

The Cost of Growing Avocados

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The California Avocado Commission Mission statement: *“To maximize grower returns by maintaining premium brand positioning for California avocados and improving grower sustainability,”* defines the activities undertaken by the Commission. An important measure of the success of the initiatives undertaken by CAC to fulfill the Mission is that over time California avocado growers retain or improve the profitability of their groves. Understanding the costs to produce avocado fruit is one way to identify the impediments growers face when growing avocados. It also helps the Commission Board to decide where to focus its resources. The Production Research Committee in particular has been interested in identifying those production costs that have rapidly increased over time. These then become the cultural care practices that should be targeted for improvement and increased research effort. Thus, one measure of success for Production Research is a reduction in cultural costs and/or greater yields, which results in avocado growing remaining profitable.

A series of studies identifying the typical costs of production and income for an “average” California avocado grove in the main growing regions repeated every 10 years has become a benchmark to indicate the fiscal health of growing avocados in California. A detailed survey of the establishment and production costs for conventional and organic avocados in Ventura, Santa Barbara, San Luis Obispo, San Diego and Riverside counties was recently completed by Eta Takele, UC Cooperative Extension Agricultural Economist. The project used information gathered from grower surveys as well as from UCCE Farm Advisors Dr. Gary Bender and Dr. Ben Faber. The information in the reports can assist growers and investors when considering investment analyses and decision making, conducting business transactions, and developing risk management strategies.

Considerable caution should be used when reviewing the numbers presented in the reports as there is a large amount of variation between groves in terms of inputs and yields. For example, the cost to harvest fruit is likely to be much lower for growers who do not use contract labor. Additionally, the costs are only a snapshot of when they were collected. The costs of production are always changing and some are likely to be different when this article is published. In addition the surveys do not present information that de-

scribes the relationship between inputs, like water or fertilizer, and yield. The assumption in the reports is that the cost of production is the same for different yields, i.e., the cost of production for 5,000 pounds is the same as for 10,000 pounds with the 5,000 pounds increase essentially “free.” The surveys are useful indications of the production costs and potential profitability of growing avocados in 2011, but do not describe the potential value of changing inputs, e.g., would increasing the amount of fertilizer increase yield and would this increase profit?

The studies were based on establishment and production practices considered “typical” of the five different counties. For groves in San Diego and Riverside counties, the land was assumed to be steep-sloped hillside; in San Luis Obispo, Ventura and Santa Barbara the land was assumed to be flat to moderately sloped. For all counties, conventional groves were 21 acres and organic groves 11 acres. This is a change from the 2001 reports which were for conventional avocado groves of 11 acres only and did not report the costs of producing organic avocados. For both conventional and organic groves, 1 acre was assumed to be occupied by roads and farmstead so that the actual planted acreage was 20 and 10 acres, respectively. For avocado groves of these sizes, it was assumed that most growers will

TABLE 1 Production costs breakdown for growing conventional avocados in five California counties based on 2011 data.

Expense	San Diego	Riverside	Ventura & Santa Barbara	San Luis Obispo
Cultural care (not including water)	\$1,847	\$1,847	\$1,792	\$1,792
Irrigation*	\$4,403	\$2,471	\$882	\$570
Harvesting	\$1,762	\$1,762	\$1,808	\$1,409
Interest on Operating Capital	\$109	\$95	\$100	\$90
Cash Overhead Costs (insurance, soil & leaf analysis, taxes, etc.)	\$965	\$913	\$1,304	\$1,305
Non-cash Overhead (land, equipment, buildings, tools, amortized establishment costs)**	\$3,894	\$3,526	\$5,027	\$5,031
Total	\$12,980	\$10,613	\$10,912	\$10,196

*Irrigation includes actual water costs and labor to check irrigation lines. It is included under cultural care in the cost studies, but has been separated out here for clarity of presentation.

**Many California avocado growers have older, mature groves and may have little or no debt on their land, buildings and other non-cash overhead costs, effectively reducing their production costs by the amounts shown in this category.

have their house on the property and manage the grove, but the analyses tried to separate household and grove costs. All costs and figures presented are on a per acre basis.

Input prices, contract fees, and service expenses were all based on 2011 prices. The reports are very detailed and separate establishment costs (years 1 through 6) from production costs (year 7 and beyond). As the reports average the costs and yields across a number of avocado groves in each county the actual costs may not describe well the costs for individual groves. Notwithstanding this limitation of the study, it is possible to see where there are differences in costs between counties and how costs of production may have changed since 2001 as the same methodology has been used in the 2001 and 2011 studies.

This article summarizes the production costs of established avocado groves and looks at the cost differences among counties, between production systems and the changes in costs between 2001 and 2011.

The complete reports for 2011 and 2001 can be found www.californiaavocadogrowers.com/research/research-library/yieldsproductivity. Earlier production and establishment reports can be found at <http://coststudies.ucdavis.edu/archived.php>.

The high cost of water

The production costs for San Diego, Riverside, Ventura, Santa Barbara and San Luis Obispo counties are summarized in [Tables 1 and 2](#) for conventional and organic groves,

TABLE 2 Production costs breakdown for growing organic avocados in five California counties based on 2011 data.

Expense	San Diego	Riverside	Ventura & Santa Barbara	San Luis Obispo
Cultural care (not including water)	\$2,842	\$2,842	\$2,850	\$2,850
Irrigation*	\$4,403	\$2,471	\$882	\$570
Harvesting	\$1,555	\$1,555	\$1,599	\$1,261
Interest on Operating Capital	\$142	\$127	\$122	\$113
Cash Overhead Costs (insurance, soil & leaf analysis, taxes, etc.)	\$1,164	\$1,112	\$1,384	\$1,386
Non-cash Overhead (land, equipment, buildings, tools, amortized establishment costs)**	\$4,314	\$3,945	\$5,386	\$5,400
Total	\$14,420	\$12,053	\$12,222	\$11,579

*Irrigation includes actual water costs and labor to check irrigation lines. It is included under cultural care in the cost studies, but has been separated out here for clarity of presentation.

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respectively. The production costs differ across counties; for example, San Diego County has water costs about \$2,000 per acre higher than the other counties for both conventional and organic production. While the total costs appear to be similar for Riverside, Ventura and Santa Barbara and San Luis Obispo counties the non-cash overhead is greater in the northern counties by about \$1,000 per acre. However, many growers who own their land and have been farming for some time don't usually consider non-cash overhead costs, which includes land, equipment, buildings and other costs, in their overall production costs. When non-cash overheads are removed, the difference among counties becomes clearer to see. For San Diego County, costs less non-cash overhead are about \$2,000 greater than River-

side County, and between \$3,200 and \$3,900 greater than Ventura, Santa Barbara, and San Luis Obispo counties for conventional production. The increased cost of production is almost solely due to the increased cost of water in San Diego County. This confirms what many growers already know; the high cost of water has increased the cost of production in San Diego County more than in the other counties.

Without non-cash overhead costs, cultural care (i.e., pruning, pest control, fertilizer, irrigation) is the largest component of production costs in both organic and conventional production. In San Diego and Riverside counties, cultural care accounts for 69% and 61% of conventional production costs, respectively, and water alone accounts

for 70% (\$4,403) and 63% (\$2,471) of cultural costs (Note: this is not for total costs where water accounts for 34% and 23% of the total costs). In Ventura, Santa Barbara and San Luis Obispo counties, cultural care accounts for about 45% of conventional production costs, but water is only a relatively minor component of that: 32% (\$882, Ventura and Santa Barbara) and 24% (\$570, San Luis Obispo) of cultural costs. In 2001, see Table 3, water accounted for a lower proportion of cultural care costs at 62% and 54% of the

cultural care costs in San Diego and Riverside counties, respectively. Water costs were 36% of cultural care costs for Ventura and Santa Barbara counties. The amount needed to pay for water has increased as a proportion of the cultural care costs in San Diego and Riverside counties and slightly decreased in Ventura and Santa Barbara counties.

Inflation in the cost of water in the southern most growing counties is not new and does not look to slow down in the future. More effective water use and greater emphasis on

TABLE 3

	Year			Change from 2001
	1992 ¹	2001 ²	2011 ³	
San Diego County				
Irrigation	\$1,060	\$1,896	\$4,403	\$2,507
Harvest	\$650	\$1,189	\$1,638	\$449
Cash overhead	\$753	\$907	\$1,065	\$158
Fertilizer	\$96	\$151	\$204	\$53
Miscellaneous**	\$42	\$94	\$754	\$660
Pruning	\$180	\$429	\$541	\$112
Pest Control	\$228	\$465	\$296	(\$169)
Root rot	\$2	\$3	\$60	\$57
CAC Assessment	\$262	\$261	\$106	(\$155)
Total	\$3,272	\$5,395	\$9,067	\$3,672
Riverside County				
Irrigation		\$1,356	\$2,471	\$1,115
Harvest		\$1,189	\$1,656	\$467
Cash overhead		\$880	\$998	\$119
Fertilizer		\$151	\$204	\$53
Miscellaneous**		\$94	\$754	\$660
Pruning		\$429	\$541	\$112
Pest Control		\$465	\$296	(\$169)
Root rot		\$3	\$60	\$57
CAC Assessment		\$261	\$106	(\$155)
Total		\$4,828	\$7,086	\$2,258
Ventura and Santa Barbara County				
Irrigation		\$532	\$882	\$350
Harvest		\$630	\$1,662	\$1,032
Cash overhead		\$825	\$1,395	\$570
Fertilizer		\$58	\$141	\$83
Miscellaneous**		\$87	\$848	\$761
Pruning		\$324	\$420	96
Pest Control		\$458	\$369	(\$89)
Root rot		\$3	\$60	\$57
CAC Assessment		\$271	\$146	(\$125)
Total		\$3,188	\$5,923	\$2,735

*Slight differences in values from Table 1 are due to separating out of the different cost components and rounding errors.

**Costs for a pick-up truck and ATV were not included in previous years making this item much greater in 2011.

¹Costs based on 11 acres; ²Costs based on 11 acres; ³Costs based on 21 acres.

helping growers in San Diego and Riverside counties with outreach to get the most out of their irrigation system were given the highest priority at the Production Research Committee meeting on April 23 for new research proposals. The cost of production survey supports this greater production research effort on the efficient use of irrigation.

Labor costs continue to rise

The two most labor intensive activities on the grove are harvesting and pruning. The cost of both of these activities has increased since 2001. Harvesting costs increased 38% and 39% for San Diego and Riverside counties and by a whopping 162% for Ventura and Santa Barbara counties. Pruning costs increased by 26% for San Diego and Riverside counties and by 30% for Ventura and Santa Barbara counties. Better canopy management systems would help in reducing some of the labor cost involved with pruning and harvesting. The trend towards higher density plantings and smaller trees can reduce harvesting costs, as can higher yields, which increases the efficiency of the pickers. To get smaller trees, more pruning or the use of plant growth regulators, e.g., Tre-Hold (NAA), may be required which increases the labor requirement. The Production Research Committee rated research on canopy management as the fourth highest priority for new research proposals.

Non-cash overhead increased by inflation in land price, equipment and establishment cost

Non-cash overhead accounts for the value of the land, buildings, equipment, etc. Since 2001 the non-cash overhead has doubled. In 2001 the value of an acre of agricultural land in San Diego County was estimated at \$8,450 and in 2011 at \$22,000, a 2.5 fold increase in value. In Ventura and Santa Barbara counties an acre of agricultural land was valued at \$16,200 in 2001, by 2011 the value had increased to \$50,000 an acre, a 3 fold increase in value. In addition, irrigation systems and the amortized establishment cost has doubled since 2001. The increase in value is outside of growers control and points to the increasingly high cost of entering the avocado industry.

Pest control is cheaper

The cost of pest control has fallen to levels similar to those reported in 1992. The decrease in the cost of pest control has occurred during a period, 2001 to 2011, of new pest introductions increasing the need for good pest management. The reduction in pest control cost may be a result of the substantial and sustained investment in pest control research over the last decade that has led to more effective pest control. Currently, about one third of the production research budget is allocated to research on pests and diseases. The Production Research Committee has rated re-

search on pests and diseases as the second highest priority.

CAC assessment lower

Although a minor cost, the reports indicate that 2011 CAC assessment was about half the 2001 level. Important to note, these reduced assessment costs did not factor in the Hass Avocado Board (HAB) Assessment which was introduced in 2003, at which time the CAC assessment had been reduced accordingly. The 2011 data uses an average production of 9,000 pounds per acre to calculate a per acre CAC assessment of \$225 for San Diego and Riverside counties, \$310 for Santa Barbara and Ventura counties and \$280 for San Luis Obispo County, decreases of over \$100 from the 2001 data. However, the HAB assessment, when added to the CAC assessment, represents an overall increase in assessments of \$70 for San Diego and Riverside counties and \$186 for Santa Barbara and Ventura counties. There is no 2001 report for San Luis Obispo County.

Profitability Analysis

To determine the profitability of growing avocados, the break-even costs per pound of fruit and the gross margins were calculated. Break-even costs are the total cost of production per acre divided by the yield per acre, resulting in per unit cost of production (\$/lb.). What growers usually call profit, or what economists call gross margin or return to management, is the gross returns (yield times price) minus the production and overhead costs. Assuming there is no debt on the operation and you are not paying someone to manage the grove for you, this is actual profit. What economists call the economic profit is the return above total costs, including debt and management costs. A zero economic profit is not necessarily bad, assuming that all costs, including the owner's labor and any management costs, have been included in the production costs. As mentioned earlier, the studies assumed owner management so no management costs were calculated in the profitability analysis. The break even costs and gross margins for 2001 and 2011 are summarized in [Table 4](#).

Conventional production break even costs have increased and gross margins have decreased since 2001.

Break even costs.

In 2011 for San Diego County the break-even price was calculated, including non-cash overhead costs, to be \$1.44 per pound and Riverside County \$1.18 per pound using an average production of 9,000 pounds per acre for each county. However, if non-cash overhead costs are removed, the break even prices fall by \$0.43 per pound to \$1.01 per pound for San Diego County and by \$0.39 per pound to \$0.79 per pound for Riverside County. In 2001 the break

TABLE 4

County	Year	Yield lbs/acre	Average price	Breakeven price	Gross margin (Profit) ¹	
			\$/lb	\$/lb	\$/lb	\$/acre
San Diego	2001	9,000	1.07	0.65	0.42	3,734
	2011	9,000	1.07	1.01	0.06	544
Riverside	2001	9,000	1.07	0.58	0.49	4,428
	2011	9,000	1.07	0.79	0.28	2,543
Ventura and Santa Barbara	2001	10,000	1.1	0.35	0.75	7,498
	2011	12,400	1.07	0.47	0.6	7,383
San Luis Obispo	20012	-	-	-	-	-
	2011	11,200	1.07	0.46	0.61	6,819

even costs without non-cash overheads were \$0.65 per pound and \$0.58 per pound for San Diego and Riverside counties, respectively.

For Ventura/Santa Barbara counties in 2011 the break-even price was calculated to be \$0.88 per pound and for San Luis Obispo County \$0.91 using an average production of 12,400 pounds per acre for Ventura/Santa Barbara counties, and 11,200 pounds per acre for San Luis Obispo County. Again, if non-cash overhead costs are excluded, the break-even prices drop by \$0.41 per pound to \$0.47 for Ventura/Santa Barbara counties and by \$0.45 per pound to \$0.46 per pound for San Luis Obispo County. In 2001 the break even costs without non-cash overheads were \$0.35 per pound for Ventura/Santa Barbara counties. There is no 2001 report for San Luis Obispo County.

Conventional returns above cost (profit margin and gross margin).

Given the assumptions in the previous paragraphs, the profit margin for 2011 (return to management above costs) in San Diego County are -\$0.37 per pound (-\$3,350 per acre) using the five year (2005-2011) average price per pound of \$1.07. In Riverside County, the profit margin is -\$0.11 per pound (-\$983 per acre), but these calculations include non-cash overhead. If non-cash overhead is removed from the calculations, the gross margin for San Diego County becomes slightly positive at \$0.06 per pound (\$544 per acre), and positive for Riverside County at \$0.28 per pound (\$2,543 per acre). This is down significantly from 2001 when the gross margin was \$0.42 per pound (\$3,734 per acre) for San Diego County and \$0.49 per pound

(\$4,428 per acre) for Riverside County.

In 2011 for Ventura/Santa Barbara counties, the profit margin is estimated to be \$0.19 per pound (\$2,356 per acre) when non-cash overhead is included, but jumps to \$0.59 per pound (\$7,383 per acre) when non-cash overhead is removed. In San Luis Obispo County, the profit margin with non-cash overhead included is estimated to be \$0.16 per pound (\$1,792 per acre), and the without non-cash overhead the gross margin is \$0.61 per pound (\$6,819 per acre). In 2001 the gross margin for Ventura/Santa Barbara counties was calculated as \$0.75 per pound (\$7,498 per acre).

The increase in break-even costs has been the greatest in San Diego County followed by Riverside County. Greater break-even costs have occurred despite the calculations assuming higher average yields. The greatly increased cost of water appears to be the main factor in the increased break-even costs in San Diego and Riverside counties and the subsequent reduction in gross margins. Growers have responded to increased costs by increasing production, but the increase in yield appears to be barely keeping pace with increased costs and has not been enough to maintain profit margins. While the increase in break-even costs has not been as great in the more northern counties, costs there have also been rising and profits falling. The average price per pound for the fruit has remained relatively steady from 2001 to 2011 requiring growers to increase the productivity of their groves to remain profitable. Therefore, increasing average per acre production remains one of the most important production research imperatives.

Organic production.

The survey also covered the costs of production for organic avocados for the first time. For organic production, cultural costs are a slightly greater percentage of the production costs in all counties. This is a result of slightly lower harvesting costs because of lower estimated yield in organic production, and slightly higher organic fertilizer costs. Water costs are the same for organic and conventional production, but on a percentage basis water accounts for a slightly lower portion of total cultural costs in all counties as a result of the higher fertilizer costs.

Organic break-even costs. In San Diego and Riverside counties, the average organic production was estimated to be 7,700 pounds per acre. This results in a break-even price of \$1.87 per pound and \$1.57 per pound for San Diego and Riverside counties, respectively. As with conventional production, if non-cash overhead costs are eliminated, the break-even prices drop to \$1.31 per pound and \$1.05 per pound for San Diego and Riverside counties, respectively.

In Ventura/Santa Barbara counties the average per acre production for organic groves was estimated to be 10,500 pounds per acre, and in San Luis Obispo County it was estimated at 9,500 pounds per acre. These figures result in break-even prices of \$1.16 per pound and \$1.22 per pound for Ventura/Santa Barbara counties and San Luis Obispo County, respectively. Removal of the non-cash overhead results in the break-even price for all three counties dropping to \$0.65 per pound.

Organic returns above cost. Based on grower input, organic avocados were assumed to receive a \$0.20 per pound premium over conventional, so an average price of \$1.27 per pound was used for all calculations. In San Diego County, organic profit margins when non-cash overhead is included are estimated to be -\$0.60 per pound (-\$4,641 per acre). This estimate improves if non-cash overhead is excluded from production costs, but still remains negative at -\$0.04 per pound (-\$327 per acre). In Riverside County, the profit margin with non-cash overhead is -\$0.30 per pound (-\$2,247 per acre), but moves positive without non-cash overhead costs to \$0.21 per pound (\$1,671 per acre).

In Ventura/Santa Barbara counties, organic production is projected to be profitable with or without non-cash overhead, at \$0.11 per pound (\$1,113 per acre) and \$0.62 per pound (\$6,499 per acre), respectively. Similarly, in San Luis Obispo County organic production is profitable with

or without non-cash overhead, but slightly less so than in Ventura/Santa Barbara counties because the yields are projected to be lower. San Luis Obispo County's profit margin with non-cash overhead is estimated at \$0.05 per pound (\$486 per acre), and without non-cash overhead at \$0.62 per pound (\$5,886 per acre).

Conclusion

There are considerable risks associated with growing avocados, including insects, diseases and frosts. There are also uncertainties that cannot be ignored, especially increasing water costs and dynamically variable fruit prices. It is unlikely that the estimated costs of production in the reports exactly match real production costs for individual groves. Yields will be different from the averages used, and fruit

prices received will vary depending on size profiles and time of harvest. However, these types of studies are beneficial in helping growers to understand all of the various costs that should be considered when looking at the economics of their grove. Reducing costs and increasing yields are both required to improve profitability. The surveys reported here indicate the price needed and the minimum amount of fruit required to be produced thereby serving as the benchmarks for evaluating cultural management success.

The information in the reports for 2011, when compared to those from 2001, highlights those items where inflation has increased costs and indicates the success of CAC activities in improving the profitability of growing avocados in California. The reports also identify the general activities that could be improved through investment in technical initiatives or other CAC activity so that California avocado growers' assessments are used to add to grove profitability. The major costs will be no surprise to growers: the high costs of water, labor for harvesting and pruning, and non-cash overhead. Improving the productivity of water use, i.e., more pounds per acre foot, and labor use through outreach and research are a major focus of the CAC production research program and priorities. The management of pests is costing growers less and is probably having an unmeasured benefit on yields and fruit quality. The effort to maintain good pest control needs to continue and suggests the production research support for pest management projects is a good investment. Lastly, it would appear that organic production of avocados needs significant yield improvements to be more profitable as the higher production costs are more than the premium received for organic fruit. 🥑

Increasing average per acre production remains one of the most important production research imperatives.