EXTENSION							
	YIELD (25-pound crtns/acre)						
	1,500	1,600	1,700	1,800	1,900	2,000	2,100
<b>OPERATING COSTS:</b>							
Land Prep	469	469	469	469	469	469	469
Transplant	1,714	1,732	1,732	1,732	1,732	1,732	1,732
Growing	2,703	2,703	2,703	2,703	2,703	2,703	2,703
Harvest	4,500	4,800	5,100	5,400	5,700	6,000	6,300
Disposal of Crop Residues	442	442	442	442	442	442	442
Interest on operating capital @ 5.75%	107.59	112.23	116.73	121.24	125.75	130.25	134.76
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>9,934</b>	<b>10,257</b>	<b>10,561</b>	<b>10,866</b>	<b>11,170</b>	<b>11,475</b>	<b>11,779</b>
Total Operating Costs/crtn	6.62	6.41	6.21	6.04	5.88	5.74	5.61
<b>CASH OVERHEAD COSTS/ACRE</b>	<b>2,265</b>	<b>2,265</b>	<b>2,265</b>	<b>2,265</b>	<b>2,265</b>	<b>2,265</b>	<b>2,265</b>
<b>TOTAL CASH COSTS/ACRE</b>	<b>12,199</b>	<b>12,522</b>	<b>12,827</b>	<b>13,131</b>	<b>13,436</b>	<b>13,740</b>	<b>14,045</b>
Total Cash Costs/crtn	8.13	7.83	7.55	7.30	7.07	6.87	6.69
<b>NON-CASH OVERHEAD COSTS/ACRE</b>	<b>104</b>	<b>104</b>	<b>104</b>	<b>104</b>	<b>104</b>	<b>104</b>	<b>104</b>
<b>TOTAL COSTS/ACRE</b>	<b>12,303</b>	<b>12,626</b>	<b>12,930</b>	<b>13,235</b>	<b>13,539</b>	<b>13,844</b>	<b>14,148</b>
Total Costs/crtn	8.20	7.89	7.61	7.35	7.13	6.92	6.74

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

Fresh Bell Pepper	PRICE(\$/crtn)	YIELD(25-pound crtn/acre)					
		1,500	1,600	1,700	1,800	1,900	2,000
9.50	4,316	4,943	5,589	6,234	6,880	7,525	8,171
10.00	5,066	5,743	6,439	7,134	7,830	8,525	9,221
10.50	5,816	6,543	7,289	8,034	8,780	9,525	10,271
11.00	6,566	7,343	8,139	<b>8,934</b>	9,730	10,525	11,321
11.50	7,316	8,143	8,989	9,834	10,680	11,525	12,371
12.50	8,816	9,743	10,689	11,634	12,580	13,525	14,471
13.00	9,566	10,543	11,539	12,534	13,530	14,525	15,521

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

Fresh Bell Pepper	PRICE(\$/crtn)	YIELD(25-pound crtn/acre)					
		1,500	1,600	1,700	1,800	1,900	2,000
9.50	2,051	2,678	3,323	3,969	4,614	5,260	5,905
10.00	2,801	3,478	4,173	4,869	5,564	6,260	6,955
10.50	3,551	4,278	5,023	5,769	6,514	7,260	8,005
11.00	4,301	5,078	5,873	<b>6,669</b>	7,464	8,260	9,055
11.50	5,051	5,878	6,723	7,569	8,414	9,260	10,105
12.50	6,551	7,478	8,423	9,369	10,314	11,260	12,205
13.00	7,301	8,278	9,273	10,269	11,264	12,260	13,255

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

Fresh Bell Pepper	PRICE(\$/crtn)	YIELD(25-pound crtn/acre)					
		1,500	1,600	1,700	1,800	1,900	2,000
9.50	1,947	2,574	3,220	3,865	4,511	5,156	5,802
10.00	2,697	3,374	4,070	4,765	5,461	6,156	6,852
10.50	3,447	4,174	4,920	5,665	6,411	7,156	7,902
11.00	4,197	4,974	5,770	<b>6,565</b>	7,361	8,156	8,952
11.50	4,947	5,774	6,620	7,465	8,311	9,156	10,002
12.50	6,447	7,374	8,320	9,265	10,211	11,156	12,102
13.00	7,197	8,174	9,170	10,165	11,161	12,156	13,152

**Table 5. Farm Investment for Producing Fresh Bell Peppers: Values and Annual Costs based on 750-Farmed Acres in Ventura County, 2012/2013**

**UC COOPERATIVE EXTENSION**

Yr Description	Price	Yrs Life	Salvage Value	Capital Recovery	Annual Investment Costs		Total
					Insurance	Taxes	
350 HP Tractor #1	207,300	14	43,867	18,331	1,026	1,256	20,613
350 HP Tractor #2	207,300	15	40,358	17,730	1,012	1,238	19,980
90 HP Tractor	49,500	11	13,452	4,922	257	315	5,494
Disc #1	19,950	8	4,504	2,580	100	122	2,802
Disc #2	19,950	8	4,504	2,580	100	122	2,802
Subsoiler #1	12,500	8	2,822	1,616	63	77	1,756
Subsoiler #2	12,500	8	2,822	1,616	63	77	1,756
Land plane	22,000	11	3,443	2,368	104	127	2,600
Fertilizer spreader	3,100	4	1,141	603	17	21	642
Chisel plow	13,500	22	551	988	57	70	1,115
Lister	8,300	20	433	639	36	44	718
Bed Shaper	7,500	7	1,913	1,048	38	47	1,133
Herbicide Sprayer	4,600	16	391	400	20	25	445
Mower	4,000	7	1,021	559	21	25	604
Mulcher & Drip Layer	3,300	6	951	504	17	21	543
Drip Tape Winder	2,000	14	217	188	9	11	208
Mulcher Lifter & Winder Toolbar	6,000	9	1,199	725	29	36	790
Truck: pickup #1	24,500	5	10,980	3,623	145	177	3,945
Truck: pickup #2	24,500	5	10,980	3,623	145	177	3,945
Truck: pickup #3	24,500	5	10,980	3,623	145	177	3,945
Truck: pickup #4	24,500	5	10,980	3,623	145	177	3,945
<b>TOTAL</b>	<b>701,300</b>		<b>167,511</b>	<b>71,887</b>	<b>3,549</b>	<b>4,344</b>	<b>79,780</b>
60% of new cost*	420,780		100,507	43,132	2,129	2,606	47,868

\*Used to reflect a mix of new and used equipment

Description	Price	Yrs Life	Salvage Value	Capital Recovery	Annual Investment Costs			Total
					Insurance	Taxes	Repairs	
<b>INVESTMENT</b>								
Building	46,800	15	4,680	4,212	210	257	936	5,616
Tools	16,000	15	1,600	1,440	72	88	320	1,920
Fuel Tank 550 gallons	2,500	15	250	225	11	14	50	300
<b>TOTAL INVESTMENT</b>	<b>65,300</b>		<b>6,530</b>	<b>5,877</b>	<b>293</b>	<b>359</b>	<b>1,306</b>	<b>7,836</b>

**ANNUAL BUSINESS OVERHEAD COSTS FOR 1 FRESH BELL PEPPER CROP**

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Land Rent	100	acre	1400	140,000
Office Expenses	100	acre	250	25,000
Liability Insurance	100	acre	1.19	119
Drip Tapes	100	acre	240	24,000
Stakes	100	acre	361	36,100



**Table 6. Hourly Costs for Equipment used to Produce Fresh Bell Peppers in Ventura County, 2012/2013**

UC COOPERATIVE EXTENSION									
Yr Description	Fresh Hours Used	Total Hours Used	COSTS PER HOUR					Total Oper.	Total Costs/Hr.
			Cash Overhead			Operating			
			Capital Recovery	Insurance	Taxes	Lube & Repairs	Fuel		
350 HP Tractor #1	149	1118	16.4	0.92	1.12	19.76	73.77	93.52	111.96
350 HP Tractor #2	142	1065	16.65	0.95	1.16	19.86	73.77	93.63	112.39
90 HP Tractor	135	1013	4.86	0.25	0.31	5.66	14.14	19.8	25.22
Disc #1	31	233	11.07	0.43	0.52	5.29	0	5.29	17.31
Disc #2	31	233	11.07	0.43	0.52	5.29	0	5.29	17.31
Subsoiler #1	32	240	6.73	0.26	0.32	4.72	0	4.72	12.03
Subsoiler #2	32	240	6.73	0.26	0.32	4.72	0	4.72	12.03
Land plane	36	270	8.77	0.38	0.47	5.6	0	5.6	15.23
Fertilizer spreader	34	255	2.37	0.07	0.08	1.94	0	1.94	4.46
Chisel plow	12	90	10.97	0.64	0.78	4.54	0	4.54	16.93
Lister	8	60	10.64	0.59	0.73	2.42	0	2.42	14.38
Bed Shaper	36	270	3.88	0.14	0.17	3.45	0	3.45	7.65
Herbicide Sprayer	12	90	4.45	0.23	0.28	2	0	2	6.95
Mulcher & Drip Layer	40	300	1.68	0.06	0.07	1.22	0	1.22	3.03
Mower	34	255	2.19	0.08	0.1	2.65	0	2.65	5.02
Drip Tape Winder	18	135	1.39	0.07	0.08	0.64	0	0.64	2.18
Mulch Lifter & Winder Toolbar	29	218	3.33	0.13	0.17	2.11	0	2.11	5.74
Truck: pickup #1	50	375	9.66	0.39	0.47	3.89	6.12	10.01	20.53
Truck: pickup #2	50	375	9.66	0.39	0.47	3.89	6.12	10.01	20.53
Truck: pickup #3	50	375	9.66	0.39	0.47	3.89	6.12	10.01	20.53
Truck: pickup #4	50	375	9.66	0.39	0.47	3.89	6.12	10.01	20.53

Table 7. Operations with Equipment to Produce Fresh Bell Peppers in Ventura County, 2012/2013

UC COOPERATIVE EXTENSION						
Operation	Operation		Labor Type/ Implement	Rate/ Material	acre	Unit
	Month	Tractor				
Disc	Mar	350 HP Tractor #1	Disc #1	Equip. Op. Labor		0.12 hour
Disc	Mar	350 HP Tractor #1	Disc #1	Equip. Op. Labor		0.12 hour
Disc	Mar	350 HP Tractor #2	Disc #2	Equip. Op. Labor		0.12 hour
Disc	Mar	350 HP Tractor #2	Disc #2	Equip. Op. Labor		0.12 hour
Subsoil	Mar	350 HP Tractor #1	Subsoiler #1	Equip. Op. Labor		0.39 hour
Subsoil	Mar	350 HP Tractor #2	Subsoiler #2	Equip. Op. Labor		0.39 hour
Land Level	Mar	350 HP Tractor #1	Land plane	Equip. Op. Labor		0.15 hour
Land Level	Mar	350 HP Tractor #1	Land plane	Equip. Op. Labor		0.15 hour
Land Level	Mar	350 HP Tractor #1	Land plane	Equip. Op. Labor		0.15 hour
Chisel Plow	Mar	350 HP Tractor #2	Chisel plow	Equip. Op. Labor		0.15 hour
List Beds	Mar	350 HP Tractor #2	Lister	Equip. Op. Labor		0.09 hour
Broadcast Fertilizer	Mar	350 HP Tractor #2	Fertilizer spreader	Equip. Op. Labor		0.4 hour
				16-20-0		280 lb
Shape Beds	Mar	350 HP Tractor #1	Bed Shaper	Equip. Op. Labor		0.43 hour
Herbicide Treatment	Mar	350 HP Tractor #2	Herbicide Sprayer	Equip. Op. Labor		0.15 hour
				Goatender		0.125 gal
Install Drip Tape & Mulch (machine)	Mar	90 HP Tractor	Mulcher & Drip Layer	Equip. Op. Labor		0.49 hour
				Plastic mulch		1 acre
Install Drip Tape & Mulch (labor)	Mar			Irrigation Labor		0.5 hour
Transplant	Apr			Custom Bell Pepper Transplanting		1 acre
				Plant		18,700 plant
				Seed		1 acre
Fertilization - UAN32%	Apr			UAN32%		5.65 gal
Fertilization - UAN32%	May			UAN32%		14.12 gal
Fertilization - UAN32%	June			UAN32%		16.95 gal
Stakes & Twine Installation	June			Manual Labor		62.6 hours
				Twine		3.5 roll
Fertilization - CAN17%	July			CAN17%		23.26 gal
Fertilization - CAN17%	Aug			CAN17%		23.26 gal
Fertilization - KTS	Apr			KTS		10 gal
Fertilization - KTS	Aug			KTS		5 gal
Hand Weeding	May			Custom Hand Weeding		1 acre
Hand Weeding	June			Custom Hand Weeding		1 acre
Hand Weeding	July			Custom Hand Weeding		1 acre
Hand Weeding	Aug			Custom Hand Weeding		1 acre
Hand Weeding	Apr			Custom Hand Weeding		1 acre
Irrigation & System Inspections	Apr			Irrigation Labor		1 hour
				District Water		2 ac-in
Irrigation & System Inspections	May			Irrigation Labor		2.5 hours
				District Water		5 ac-in
Irrigation & System Inspections	June			Irrigation Labor		2.5 hours
				District Water		5 ac-in
Irrigation & System Inspections	July			Irrigation Labor		3 hours
				District Water		6 ac-in
Irrigation & System Inspections	Aug			Irrigation Labor		3 hours
				District Water		6 ac-in
Pest Control Advisor	Apr			PCA - Bell Pepper		1 acre
Pest Management	June			2 material pesticide app		1 acre
Pest Management	June			1 material pesticide app		1 acre
Pest Management	July			2 material pesticide app		1 acre
Pest Management	July			3 material pesticide app		1 acre
Pest Management	July			2 material pesticide app		1 acre
Pest Management	July			3 material pesticide app		1 acre
Pest Management	Aug			1 material pesticide app		1 acre
Conditional Ag Waiver Program	Aug			Conditional Ag Waiver		1 acre
Food Safety Program	Apr			Food Safety - Farm		1 acre
Food Safety Program	Aug			Food Safety - Harvest		1 acre
Microbial Water Test	Mar - Aug			Microbial Water Test		1 acre
Truck Use	Mar - Aug		Truck: pickup #1	Equip. Op. Labor		0.6 hour
Truck Use	Mar - Aug		Truck: pickup #2	Equip. Op. Labor		0.6 hour
Truck Use	Mar - Aug		Truck: pickup #3	Equip. Op. Labor		0.6 hour
Truck Use	Mar - Aug		Truck: pickup #4	Equip. Op. Labor		0.6 hour
Harvest	Aug			Pick, Grade, Pack, Haul, Sell		1,800 crtn
	Aug			California Pepper Commission Assessment		1,800 crtn
Stakes & Twine Removal	Aug			Manual Labor		31.3 hours
Mow Plants	Aug	90 HP Tractor	Mower	Equip. Op. Labor		0.41 hour
Remove Drip & Mulch (Labor)	Aug			Manual Labor		0.5 hour
Remove Drip Tape (Machine)	Aug	90 HP Tractor	Drip Tape Winder	Equip. Op. Labor		0.22 hour
Remove Plastic Mulch (Machine)	Aug	90 HP Tractor	Mulcher Lifter & Winder Toolbar	Equip. Op. Labor		0.35 hour
Discing Crop Residues	Aug	350 HP Tractor #1	Disc #1	Equip. Op. Labor		0.12 hour
Discing Crop Residues	Aug	350 HP Tractor #2	Disc #2	Equip. Op. Labor		0.12 hour

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