

**University of California**  
Agriculture and Natural Resources

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



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**UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION  
COSTS AND PROFITABILITY ANALYSIS  
FOR CABBAGE 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 28.62% of cabbage production in 2011 and ranks second in California. Production costs and profitability evaluations 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 cabbage production. This study is based on assumptions of cabbage 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 cabbage 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 the model as a guide to estimate costs and evaluate their profitability.

## INTRODUCTION

Cabbage is a multi-million dollar commodity in California. In 2011, Ventura County had approximately 3,230 acres, or 28.62% of California's total cabbage acreage with crop value of \$19.4 million. The growing period for cabbage depends on the time of transplanting. We based this study on one warm season crop in the Oxnard Plain, Ventura County with approximate growing period from land preparation to harvesting being four months. We based the study on 500 acres operation with 2.5 cropping (1,250 acres farmed per year). This study serves as a guideline for production practices and costs of production and profitability to be used by growers, prospective growers, agricultural lenders, educators and all who are involved or have interest with cabbage 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 service expenses are based on 2012/2013 prices. We present this study on a per acre basis for one warm crop taking four 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 leaving 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, five rolling, three leveling, and then broadcast fertilizing 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. Based on the equipment complement we developed from our growers' interview, we estimate average tillage field time takes approximately 2.83 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 twice in October. The commonly grown cabbage varieties in Ventura County for green hybrids include Supreme Vantage, Headstart, Pacifica, Discovery, Grenadier, Charmant, and Grandslam; and red hybrids include Rubyball, Primero, Sombrero, and Red Rookie. All varieties have similar cultural, harvesting, and marketing requirements.

Transplanting rates vary depending on spacing. In this study, we used an approximate rate of 28,500 transplants per acre on 40" beds with two rows of transplants 14" apart, and transplants 12"-14" apart within rows. Custom transplanting costs about \$335 per acre and plants cost about \$0.012 each based on bulk purchase price in 2013.

**Fertilization.** Cabbage fertilization in the Oxnard Plain includes approximately 250 pounds of nitrogen (N) per acre. Fertilizer is applied to provide N at about 100 pounds at pre-plant and 150 pounds post-plant. An application of 625 pounds per acre of ammonium phosphate 16-20-0 (100 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. Two to three weeks after transplanting, CAN17% at 34.88 gallons (75 lbs. of N) per acre is applied through the irrigation system. Then a second application of CAN17% at 34.88 gallons (75 lbs. of N) per acre is applied six to seven weeks after the first application through the irrigation system to help mature cabbages 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 and CAN17% costs about \$3.80 per gallon.

**Irrigation System.** Cabbage 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 \$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 cabbage crop.

Drip tapes are installed after bed preparation. 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 cabbage production, the drip tapes are removed before final harvest (the second harvest in this study). 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).

**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, irrigations are done 5 times for a total of 1 acre-foot of water for one cabbage crop. Five acre-inches (3ac-in early-August and 2ac-in late-August) of water is applied to set the plants and seven acre-inches (2 ac-in early-September, 3ac-in later-September, and 2ac-in October) is applied in the remaining growing periods through harvest. Labor hours to switch the water on and off, inspections, and maintenance is estimated to take about 30 minutes per irrigation for a total of 2.5 hours per acre per crop.

**Pest Management.** The most harmful insect pests include crickets, cutworms, flea beetles, saltmarsh caterpillars, aphids, silverleaf whitefly's, beet armyworms, diamondback moths, cabbage loopers, and Bagra bug (new stink bug). The Bagra bug is a new invasive insect pest that has infested Brassica crops throughout the southwestern desert growing areas of Arizona and California and has moved to the southern coastal area of Ventura County. Based on known research studies done by the University of California Cooperative Extension (UCCE) Desert Research and Extension and the Yuma Agriculture centers, pyrethroid insecticides and other conventional insecticides provide good control (Natwick, Palumbo, Henderson, Lopez, & Dara, 2010). Cabbage is not marketable once insect damage cause malformation of the cabbage head. Therefore pest management is done early for stand establishment and during head development to prevent damage. There are very few diseases of cabbage in California however, downy mildew, wirestem, and white mold may require control if wet and moist cooler conditions persist (Daugovich, et al., 2008).

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 cabbage crop may vary by location; however, we used an average of \$43 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 four to five pesticide applications per acre per crop. Each application consists of a mixture of materials. Some of the materials used in the mixture would be Coragen (Chlorantraniliprole), Movento (Spinetoram), Forum (Dimethomorph), and Brigade (Bifenthrin-pyrethroid) to control insect pests including the Bagra bug. In this study, the first pesticide application is done 3 weeks before transplant; the second about 4 days after transplant; the third about 10 days after the second application and the fourth application about 10 days after the third application. If necessary and depending on infestation level, a fifth application may be applied about 10 days after the fourth application.

We used custom pesticide treatment which cost approximately \$120 per acre per application for application and material. Written recommendations are required for commercially applied pesticides by licensed pest control advisors. Pest control materials and label rates mentioned in this study are listed on the UCIPM website at <http://www.ipm.ucdavis.edu/PMG/selectnewpest.cole-crops.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 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 mechanical cultivation for weed control costs about \$15 per acre (typically controls about 80% of weeds) and is done once during mid-growing period. Custom hand weeding costs about \$85 per acre (typically controls about 20% of weeds) and is done once before harvesting.

**Food Safety Program.** Many growers of fresh market commodities like cabbage 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 8 water tests per acre from land preparation to harvest for one cabbage 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 operation per year (\$0.37 per acre for 4 months based on 500-acre farm). Two harvest crew audit 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 4-month (land preparation to harvest) cabbage crop, the total costs of microbial water test will be \$272 for the entire operation (\$0.54 per acre).

**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 cabbage 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 \$7.67 per acre (for 4 months) to reflect cost for one crop in this study.

## HARVESTING AND MARKETING

Cabbage is hand-harvested and field packed into 45 pounds or 50 pounds cartons (depending on market and handler requirement) by contract harvesters twice per acre per crop. In this study, we based harvesting costs on 45-pound carton. Cabbage is picked and packed in the fields then hauled, cooled, and

sold under the California Leafy Greens Marketing Agreement (LGMA) program. Based on interview data, harvesting costs estimate is about \$3.99 per 45-pound carton.

Year	Yield/Acre
2007	800
2008	1,200
2009	1,000
2010	1,200
2011	1,100
<b>Average</b>	<b>1,050</b>

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

**Yield and Price.** We used the California agriculture statistics average fresh market cabbage yield which is about 1,050 cartons (45-pounds per carton) per acre per crop for our study. This yield level is similar to the average from our growers' interview and the average of the county crop report. We estimated gross returns based on \$8 per carton price.

**Leafy Green Handler Marketing Agreement (LGMA).** The California Department of Food and Agriculture (CDFA) established an assessment rate of \$0.0065 per carton on all handlers of leafy green produce to be paid to the Leafy Green Handler Marketing Agreement program. Handlers in turn charge growers an assessment fee of \$0.00025 per pound for all leafy greens sold under LGMA. Therefore, in this study, we used an assessment fee of \$0.01125 per carton (45-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 cabbage. An opportunity cost is the return foregone by choosing to produce cabbage 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 typically 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 \$933 per acre for 4 months to reflect rental for one cabbage 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 \$166.67 per acre for 4 months to reflect the cost for one cabbage 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 \$66.67 per acre for 4 months to reflect the cost for one cabbage 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 \$396 (\$0.79 per acre for 4 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.

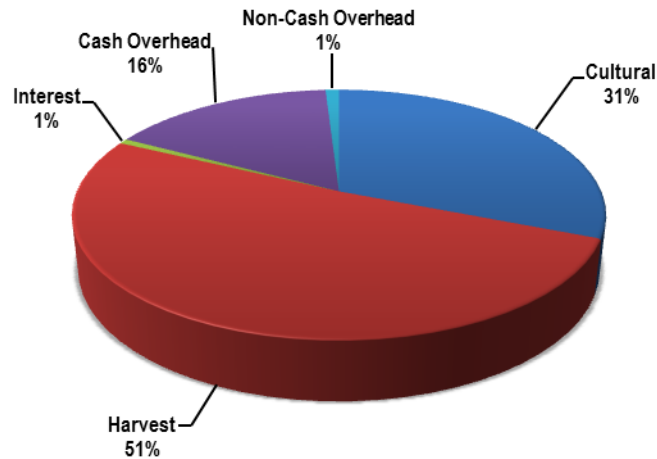
**Ownership Cost of Equipment and Farm Investments.** We used the capital recovery method to calculate ownership costs of farm equipment and investments. This method allows growers to calculate an annual amount of money to charge the enterprise so that the value of assets will be recovered within a specific 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 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 cabbage is \$8,212 per acre. Figure 1 shows the breakdown of costs. It includes 31% (\$2,543) accounted for by cultural practices (consisting of land preparation, transplanting, irrigation, fertilization, pest and weed control, equipment, and conditional waiver and food safety programs); 51% (\$4,200) by harvesting (picking, packing, hauling, cooling, selling, and LGMA grower assessment); 1% (\$53.43) by interest on operating capital; 16 % (\$1,336) by cash overhead (land rent, office expenses, farm manager, drip tapes, insurances, taxes and investment repairs); and 1% (\$80) by non-cash overhead (capital recovery of building, tools, fuel tank, and equipment).



**Figure 1.** Proportion of production costs for Cabbage 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 1,050 cartons (45-pound carton) per acre is estimated at about \$7.74 per carton to cover all cash costs and \$7.82 per carton to cover total costs. On the other hand, the break-even yield for the average price of \$8 per carton (45-pound carton) is about 1,016 cartons per acre for cash costs and 1,027 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.

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

UC COOPERATIVE EXTENSION									
Operation	Operation	Cash and Labor Costs per Acre						Total Cost	Your Cost
	Time (Hrs/A)	Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/Rent			
<b>Land Prep:</b>									
Disc (4x)	0.41	7.54	33.32	11.22	0	0	52.09		
Subsoil (2x)	0.65	11.88	52.52	17.22	0	0	81.62		
Roller (5x)	0.37	6.75	29.83	8.53	0	0	45.11		
Land Level (3x)	0.46	8.36	36.94	12.56	0	0	57.85		
Broadcast fertilizer	0.34	6.18	27.32	8.09	306.25	0	347.84		
Chisel	0.12	2.23	9.85	3.27	0	0	15.34		
List Beds	0.08	1.41	6.25	1.98	0	0	9.64		
Shape Beds	0.28	5.09	22.48	7.05	0	0	34.62		
Herbicide Treatment	0.12	2.26	10.01	2.97	25.37	0	40.61		
Pest Control Advisor	0	0	0	0	0	43	43		
Pesticide Treatment Application	0	0	0	0	0	120	120		
<b>TOTAL Land Prep COSTS</b>	<b>2.83</b>	<b>52</b>	<b>229</b>	<b>73</b>	<b>332</b>	<b>163</b>	<b>848</b>		
<b>Transplanting:</b>									
Drip Irrigation Setup (Machine)	0.17	3.18	2.7	1.22	0	0	7.1		
Drip Irrigation Setup (Labor)	0.25	3	0	0	0	0	3		
Transplant	0	0	0	0	342	335	677		
<b>TOTAL Transplant COSTS</b>	<b>0.42</b>	<b>6</b>	<b>3</b>	<b>1</b>	<b>342</b>	<b>335</b>	<b>687</b>		
<b>Growing:</b>									
Irrigation & System Inspection (5x)	2.5	29.95	0	0	170.04	0	199.99		
Conditional Waiver Program	0	0	0	0	0	7.67	7.67		
Microbial Water Test	0	0	0	0	0	0.54	0.54		
Food Safety Program	0	0	0	0	0	1.15	1.15		
Fertilizer - CAN17% (2x)	0	0	0	0	265.09	0	265.09		
Pesticide Treatment Application (3x)	0	0	0	0	0	360	360		
Weed Cultivation	0	0	0	0	0	15	15		
Hand Weeding	0	0	0	0	0	85	85		
Drip Irrigation Removal (Machine)	0.29	5.42	4.59	2.11	0	0	12.12		
Drip Irrigation Removal (Labor)	0.25	3	0	0	0	0	3		
Pickup Truck	2	36.72	13.6	8.03	0	0	58.35		
<b>TOTAL Growing COSTS</b>	<b>5.04</b>	<b>75</b>	<b>18</b>	<b>10</b>	<b>435</b>	<b>469</b>	<b>1,008</b>		
<b>Harvesting and Marketing:</b>									
Cut, Pack, Haul, Cool, Sell	0	0	0	0	0	4,188.19	4,188.19		
LGMA Grower Assessment	0	0	0	0	0	11.81	11.81		
<b>TOTAL Harvesting and Marketing COSTS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4,200</b>	<b>4,200</b>		
Interest on Operating Capital @ 5.75%							53.43		
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>8.29</b>	<b>133</b>	<b>249</b>	<b>84</b>	<b>1109</b>	<b>5167</b>	<b>6,796</b>		
<b>CASH OVERHEAD:</b>									
Land Rent							933		
Office Expenses							166.67		
Liability Insurance							0.79		
Farm Manager							66.67		
Drip Tapes							160		
Property Taxes							4.15		
Property Insurance							3.39		
Investment Repairs							1.04		
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>							<b>1,336</b>		
<b>TOTAL CASH COSTS/ACRE</b>							<b>8,132</b>		
<b>NON-CASH OVERHEAD:</b>									
		Per producing Annual Cost							
		Acre	Capital Recovery						
Building		37.44	3.37				3.37		
Tools		12.8	1.15				1.15		
Fuel Tank 550 gallons		2.00	0.18				0.18		
Equipment		577.56	75.51				75.51		
<b>TOTAL NON-CASH OVERHEAD COSTS</b>		<b>630</b>	<b>80</b>				<b>80</b>		
<b>TOTAL COSTS/ACRE</b>							<b>8,212</b>		

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

UC COOPERATIVE EXTENSION				
	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre
<b>GROSS RETURNS</b>				
Cabbage	1050	crtn	\$8	\$8,400
<b>TOTAL GROSS RETURNS</b>	<b>1050</b>	<b>crtn</b>		<b>\$8,400</b>
<b>Operating Costs:</b>				
<b>Custom:</b>				<b>967</b>
Custom Transplanting	1	acre	335	335
Conditional Waiver Program	1	acre	7.67	7.67
Microbial Water Test	1	acre	0.54	0.54
Food Safety - Farm Audit	1	acre	0.37	0.37
Food Safety - Harvest Crew Audits	1	acre	0.78	0.78
Pest Control Advisor	1	acre	43	43
Pesticide Application	4	acre	120	480
Weed Cultivation	1	acre	15	15
Hand weeding	1	acre	85	85
<b>Fertilizer:</b>				<b>571</b>
16-20-0	625	lb	0.49	306.25
CAN17%	69.76	gal	3.8	265.088
<b>Herbicide:</b>				<b>25</b>
Goaltender (Oxyfluorfen)	1	pint	25.37	25.37
<b>Water:</b>				<b>170</b>
District Water	12	ac-in	14.17	170.04
<b>Harvesting &amp; Marketing:</b>				<b>4,200</b>
Cut, Pack, Haul, Cool, Sell	1050	crtn	3.99	4,188.19
LGMA Grower Assessment	1050	crtn	0.01	11.81
<b>Planting Material:</b>				<b>342</b>
Cabbage Plant	28500	plant	0.012	342
<b>Labor:</b>				<b>133</b>
Equipment Operator Labor	6.34	hrs	15.30	97.02
Irrigation Labor	3	hrs	11.98	35.94
<b>Machinery:</b>				<b>334</b>
Fuel-Gas	3.33	gal	4.08	13.6
Fuel-Diesel	61.41	gal	3.84	235.8
Lube				37.41
Machinery Repair				46.85
Interest on Operating Capital (5.75%)				53.43
<b>TOTAL OPERATING COSTS/ACRE</b>				<b>6,796</b>
<b>TOTAL OPERATING COSTS/CRTN</b>				<b>6.47</b>
<b>NET RETURNS ABOVE OPERATING COSTS</b>				<b>1,604</b>
<b>CASH OVERHEAD COSTS</b>				
Land Rent				933
Office Expenses				166.67
Liability Insurance				0.79
Farm Manager				66.67
Drip Tapes				160
Property Taxes				4.15
Property Insurance				3.39
Investment Repairs				1.04
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>				<b>1,336</b>
<b>TOTAL CASH OVERHEAD COSTS/CRTN</b>				<b>1.27</b>
<b>TOTAL CASH COSTS/ACRE</b>				<b>8,132</b>
<b>TOTAL CASH COSTS/CRTN</b>				<b>7.74</b>
<b>NET RETURNS ABOVE CASH COSTS</b>				<b>268</b>
<b>NON-CASH OVERHEAD COSTS (Capital Recovery)</b>				
Building				3.37
Tools				1.15
Fuel Tank 550 gallons				0.18
Equipment				75.51
<b>TOTAL NON-CASH OVERHEAD COSTS/ACRE</b>				<b>80</b>
<b>TOTAL NON-CASH OVERHEAD COSTS/CRTN</b>				<b>0.08</b>
<b>TOTAL COST/ACRE</b>				<b>8,212</b>
<b>TOTAL COST/ crtn</b>				<b>7.82</b>
<b>NET RETURNS ABOVE TOTAL COST</b>				<b>188</b>

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

UC COOPERATIVE EXTENSION					
Beginning 07-12	JUL	AUG	SEP	OCT	TOTAL
Ending 10-12	12	12	12	12	
<b>Land Prep:</b>					
Disc (4x)	52.09				52.09
Subsoil (2x)	81.62				81.62
Roller (5x)	45.11				45.11
Land Level (3x)	57.85				57.85
Broadcast fertilizer	347.84				347.84
Chisel	15.34				15.34
List Beds	9.64				9.64
Shape Beds	34.62				34.62
Herbicide Treatment	40.61				40.61
Pest Control Advisor	43				43
Pesticide Treatment Application	120				120
<b>TOTAL Land Prep COSTS</b>	<b>848</b>				<b>848</b>
<b>Transplant:</b>					
Drip Irrigation Setup (Machine)		7.1			7.1
Drip Irrigation Setup (Labor)		3			3
Transplant		677			677
<b>TOTAL Transplant COSTS</b>	<b>0</b>	<b>687</b>			<b>687</b>
<b>Growing:</b>					
Irrigation & System Inspection (5x)		48.5	68.66	82.83	199.99
Conditional Waiver Program				7.67	7.67
Microbial Water Test		0.54			0.54
Food Safety Program		0.37		0.78	1.15
Fertilizer - CAN17% (2x)		132.54	132.54		265.08
Pesticide Treatment Application (3x)		240	120		360
Weed Cultivation			15		15
Hand Weeding				85	85
Drip Irrigation Removal (Machine)				12.12	12.12
Drip Irrigation Removal (Labor)				3	3
Pickup Truck	14.59	14.59	14.59	14.59	58.35
<b>TOTAL Growing COSTS</b>	<b>15</b>	<b>437</b>	<b>351</b>	<b>206</b>	<b>1,008</b>
<b>Harvesting and Marketing:</b>					
Cut, Pack, Haul, Cool, Sell				4,188.19	4,188.19
LGMA Grower Assessment				11.81	11.81
<b>TOTAL Harvesting and Marketing COSTS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4,200</b>	<b>4,200</b>
Interest on Operating Capital (5.75%)	6.83	8.90	2.78	34.91	53.43
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>869</b>	<b>1,133</b>	<b>354</b>	<b>4,441</b>	<b>6,796</b>
<b>CASH OVERHEAD</b>					
Land Rent	233.25	233.25	233.25	233.25	933
Office Expenses	41.67	41.67	41.67	41.67	166.67
Liability Insurance	0.79				0.79
Farm Manager	16.67	16.67	16.67	16.67	66.67
Drip Tapes		160			160
Property Taxes	4.15				4.15
Property Insurance	3.39				3.39
Investment Repairs	0.26	0.26	0.26	0.26	1.04
<b>TOTAL CASH OVERHEAD COSTS</b>	<b>300</b>	<b>452</b>	<b>292</b>	<b>292</b>	<b>1,336</b>
<b>TOTAL CASH COSTS/ACRE</b>	<b>1,169</b>	<b>1,584</b>	<b>645</b>	<b>4,733</b>	<b>8,132</b>

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

UC COOPERATIVE EXTENSION							
	YIELD (crtns/acre)						
	900	950	1,000	1,050	1,100	1,150	1,200
<b>OPERATING COSTS:</b>							
Land Prep	848	848	848	848	848	848	848
Transplant	687	687	687	687	687	687	687
Growing	1008	1008	1008	1008	1008	1008	1008
Harvest	3,600	3,800	4,000	4,200	4,400	4,600	4,800
Interest on operating capital @ 5.75%	48.68	50.26	51.85	53.43	55.01	56.60	58.18
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>6,191</b>	<b>6,393</b>	<b>6,595</b>	<b>6,796</b>	<b>6,998</b>	<b>7,199</b>	<b>7,401</b>
Total Operating Costs/crtn	6.88	6.73	6.59	6.47	6.36	6.26	6.17
CASH OVERHEAD COSTS/ACRE	1,336	1,336	1,336	1,336	1,336	1,336	1,336
<b>TOTAL CASH COSTS/ACRE</b>	<b>7,527</b>	<b>7,729</b>	<b>7,930</b>	<b>8,132</b>	<b>8,333</b>	<b>8,535</b>	<b>8,737</b>
Total Cash Costs/crtn	8.36	8.14	7.93	7.74	7.58	7.42	7.28
NON-CASH OVERHEAD COSTS/ACRE	80.21	80.21	80.21	80.21	80.21	80.21	80.21
<b>TOTAL COSTS/ACRE</b>	<b>7,607</b>	<b>7,809</b>	<b>8,010</b>	<b>8,212</b>	<b>8,414</b>	<b>8,615</b>	<b>8,817</b>
Total Costs/crtn	8.45	8.22	8.01	7.82	7.65	7.49	7.35

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

PRICE(\$/crtn)	YIELD(crtn/acre)						
Cabbage	900	950	1,000	1,050	1,100	1,150	1,200
\$6.50	-341	-218	-95	29	152	276	399
\$7.00	109	257	405	554	702	851	999
\$7.50	559	732	905	1,079	1,252	1,426	1,599
\$8.00	1,009	1,207	1,405	<b>1,604</b>	1,802	2,001	2,199
\$8.50	1,459	1,682	1,905	2,129	2,352	2,576	2,799
\$9.00	1,909	2,157	2,405	2,654	2,902	3,151	3,399
\$9.50	2,359	2,632	2,905	3,179	3,452	3,726	3,999

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

PRICE(\$/crtn)	YIELD(crtn/acre)						
Cabbage	900	950	1,000	1,050	1,100	1,150	1,200
\$6.50	-1,677	-1,554	-1,430	-1,307	-1,183	-1,060	-937
\$7.00	-1,227	-1,079	-930	-782	-633	-485	-337
\$7.50	-777	-604	-430	-257	-83	90	263
\$8.00	-327	-129	70	<b>268</b>	467	665	863
\$8.50	123	346	570	793	1,017	1,240	1,463
\$9.00	573	821	1,070	1,318	1,567	1,815	2,063
\$9.50	1,023	1,296	1,570	1,843	2,117	2,390	2,663

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

PRICE(\$/crtn)	YIELD(crtn/acre)						
Cabbage	900	950	1,000	1,050	1,100	1,150	1,200
\$6.50	-1,757	-1,634	-1,510	-1,387	-1,264	-1,140	-1,017
\$7.00	-1,307	-1,159	-1,010	-862	-714	-565	-417
\$7.50	-857	-684	-510	-337	-164	10	183
\$8.00	-407	-209	-10	<b>188</b>	386	585	783
\$8.50	43	266	490	713	936	1,160	1,383
\$9.00	493	741	990	1,238	1,486	1,735	1,983
\$9.50	943	1,216	1,490	1,763	2,036	2,310	2,583

**Table 5. Farm Investment for Producing Cabbage: Values and Annual Costs based on 1,250-Farmed Acres in Ventura County, 2012/2013**

UC COOPERATIVE EXTENSION							
Description	Price	Yrs Life	Salvage Value	Capital Recovery	Annual Investment Costs		
					Insurance	Taxes	Total
350 HP Tractor #1	207,300	8	72,345.40	24,106.32	1,142.35	1,398.23	26,646.90
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	49,500	18	7,504.04	3,879.21	232.86	285.02	4,397.09
Disc - 21ft #1	19,950	7	5,089.76	2,786.69	102.29	125.20	3,014.18
Disc - 21ft #2	19,950	7	5,089.76	2,786.69	102.29	125.20	3,014.18
Subsoiler - 12ft #1	12,500	4	4,600.81	2,433.28	69.86	85.50	2,588.64
Subsoiler - 12ft #2	12,500	4	4,600.81	2,433.28	69.86	85.50	2,588.64
Roller - 22ft	6,000	4	2,208.39	1,167.97	33.53	41.04	1,242.55
Land plane #1	22,000	15	2,112.14	1,984.13	98.50	120.56	2,203.19
Land plane #2	22,000	7	5,612.76	3,073.04	112.80	138.06	3,323.90
Fertilizer spreader #1	3,100	2	1,456.80	949.79	18.61	22.78	991.19
Chisel plow	13,500	13	1,654.81	1,320.68	61.91	75.77	1,458.37
Lister - 28ft	8,300	20	432.61	638.54	35.67	43.66	717.87
Bed Shaper	7,500	5	2,443.03	1,276.02	40.62	49.72	1,366.35
Boom-type sprayer	4,600	9	919.18	555.77	22.55	27.60	605.91
Drip Layer	2,500	9	499.55	302.05	12.25	15.00	329.30
Tape Lifter & Winder	5,445	3	2,264.53	1,269.99	31.49	38.55	1,340.03
Pickup Truck #1	24,500	3	12,972.94	4,829.24	153.08	187.36	5,169.68
Pickup Truck #2	24,500	3	12,972.94	4,829.24	153.08	187.36	5,169.68
Pickup Truck #3	24,500	3	12,972.94	4,829.24	153.08	187.36	5,169.68
Pickup Truck #4	24,500	3	12,972.94	4,829.24	153.08	187.36	5,169.68
<b>TOTAL</b>	<b>721,945</b>		<b>243,072</b>	<b>94,387</b>	<b>3,942</b>	<b>4,825</b>	<b>103,154</b>
60% of new cost*	433,167		145,843	56,632	2,365	2,895	61,892

\*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	4,211.95	210.3	257.4	936	5,615.65
Tools	16,000	15	1,600	1,439.98	71.9	88	320	1,919.88
Fuel Tank 550 gallons	2,500	15	250	225	11.23	13.75	50	299.98
<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 CABBAGE CROP**

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Land Rent	500	acre	933	466,500
Office Expenses	500	acre	166.67	83,335
Liability Insurance	500	acre	0.79	395
Farm Manager	500	acre	66.67	33,335
Drip Tapes	500	acre	160	80,000

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

UC COOPERATIVE EXTENSION											
Description	Cabbage Hours Used	Total Annual Hours Used	COSTS PER HOUR							Total Oper.	Total Costs/Hr.
			Cash Overhead			Operating					
			Capital Recovery	Insurance	Taxes	Lube & Repairs	Fuel	Total	Total		
350 HP Tractor #1	779	1948	12.37	0.59	0.72	20.17	73.77	93.93	107.61		
350 HP Tractor #2	770	1925	12.52	0.59	0.73	20.06	73.77	93.83	107.67		
90 HP Tractor	258	645	6.01	0.36	0.44	5.59	14.14	19.74	26.55		
Disc - 21ft #1	103	258	10.80	0.4	0.49	5.21	0	5.21	16.89		
Disc - 21ft #2	103	258	10.80	0.4	0.49	5.21	0	5.21	16.89		
Subsoiler - 12ft #1	162	405	6.01	0.17	0.21	4.48	0	4.48	10.87		
Subsoiler - 12ft #2	162	405	6.01	0.17	0.21	4.48	0	4.48	10.87		
Roller - 22ft	184	460	2.54	0.07	0.09	1.14	0	1.14	3.84		
Land plane #1	76	190	10.44	0.52	0.63	5.46	0	5.46	17.06		
Land plane #2	152	380	8.09	0.3	0.36	5.49	0	5.49	14.24		
Fertilizer spreader #1	168	420	2.26	0.04	0.05	1.85	0	1.85	4.21		
Chisel plow	61	153	8.63	0.4	0.5	4.73	0	4.73	14.26		
Lister - 28ft	39	98	6.52	0.36	0.45	3.58	0	3.58	10.91		
Bed Shaper	139	348	3.67	0.12	0.14	3.28	0	3.28	7.21		
Boom-type sprayer	62	155	3.59	0.15	0.18	2.03	0	2.03	5.94		
Drip Layer	87	218	1.39	0.06	0.07	0.88	0	0.88	2.40		
Tape Lifter & Winder	147	368	3.45	0.09	0.10	1.02	0	1.02	4.66		
Pickup Truck #1	250	625	7.73	0.24	0.3	4.01	6.80	10.81	19.09		
Pickup Truck #2	250	625	7.73	0.24	0.3	4.01	6.80	10.81	19.09		
Pickup Truck #3	250	625	7.73	0.24	0.3	4.01	6.80	10.81	19.09		
Pickup Truck #4	250	625	7.73	0.24	0.3	4.01	6.80	10.81	19.09		



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

**UC COOPERATIVE EXTENSION**

Operation	Operation			Labor Type/	
	Month	Tractor	Implement	Material	Rate/Acre Unit
Disc	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 - 12ft #1	Equip. Op. Labor	0.39 hour
Subsoil	July	350 HP Tractor #2	Subsoiler - 12ft #2	Equip. Op. Labor	0.39 hour
Roller	July	350 HP Tractor #2	Roller - 22ft	Equip. Op. Labor	0.09 hour
Roller	July	350 HP Tractor #2	Roller - 22ft	Equip. Op. Labor	0.09 hour
Roller	July	350 HP Tractor #2	Roller - 22ft	Equip. Op. Labor	0.09 hour
Roller	July	350 HP Tractor #2	Roller - 22ft	Equip. Op. Labor	0.09 hour
Land Level	July	350 HP Tractor #1	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
Land Level	July	350 HP Tractor #2	Land plane #2	Equip. Op. Labor	0.18 hour
Broadcast fertilizer	July	350 HP Tractor #1	Fertilizer spreader #1	Equip. Op. Labor	0.4 hour
				16-20-0	625 lb
Chisel	July	350 HP Tractor #1	Chisel plow	Equip. Op. Labor	0.15 hour
List Beds	July	350 HP Tractor #2	Lister - 28ft	Equip. Op. Labor	0.09 hour
Shape Beds	July	350 HP Tractor #1	Bed Shaper	Equip. Op. Labor	0.33 hour
Herbicide Treatment	July	350 HP Tractor #2	Boom-type sprayer	Equip. Op. Labor	0.15 hour
				Goaltender	1 pint
Pest Control Advisor	July			PCA - cabbage	1 acre
Pesticide Treatment Application	July			Pesticide Application	1 acre
Drip Irrigation Setup (Machine)	Aug	90 HP Tractor	Drip Layer	Equip. Op. Labor	0.20 hour
Drip Irrigation Setup (Labor)	Aug			Irrigation Labor	0.25 hour
Transplant	Aug			Custom Transplanting	1 acre
				Cabbage plant	28,500 plant
Irrigation & System Inspection	Aug			Irrigation Labor	0.5 hour
				District Water	3 ac-in
Irrigation & System Inspection	Sept			Irrigation Labor	0.5 hour
				District Water	2 ac-in
Irrigation & System Inspection	Sept			Irrigation Labor	0.5 hour
				District Water	2 ac-in
Irrigation & System Inspection	Oct			Irrigation Labor	0.5 hour
				District Water	3 ac-in
Irrigation & System Inspection	Oct			Irrigation Labor	0.5 hour
				District Water	2 ac-in
Conditional Waiver Program	Oct			Conditional Waiver Program	1 acre
Microbial Water Test	July-Aug			Microbial Water Test	1 acre
Food Safety Program	Aug			Farm Audit	1 acre
				Harvest Crew Audit	1 acre
Fertilizer - CAN17%	Aug			CAN17%	34.88 gal
	Sept			CAN17%	34.88 gal
Pesticide Treatment Application	Aug			Pesticide Application	1 acre
	Aug			Pesticide Application	1 acre
	Sept			Pesticide Application	1 acre
Weed Cultivation	Sept			Custom Cultivation	1 acre
Hand Weeding	Oct			Custom Hand Weeding	1 acre
Drip Irrigation Removal (Machine)	Oct	90 HP Tractor	Tape Lifter & Winder	Equip. Op. Labor	0.35 hour
Drip Irrigation Removal (Labor)	Oct			Irrigation Labor	0.25 hour
Pickup Truck	July-Oct		Pickup Truck #1	Equip. Op. Labor	0.6 hour
	July-Oct		Pickup Truck #2	Equip. Op. Labor	0.6 hour
	July-Oct		Pickup Truck #3	Equip. Op. Labor	0.6 hour
	July-Oct		Pickup Truck #4	Equip. Op. Labor	0.6 hour
Harvest	Oct			Cut, Pack, Haul, Cool, Sell	1050 crtn
				LGMA Grower Assessment	1050 crtn

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