

**AVOCADO SAMPLE ESTABLISHMENT AND PRODUCTION
COSTS AND PROFITABILITY ANALYSIS
SAN DIEGO AND RIVERSIDE COUNTIES, 2011
ORGANIC PRODUCTION PRACTICES**



Etaferahu Takele, Area Farm Advisor, Agricultural Economics/Farm Management,
University of California Cooperative Extension (UCCE) Southern California
Gary Bender, Farm Advisor, Soils and Water, Subtropical Horticulture,
UCCE San Diego County
Mao Vue, Staff Research Associate, UCCE Southern California

UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

**AVOCADO SAMPLE ESTABLISHMENT AND PRODUCTION
COSTS AND PROFITABILITY ANALYSIS
FOR SAN DIEGO AND RIVERSIDE COUNTIES
ORGANIC PRODUCTION PRACTICES**

Based on data collected in 2011

TABLE OF CONTENTS

Title	Page
ABSTRACT	2
INTRODUCTION	2
Orchard Specification	3
Land Preparation	3
Planting	3-4
Pruning	4
Irrigation	4-5
Pest Management	5-6
Weed Management	6
Fertilization	6
Root Rot Treatment	7
HARVESTING, MARKETING, ORGANIC FEES, AND REIMBURSEMENT	7-9
INTEREST ON OPERATING CAPITAL	9
LABOR	9
EQUIPMENT	9
CASH OVERHEAD	9-10
NON-CASH OVERHEAD	10-11
SUMMARY OF PRODUCTION	11
PROFITABILITY ANALYSIS	11-13
Comparison between Conventional and Organic	13
REFERENCE	14

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 named product is intended, nor did criticism imply of similar products that are not mentioned. Consult with your organic program representative before using materials mentioned in this study or any other materials. Use of organic material requires approval from **Organic Material Review Institute**. Consult your organic program representative about any questions regarding such approval.

Funding for this project was provided in part by the California Avocado Commission.

ABSTRACT

There has been a growing interest of organic avocado production following consumer perceived preference for organic crops. San Diego and Riverside counties are among the top organic producing counties in California. These counties make up 62% of the organic avocado industry in California. The establishment and production costs and profitability analyses have been the fundamental tool that growers and investors use for investment analyses and decisions, conducting business transactions, and risk management strategies. In this study, we provide up to date costs of establishment and production and profitability; benchmark indicators for evaluating the viability and sustainability of organic avocado production. This study is based on assumptions of organic avocado orchard establishment and production practices that are considered typical in San Diego and Riverside counties and is based on 10 acres orchard. Data regarding production practices, inputs and prices was collected from growers, the University of California Cooperative Extension (UCCE) farm advisor, agricultural institutions, and supply and equipment dealers. While this study makes every effort to model an organic production system based on typical, real world practices, it cannot fully represent financial, agronomic, and market risks, which affect the profitability and economic viability of all organic producers.

INTRODUCTION

According to the California Department of Food and Agriculture (CDFA) there are currently about 4,825 organic avocado acres in California for 2010/2011. San Diego and Riverside are among the top organic producing counties. Together they make up 62% of the 2010/2011 organic avocado industry in California. Over the past decade, there has been a slow but steady increase in organic avocado acreage. In 2001/2002, there were about 1,680 organic acres in San Diego County and about 510 organic acres in Riverside County. In 2010/2011, organic avocado acreage increased to about 2,460 (51%) in San Diego County and about 525 (11%) in Riverside County.

We developed this study for growers, prospective growers, agricultural lenders, educators and all who are involved or have interest with the establishment and production of organic avocados in San Diego and Riverside counties. This study provides establishment and production practices, and estimates of financial requirements for establishing an organic avocado orchard and producing organic avocados. It also provides analyses of profitability.

This study is based on assumptions of typical organic practices for establishing and producing avocados in San Diego and Riverside counties in 2011. We are assuming that the production practices and costs are similar for both counties in most cases except for lower water costs in Riverside County. The assumptions of the typical practices were based on data we collected from growers and the UCCE farm advisor in the fall of 2011 and reviewed in 2012. While the assumptions outlined in this study may not fit all conditions, they represent current trends of production and the methodology can easily be adapted to address individual situations, and analyze expenditures, profits, and investments. When practices deviate from those give in this study, growers can substitute their own costs in the “Your Cost” column in the tables. They can compare their costs with ours, analyze the reasons for the differences, and make adjustments if necessary.

ASSUMPTIONS

The discussion in these sections includes production practices: inputs, application rates, time of application, and methods. Input prices, contract fees and service expenses are based on 2011 prices.

ORCHARD SPECIFICATION

This study is based on 11 acres of steep sloped hillside organic avocado plantings in San Diego and Riverside counties. Ten of the eleven acres are in the actual organic avocado production and one acre is in roads and farmstead. For an avocado orchard this size the majority of growers will have their house on the grove, however, we have made an effort to separate the household costs from orchard costs.

ESTABLISHMENT AND PRODUCTION PRACTICES

Land preparation. In San Diego and Riverside counties, there have been very little avocado orchard establishments on new open land since 2001. If new orchards are planted, they are commonly planted on previous avocado ground. Whereas new planting on previous avocado grounds would have roads and drainage systems already in place, we want the study to represent planting on new and open land in which case costs of establishment include new road building and drainage systems installations.

The land is required to be void of all chemical and synthetic materials for at least 3 years and is ready for organic production. The typical land preparation for an avocado orchard planting includes the following. Brush will be crushed by a crawler tractor to leave organic residue on the surface and help with erosion control. During the first year of establishment, orchard layout including planting spaces, installation of the irrigation and drainage systems and grading for erosion control are designed. Erosion control methods include paving the roads, installing drainage systems, and seeding the exposed areas of the ground. During the first year, these operations are done twice, most likely in Dec (1.5 hours) and Jan (1.5 hours) and are estimated to take 3 hours per acre. Erosion control is done throughout the life of the orchard and includes cleaning drains and sand bagging. From the second year onward, these operations are estimated to take 3 hours per acre and done in December and January. Roads are constructed before planting and strategically designed for easy travel access to people, trucks, equipment and ATVs in the orchard. The majority of the land preparation operations including irrigation and drainage system installations are done by contactors. The cost of clearing land, road building, and orchard layout is estimated to be \$2,500 per acre. Installation of the irrigation and drainage system is included in the cost of the irrigation system.

Planting. Planting space varies among growers in San Diego and Riverside counties. In the past, the common planting space was about 20'x 15' with 145 trees per acre. In recent years, there have been some trials on narrow space plantings. For this study, we used a spacing of 20'x15' with 145 trees per acre. Hass trees grafted onto clonal rootstock are the most common type used in these regions and in the major avocado producing counties of California.

Planting operations includes digging holes for plants with shovels and transporting the trees to the sites for planting. Moist backfill soil is placed in the holes and compressed to remove air

pockets. Trees are planted in the holes along with stakes and then wrapped. Gypsum (\$0.012 per pound) is applied to create conditions that suppress development of root rot. Two thousand one hundred and seventy-five pounds of gypsum (15 pounds per tree) is applied per acre and it takes about 12 hours per acre (5 minutes per tree) for hand applications. A layer of mulch in the tree rows is applied to help the soil retain moisture and contain weeds. Mulch also suppresses the development of root rot and reduces the adverse effects of saline soil and water (IPM, 2011). Mulch is applied in the first and third year. Each time, it is applied at 200 cubic yards per acre at a price of \$2.50 per cubic yard. It costs \$200 per acre for contractors to apply the mulch.

Clonal rootstock trees with wraps cost \$27.50 per unit and stakes (2x2x6ft) cost \$2.20 per unit based on bulk purchase price. Digging, planting, wrapping, and staking the trees are estimated to take 36.25 hours per acre (15 minutes per tree)

During the second year, some replanting of trees will take place to replace lost trees. For this study, 5 trees are replaced per acre. The price of replacement trees with wraps remains the same. Re-planting time also remains the same at 15 minutes per tree (a total of 1.25 hours per acre). Growers can also use the stakes and mulch used in the first year for the replaced trees.

Pruning. Pruning begins in establishment year 4. Pruning is needed for improving yield for profitability, reducing fertilization needs, and maximizing tree-bearing surfaces (Dixon, 2011). Pruning consists of removing deadwood and overcrowding branches, and creation and maintenance of desirable structure and size. Growers in these regions typically prune once per year in March starting in establishment year 4. Pruning is considered to take 6 minutes per tree in year 4; 7 minutes per tree in year 5; 9 minutes per tree in year 6; and pruning is considered to be done in January (11 minutes per tree) and June (5 minutes per tree) during production years.

Year	Acre-Inches per Acre per Year	Gallons per tree per year
1	6	1124
2	11	2060
3	16	2996
4	21	3933
5	26	4869
6	32	5993
7+	42	7865

IRRIGATION

Irrigation System. The cost of irrigation system varies depending on where farmers purchase their system and parts. Information for irrigation system and parts were gathered from various supply companies in these regions. We used \$2,660 per acre including installation for an irrigation system (drippers and micro sprinklers included).

The irrigation system is installed before planting in the first year of establishment. During year 1, one dripper is placed at root ball on one side of the tree. In year 2, a second dripper is added on the opposite side of the tree. In year 3, the drippers are replaced with micro sprinklers.

One micro sprinkler per tree, emitting on average 10 to 15 gallons of water per hour is used. Water should not wet the tree trunk in order to prevent diseases.

Irrigation Water Application Rate and Prices. The price of water varies depending on source (wells or district water), method, and pumping distances to the orchard. It also depends on pumping capacity, pump size, and elevation. In San Diego and Riverside counties, irrigation water source varies including purchase from local district and pumping from wells. Growers with orchards of over 25 acres are most to likely have their own wells. Water cost in San Diego

County is estimated at \$1,200 per acre-foot (\$100 per acre-inch) and \$650 per acre-foot (\$54 per acre-inch) for Riverside County; rates we arrived at based on information provided by growers, the UCCE farm advisor, and various water districts in these regions. Irrigation water use in San Diego and Riverside counties by tree age is presented in Table A.

Frequency and amount of irrigation depends on weather, rainfall, and location. Typically, growers irrigate from March through November. Number of irrigations in this study includes 58 irrigations from the first year of establishment throughout production years. Irrigation labor includes walking in the orchard to inspect the system, water flow, fixing leaky problems, or cleaning emitter clogs caused by rodents, insects, and chemical precipitations. Labor hours for irrigation are estimated at 14.50 hours per acre per year (15 minutes per irrigation per acre).

Pest Management. There are varieties of pests found in California avocado orchards. Some common types of pests include loopers, moths, thrips, persea mites, gophers, and squirrels. In California, avocado orchards are under good biological control due to beneficial insects that preys on harmful pests like the omnivorous looper and amorbia moth. The main pest issues in these study areas include avocado thrips and persea mites' reoccurrences. Thrips and persea mites control method for organic avocado production include application of material such as spinosad (Entrust) mixed with 1 % narrow range 415 oil (NR415) once per year in April beginning in establishment year 3 when trees reach bearing age. Three ounces (\$33.87 per ounce) of spinosad and 1 gallon (\$10 per gallon) of NR415 oil is applied per acre by aerial application (\$125 per acre by helicopter). According to UCIPM website, NR415 oil is approved for use on organic avocado productions. However, we suggest that growers consult with your organic certifier to ensure if NR415 oil is allowed for your specific operation. Growers in these regions also consult and contract with pest control advisors to monitor pest population levels in the orchard and release beneficial insects as needed. We estimated pest control advisors charge \$36 per acre per year starting from the third year of establishment.

Rodents (gopher and ground squirrel) also cause problems in avocado orchards. According to UC Integrated Pest Management program experts, gopher control is needed to prevent damage to young trees, their gnawing can damage sprinklers, and their tunnels can divert and carry off irrigation water. Gopher control is particularly needed during the first three years of establishment. Two gopher traps per acre are needed and set up during the first year of establishment after planting. Each trap costs \$7.50 per unit. The costs of traps are spread over the first three years of establishment (\$5 per acre per year); however, the traps can last up to ten years. Labor hours to check traps and collect dead gophers are estimated at 2 hours per acre per year (10 minutes per acre per month).

In addition, squirrel control is needed throughout the tree life or until squirrels are under control. Traps and organic bait are used for squirrel control in order to prevent tunneling through soil and erosion problems. Typically, one bait station with baits serves one acre. Each of the bait station costs \$2.30 and can last up to 10 years; therefore, the cost per acre per year becomes \$0.23. Organic bait is applied monthly throughout the year. Total bait application is 0.75 pound per acre per year (0.0625 pound per application per month) and cost \$7.23 per pound. Traps are set during the first year of establishment; one squirrel trap (\$20 per trap) is set between two acres (\$10 per acre) and lasts up to ten years before replacement. Therefore, the costs are spread over

ten years at \$1 per acre per year. It takes about 1.5 hours per acre per year (7.5 minutes per acre per month) to set trap, lay out bait station with bait, replenish bait, and collect dead squirrels during the first year of establishment. From the second year onward, it also takes 1.5 hours per acre per year (7.5 minutes per acre per month) to collect dead squirrels. Dead squirrels may also be collected throughout the year during other operations such as pruning, irrigation, and weed control.

There may be other pests present in avocado orchards of these study areas; therefore, growers can adjust their cost of pest management as applicable. For more information on pesticide use permits, contact your County Agricultural Commissioner’s office or Cooperative Extension farm advisors. The University of California also has pest management information on the UC Statewide Integrated Pest Management Program website at: <http://www.ipm.ucdavis.edu/PMG/selectnewpest.avocado.html>.

Weed Management. Weeds can harbor insects and pests and make it difficult for rodent control. Too much weed also interferes with efficient application of irrigation water to the avocado trees. The typical weed management practice for organic production is weed whipping. Weed whipping takes 5 hours per acre and is done once per year during establishment years 1 through 5; and 2 hours per acre for establishment year 6 throughout production years. As avocado trees mature, weed management will most likely reduce because the canopy shade will reduce weed growth.

Table B Nitrogen (N) Application Rates per Tree and per Acre Annually. Organic Fertilizer - Organic Crumbles (Bio Flora 8-8-4+8% cal.) Application Rates per Tree and per Acre Annually.

3 Applications Program (applied in Feb, June, Sept)

Year	Pounds of N per tree per year	Pounds of N per acre per year	Pounds of Organic Crumbles per tree per year	Pounds of Organic Crumbles per acre per year
1	0.15	21.75	1.88	271.88
2	0.30	43.5	3.75	543.75
3	0.45	65.25	5.63	815.63
4	0.60	87	7.50	1087.50
5	0.75	108.75	9.38	1359.38
6	0.90	130.5	11.25	1631.25
7+	1.05	152.25	13.13	1903.13

1 pound of organic crumble contains 8% nitrogen (N).

Fertilization. The amount of fertilizer application increases with tree age. Per our discussion with growers, fertilization takes place on a 3-month applications program in February, June, and September. Organic crumbles (Bio flora 8-8-4+8% cal.) is the most commonly used material for Nitrogen (N) in San Diego and Riverside counties. Organic crumbles cost \$0.41 per pound. Table B presents the amount of annual organic crumbles fertilizer that provides the N per tree and per acre. Organic crumbles are hand applied. Application time depends on the weight of the organic crumbles material carry to the trees. The time to carry the material to the trees and apply the organic crumbles is estimated to range from 4 to 8.50 hours per acre during the first five

years of establishment. The estimate increases to 9 to 11 hours per acre during establishment year 6 and beyond. Potassium is also applied using sulfate of potash (0-0-50). It is applied once per year in March at 100 pounds per acre through the irrigation system and costs \$0.90 per pound based on bulk purchase price.

Root Rot Treatment. For treatment of root rot, growers apply gypsum annually from establishment years throughout production years. Gypsum is hand applied once per year in August at 2,175 pounds per acre (15 pounds per tree) and takes about 12 hours (5 minutes per tree) to apply. Gypsum costs \$26.10 (\$0.012 per pound) per acre.

Road Repairs. For this study, road repairs are done during establishment year 2, 4, 5 and production years. Contract road repair costs about \$38 per acre per year.

HARVESTING, MARKETING, ORGANIC FEES, AND REIMBURSEMENT

Table C. Typical Avocado Yield for San Diego and Riverside Counties using Organic Production Practices

Year	Yield (lbs./acre)
3	600
4	2500
5	3700
6	5000
7+ (maturity)	7700

Yield. Fruit bearing begins in the third year of establishment. Table C presents the yield estimates provided by growers and the UCCE farm advisor. Based on our discussions with growers and the UCCE farm advisor, organic yield is considered lower than the conventional production. In this study, organic avocado yield is estimated at 15% lower than the conventional yield.

Fruit bearing begins the third year of establishment; and harvesting also begins the same year. Growers in San Diego and Riverside counties typically harvest from January to August depending on weather and production level. Harvesting costs include picking, hauling, and the California Avocado Commission assessment (CAC) fee. Picking fees based on growers and the UCCE farm advisor interviews are estimated at \$0.09 per pound for establishment years 3 and 4 and \$0.18 per pound for establishment year 5 and throughout production years for San Diego and Riverside counties. Hauling fee is assumed at equal distant from field to the nearest packinghouse or cooling house for all counties and is estimated at \$0.004 per pound. The CAC assessment fee is based on total crop value. The fee in 2011 was \$0.011 for every \$1.27 of crop value.

CDFA State Organic Program Registration. According to the California Department of Food and Agriculture (CDFA), every person involved in organic production must register with the state organic program. Growers are encouraged to register through their County Agricultural Commissioner’s office. First time registrant fee is \$75 per orchard (\$7.50 per acre for 10 acres orchard) regardless of expected sales in that year. First time registration is typically done in the third year (the year when harvest begins). Then in the following years, registration fees are based on annual gross sales therefore will increase as trees mature and yield increases. CDFA recommends grower register 30 days prior to harvest season. Therefore, growers’ registration of their annual gross sales is based on their expectation of prices and yield for the season. Growers must renew CDFA registration every 12 month from first registration date (CDFA, 2012). An organic fee schedule chart based on gross sales is available at the California Organic Program website: http://www.cdffa.ca.gov/is/docs/New_and_Amend_Organic_Registration.pdf
(Link can be view in the free version of Adobe Reader X program)

Based on our yield assumptions for San Diego and Riverside counties (Table C) registration fee estimations include the following: year 3 is \$75 per orchard (\$7.50 per acre based on 10 acres

orchard); year 4 and 5 is \$100 per orchard (\$10 per acre); year 6 and beyond is \$175 per orchard (\$17.50 per acre).

Organic Certification. According to CDFA, organic growers with gross sales exceeding \$5,000 must be certified. There are many organic certification programs in California and fees may be different from each other. In this study, we used the California Certified Organic Farmers (CCOF) certification program and fees. Growers are encouraged to do their own research and pick the certification program that best fits their needs. A list of CDFA approved organic certifiers is available on the state organic program website: <http://www.cdfa.ca.gov/is/docs/CertifiersListNew.pdf>.

According to the southern region CCOF representative, it may take up to 90 days to complete the application and inspection process. The one time application fee is \$275 per orchard (\$27.50 per acre based on 10 acres orchard) and the inspection fee is \$500 per orchard (\$50 per acre based on 10 acres orchard). Once a grower is certified, there are annual certification contract and renewal fees. Certification renewal fees are based on annual crop value and must be paid by the end of the calendar year in December and no later than January 1.

Certification renewal fees per orchard for San Diego and Riverside counties based on our assumptions of yield and crop values include \$200 (\$20 per acre for a 10 acres orchard) for establishment year 3; \$350 (\$35 per acre) for establishment year 4 and 5; \$525 (\$52.50 per acre) for establishment year 6 and production years. The CCOF certification fee schedule is available on the California Certified Organic Farmers website: <http://www.ccof.org/fees.php>.

USDA - CDFA Cost Share Program. The Cost Share Program is administered by the CDFA. The United States Department of Agriculture (USDA) has provided funds to the CDFA to be distributed to operations that have been certified organic by the USDA accredited certifiers. Growers can apply once per year for reimbursement. Growers can apply by submitting an application with a copy of certification, and copies of organic certification expenses. The Cost Share Program is on a first come first serve basis depending on availability of funding. According to the CDFA, eligible growers will be reimbursed up to 75% of their organic certification costs, not to exceed \$750 per year. Information on the Cost Share Program can be viewed at the CDFA Organic Program website: http://www.cdfa.ca.gov/is/i_&c/organic.html

For this study, we assumed growers apply to the Cost Share Program annually starting in establishment year 2 when organic application and inspection is done. For year 2, cost share reimbursement for San Diego and Riverside counties is \$58.13 per acre (\$581.25 per orchard). For year 3, reimbursement is \$15 per acre (\$150 per orchard); year 4 and 5 reimbursement is \$26.25 per acre (\$262.50 per orchard); year 6 and beyond reimbursement is \$39.38 per acre (\$393.75 per orchard).

Hass Avocado Board Assessment (HAB) Fee. Some growers indicated that they pay fees to first handlers who belong to the HAB; a 2.5-cent per pound assessment fee, which will be remitted to the HAB. According to 7 U.S.C. 7801-7813, first handler is defined as a Hass avocado marketing operator that sells domestic or imported Hass avocados for United States domestic consumption, and who is responsible for remitting assessment to the HAB (2000).

However, we do not have sufficient information whether all Hass avocado growers belong to HAB and whether or not they pay the HAB assessment fee. Therefore, we did not include the fee in this study. In addition, qualified organic growers may be exempt from the 2.5 cent per pound HAB assessment fee if they apply for exemption annually. For more information on HAB assessment, growers can check with their packinghouse (first handler) to see if they are required to pay the HAB assessment.

Price. Based on grower's interview and discussions with the UCCE farm advisor, organic avocados are considered to receive about \$0.20 more than conventional avocados. Using the conventional five year average price of \$1.07 (source: The California Avocado Commission); the organic price becomes \$1.27 per pound.

INTEREST ON OPERATING CAPITAL. Interest on operating capital is calculated at an annual operating loan (short-term) rate of 5.75% provided by Production Credit Association for 2011. The interest on operating capital reflects borrowing costs and or opportunity costs for money used in the cultural practices for establishment of an organic avocado orchard and producing organic avocados. An opportunity cost is the return forgone by choosing to produce avocados instead of using the money on other alternative investment options.

LABOR. Labor wages are based on information gathered from growers, includes owner, and hired services. The wage rates used for this study including benefits are \$14 per hour for manual labor and \$18 per hour for skilled labor. Skilled laborers include pick-up truck and ATV drivers.

EQUIPMENT. The equipment complement includes pick-up truck for material deliveries and for trips to the market for supplies; and an ATV for irrigation system checks, erosion control, and rodent control. For this study, we assumed a pick-up truck is used for 7.5 hours per acre per year and the ATV is used for 15 hours per acre per year.

Equipment operating cash costs including fuel, lubrication, and repairs are calculated using formulas and coefficients developed by the American Society of Agricultural Engineer (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. For this study, we used average fuel prices of \$3.85 per gallon for gasoline and \$3.44 per gallon for diesel, obtained from the U.S. Energy Information Administration.

CASH OVERHEAD

Office Expenses. Expenses in this category include office supplies, telephone services, faxes, photocopies, computers, bookkeeping, accounting, legal fees, and so on. Although many growers with orchards this size (10 acres) may run their business from home and may not separate the business and home overhead expenses, we made an attempt to account the business expenses separately. Office expenses are estimated at \$120 per acre per year based on information gathered from growers.

Property Taxes. San Diego and Riverside counties charge a base property tax rate of 1% on the assessed value of property, including land, equipment, buildings, and improvements. There may also be additional taxes on property in special assessment districts but for this study, we calculated county taxes at 1% (the base rate) of the value of the properties.

Property Insurance. Growers also carry insurance for property protection, which is typically calculated at 7.75% of the average value of assets for 2011.

Investment Repairs. Investment repairs and maintenances are calculated at 2 to 3% of investment values as suggested in some farm management books. For buildings and tools, we calculated repairs at 2%. For the irrigation system and parts, we calculated repairs at 2%.

Interest on Establishment. Interest on establishment is also calculated using the annual operating loan (short-term) rate of 5.75% on the accumulated loan during the first six years of establishment.

Other expenses. Other overhead expenses include leaf analysis, soil analysis, liability insurance and sanitation fees. Leaf analysis is done using a sample of about 40 leaves picked from different trees throughout the orchard and is typically conducted in September. It costs \$55 for a 10 acres orchard (\$5.50 per acre in our study). Soil analysis is also conducted in September; it costs \$70 for a 10 acres orchard (\$7 per acre in our study). Growers also carry annual liability insurance to cover accidents. For farm size smaller than 25 acres, liability insurance costs \$477 per orchard (\$47.70 per acre for 10 acres orchard) per year and typically paid in June. Sanitation fees are not included in this study because the need for sanitation facility is during harvesting which is provided by harvesting contractors. Growers rarely rent sanitation facility during the remaining part of the production year.

NON-CASH OVERHEAD COSTS

Land Rent. Currently very little new plantings are taking place on open land in San Diego and Riverside counties. Most plantings have been on land that had been previously avocado orchard; therefore, information on new land value was not available from the growers or appraisers.

Market prices for land usually show not only the production value of land but also the speculative value of land, which include its uses for non-agricultural purposes. We investigated multiple sources to come up with a reasonable land value for agricultural purposes. We used the values published by the California Chapter of the American Society of Farm Managers and Rural Appraisers annual publications on land values and leases. The land values published for avocados in San Diego and Riverside counties ranged from \$14,000 to \$22,000 per acre. We used the high end (\$22,000) for these counties and estimated the opportunity costs (the return foregone from investing in other alternative) of land at 4.75% which is California's long-term rate of return on agricultural production assets from current income.

Ownership Costs of Farm Equipment and Investments. We used the capital recovery method to calculate ownership cost 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 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 a 60% of new prices to reflect a mix of old and new equipment complement.

Amortized Establishment Cost. In this study, we used the first six years as establishment period. The cumulative establishment costs (accumulated costs of establishment less the gross income for years 1- 6) in San Diego County are \$43,626 per acre and \$37,798 per acre in Riverside County. The establishment cost is then amortized at the long-term average rate of return on agricultural production asset from current income over a 30-year productive life to determine the annual amount that must be recovered from the investment.

SUMMARY OF PRODUCTION COSTS

Our estimate of total annual production cost for organic avocados is \$14,420 per acre for San Diego County and \$12,053 per acre for Riverside County. Production costs by type of activity and by type of inputs are presented in tables 3 and 5, respectively, for San Diego County, and in tables 4 and 6, respectively, for Riverside County.

The production costs breakdown for San Diego County include 50% (\$7,245) accounted for by cultural (production) practices (consisting of pruning, weed control, erosion control, pest control, fertilization, irrigation, and road repair); 11% (\$1,555) by harvesting (picking, hauling, marketing, and organic fees); 1% (\$142) by interest on operating capital; 8% (\$1,164) by cash overhead costs (liability insurance, soil analysis, leaf analysis, office expenses, property taxes, property insurance, and investment repairs); and 30% (\$4,314) by non-cash overhead costs (annual ownership costs for equipment, buildings, tools, irrigation system, and amortization of accumulated tree establishment). For Riverside County, the production costs breakdown include 43% (\$5,313) accounted for by cultural (production) practices; 13% (\$1,555) by harvesting; 1% (\$127.47) by interest on operating capital; 10% (\$1,112) by cash overhead costs; and 33% (\$3,945) by non-cash overhead costs.

PROFITABILITY ANALYSIS

We analyzed profitability of producing avocados in San Diego and Riverside counties for organic production. We calculated break-even costs per pound and economic margins. Break-even costs allow growers to compare expected market prices with the unit cost of production. A break-even cost is the per unit cost of production; that is the total cost of production per acre divided by yield per acre.

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 time yield) minus cash costs of production and overhead.

Economic profit or returns above total costs including management are 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 fees, are included in the production cost. In this study, we do not include management charges, so the return after all costs is deducted reflect returns to management. Returns to management are calculated as gross returns minus cash and non-cash costs of production.

Given the typical yield assumptions we used in this study of 7,700 pounds, the break-even cost is estimated at \$1.87 per pound for San Diego County and \$1.57 per pound for Riverside County. Given the price assumption of \$1.27 per pound, the profit margin (returns to management) therefore equals about -\$0.60 per pound (-\$4,641 per acre) for San Diego and about -\$0.30 per pound (-\$2,274 per acre) for Riverside County.

Returns above Costs. We realize that many of the avocado growers in San Diego and Riverside counties have older and mature avocado orchards; therefore may have very little or no debt on their investments in land, buildings, irrigation systems, tools, and equipment. However, we developed this cost study of establishment and production of a new avocado orchard in San Diego and Riverside counties and provide investors with up to date (2011) investment and profitability benchmarks and to reflect the opportunity cost of producing avocados.

The cost of production and profitability analyses, given the planting space of 20' x 15' and yield of 7,700 pounds of organic avocados shows that the cash cost per pound of production to be \$1.31 and the total cost per pound to be \$1.87 for San Diego County; and \$1.05 per pound for cash cost and \$1.57 per pound for total cost for Riverside County. Given growers comments of the price of organic avocados to be \$0.20 more than the conventional; the price is \$1.27 per pound, the gross margin (profit after cash costs) therefore equals about -\$0.04 per pound (-\$327 per acre) and the net margin (returns to management - profit after all costs except management) equals about -\$0.60 per pound (-\$4,641 per acre) for San Diego County. For Riverside County, the gross margin equals about \$0.22 per pound (\$1,671 per acre) and the net margin equals about -\$0.30 per pound (-\$2,274 per acre).

Crop yield and prices received by growers vary from individual to individual. Therefore, we provided range analyses including break-even costs at various yields as well as gross margins and returns to management at various yields and price combination so that growers can approximate their orchard's profitability using the price and yield combination that would fit their operation.

Risk. There are several risks associated with producing and marketing organic avocados. Production risks are associated with various sources of uncertainty including insect damage, diseases, and severe frost that affect organic production. Frost is the main production risk in San Diego and Riverside counties. The market and price of organic avocados are also very volatile. They are caused by factors such as increase in supply and or decrease in demand for organic avocados.

While this study makes every effort to model a production system based on typical, real world practices, it cannot fully represent financial, agronomic, and market risks, which affect the profitability and economic viability of all producers. Access to information on organic

production practices, prices, and markets are crucial for those involved in organic avocado production and marketing of the crop.

Comparison between Conventional and Organic Avocado Orchard Establishment and Production Costs in San Diego and Riverside Counties. Our study shows that establishment and production costs are slightly lower in Riverside County due to lower water costs than San Diego County. However, returns are equally undesirable in both counties due to high production costs.

Among production practices, organic orchard establishment costs are higher by ~12% (\$5,391 for San Diego and Riverside) than conventional avocado establishment costs. The major part of the differences in the establishment years is accounted for by fertilization and pest control methods. During establishment years 1- 6, organic fertilizer costs \$3,455 per acre and pest management costs \$1,355 per acre. In comparison, conventional fertilization costs only \$607 per acre and pest management costs \$1,024 per acre.

In production year, costs of organic avocados production exceeded that of the conventional production by about \$1,440 per acre. The major part of that cost is accounted for by organic fertilization, which is (\$1,021 per acre) five times more than conventional fertilization (\$195 per acre). Difference in pest control is not very much. The cost for organic pest control is \$300 per acre in comparison to \$216 per acre for conventional methods.

Profitability estimate of organic avocados in these counties is lower than avocados produced conventionally. Though organic avocados are considered to receive \$0.20 more per pound than conventional avocados, organic avocado production shows lower yield than the conventional production. Per information from growers' and the UCCE farm advisor interviews, organic avocado production is estimated to yield about 15% less than the conventional methods. Hence, returns to management of organic avocados production are estimated to be -\$4,641 per acre vs. -\$3,350 per acre for conventional production in San Diego County and -\$2,274 per acre vs. -\$983 for conventional in Riverside County.

Future Studies – Narrow Spacing. Recently, we learned from the UCCE farm advisor in San Diego County that there are a small number of growers that increased their yield per acre through narrow spaced orchards. These are relatively new orchards and not widely adopted. Farm Advisor Gary Bender in his article titled Avocado Farming with High Priced Water (Subtropics Volume 10 No.2) wrote that he saw high yielding narrow spaced orchards, which he thought, might bring hope to avocado production for the future in San Diego and Riverside counties. He said that the costs and the knowhow of pruning would be key factors to determine profitability of such narrow spacing. With the new funding, he obtained from the California Avocado Commission to study effective pruning methods, future costs of establishment and production will incorporate this information and analyze profitability of narrow space planting of avocados in San Diego and Riverside counties.

REFERENCE

- American Society of Agricultural Engineers. (1992). American Society of Agricultural Engineers Standards Yearbook. St. Joseph, MI.: ASAE.
- Bender, G. S. (1999). Avocado Fertilization. University California Cooperative Extension. San Diego, CA.
- Bender, G. S. (1999). Avocado Irrigation Guide. University California Cooperative Extension. San Diego, CA.
- Bender, G. S. Orchard Operations for Avocados in San Diego County. University California Cooperative Extension. San Diego, CA.
- Boehlje, M. D., and V. R. Eidman. (1984). Farm Management. John Wiley and Sons. New York, NY.
- California Avocado Crop Statistics. (2011). California Avocado Commission. Santa Ana, CA.
- Dixon, J. 2010, Growers seminar 2010/2011, Handout for Pruning for Production: November
- Etaferahu, T., Bender, G., and Chambers, S. (2001). Avocado Sample Establishment and Production Costs and Profitability Analysis for San Diego and Riverside Counties, Based on 2001 Data Collected in San Diego and Riverside Counties, California. University of California Cooperative Extension.
- Fees and Renewal Information. (2011). California Certified Organic Farmers. Retrieved Nov 2011, from <https://www.ccof.org/fees.php>
- Gasoline and Diesel Fuel. (2011) U.S. Energy Information Administration. Retrieved Aug 2011 from <http://www.eia.gov/petroleum/gasdiesel/>
- Integrated Pest Management Education and Publications. (2011). UC IPM Pest Management Guidelines, Avocado. In Faber, B. A., P.A. Phillips, L. J. Marais, B. B. Westerdahl, and U.C. Kodira (Ed.). University of California. Division of Agriculture and Natural Resources. Oakland, CA. Publication 3339. <http://www.ipm.ucdavis.edu/PMG/selectnewpest.avocado.html>
- Organic Sales Report (2010). California Organic Program, California Department of Food and Agriculture. Sacramento, CA.
- New and Amended Organic Registration Packet. (2011). California Department of Food and Agriculture. Retrieved Nov 2011, from http://www.cdfa.ca.gov/is/docs/New_and_Amend_Organic_Registration.pdf
- Riverside County Agricultural Commissioner and Weights & Measures. Agricultural Crop Reports 2001-2011. Riverside, CA.
- San Diego Department of Agricultural, Weights, and Measures. Crop Statistics and Annual Reports 2001-2011. San Diego, CA.
- Schwankel, L., T. Prichard, B. Hanson, and I. Wellman. (2000). Costs of Pressurized Irrigation Systems for Tree Crops. University of California Agriculture and Natural Resources. Oakland, CA.
- Trends in Agricultural Land and Lease Values. (2010-2011). California Chapter of the American Society of Farm Managers and Rural Appraisers. Sacramento, CA. Retrieved Aug 2011, from <http://www.calasfmra.com/trends.php>

Table 1. Costs per Acre to Establish an Avocado Orchard in San Diego County using Organic Production Practices in 2011

OPERATING COSTS:	Year 1	Year2	Year 3	Year 4	Year 5	Year 6
Pre-plant:						
Clear Land, Road Built, Orchard Layout	2500					
TOTAL Pre-plant COSTS	2500					
Plant:						
Avocado Trees, Stakes, & Labor	4,814					
Gypsum & Labor	194.1					
Mulch & Labor	700					
TOTAL Plant COSTS	5,708					
Replant:						
Replacement Trees & Labor (5 trees/acre)		155				
TOTAL Replant COSTS		155				
Cultural:						
Mulch & Labor			700			
Erosion Control (2x/yr.)	42	42	42	42	42	42
Weed Control - weed whipping	70	70	70	70	70	28
Rodent Control for Gophers - traps & labor (12x/yr.)	33	33	33			
Rodent Control for Squirrels - trap, bait station, baits, labor (12x/yr.)	27.65	27.65	27.65	27.65	27.65	27.65
Fertilizer - organic crumbles (Bio Flora 8-8-4+8% cal) & labor (3x/yr.)	167.61	294.90	422.19	549.62	676.9	804.19
Fertilizer - sulfate of potash 0-0-50	90	90	90	90	90	90
Irrigation & Walk Lines (58 irrigations/yr.)	803	1303	1803	2303	2,803	3,403
Misc. pickup truck (labor, fuel, lube & repairs)	227	227	227	227	227	227
Misc. ATV (labor, fuel, lube & repairs)	450	450	450	450	450	450
Root Rot Treatment - gypsum & labor		194.10	194.10	194.10	194.10	194.10
Misc. Road Repair		38		38	38	
Pest Control - spinosad (Entrust), NR415 oil, helicopter rental			236.61	236.61	236.61	236.61
Pest Control Advisor			36	36	36	36
Orchard Pruning				203	236.74	304.5
TOTAL Cultural COSTS	1910	2770	4,332	4,467	5,128	5,843
Harvesting, Marketing, Organic Fees, & Reimbursement:						
Organic Certification Application & Inspection		77.5				
CDFA State Organic Registration fee			7.50	10	10	17.5
Organic Certification renewal fee (based on CCOF rates)			20	35	35	52.5
USDA - CDFA Cost Share Program Reimbursement		-58.13	-15	-26.25	-26.25	-39.38
Picking - Yr. 3-4 \$0.09/lb.; Yr. 5-7 \$0.18/lb.			54	225	666	900
Hauling - \$0.004/lb.			2.40	10	14.8	20
CAC assessment - \$0.011 x production value			8.38	34.93	51.69	69.85
TOTAL HARVESTING, MARKETING, AND ORGANIC FEES COSTS		19.38	77	289	751	1020
Interest on Operating Capital @ 5.75%	550.96	118.54	90.33	83.53	100.06	112.07
TOTAL OPERATING COSTS/ACRE	10,670	3063	4,499	4,839	5,979	6976

Table 1. Costs per Acre to Establish an Avocado Orchard in San Diego County using Organic Production Practices in 2011, cont.

CASH OVERHEAD:						
Liability Insurance	47.70	47.70	47.70	47.70	47.70	47.70
Interest on Operating Capital - cash overhead	25.32	25.32	25.32	25.32	25.32	25.32
Leaf Analysis	5.50	5.50	5.50	5.50	5.50	5.50
Soil Analysis	7	7	7	7	7	7
Office Expenses	120	120	120	120	120	120
Property Taxes	260	325	356	393	422	451
Property Insurance	230	281	305	333	356	378
Investment Repairs	81	81	81	81	81	81
Interest on Establishment		748	1108	1530	1861	2193
TOTAL CASH OVERHEAD COSTS/ACRE	777	1640	2055	2543	2926	3308
TOTAL CASH COSTS	11446	4703	6,555	7,382	8,905	10284
INCOME FROM PRODUCTION	0	0	762	3175	4699	6350
NET CASH COSTS FOR THE YEAR	11446	4703	5,793	4,207	4,206	3934
ACCUMULATED NET CASH COSTS	11446	16149	21,942	26,149	30,355	34,289
NON-CASH OVERHEAD:						
Land	1,045	1,045	1,045	1,045	1,045	1,045
Building	57.41	57.41	57.41	57.41	57.41	57.41
Tools	24.66	24.66	24.66	24.66	24.66	24.66
Irrigation System	152.7	152.7	152.7	152.7	152.7	152.7
Equipment	276.42	276.42	276.42	276.42	276.42	276.42
TOTAL NON-CASH OVERHEAD COSTS	1556	1556	1556	1556	1,556	1,556
TOTAL COSTS/ACRE	13003	6259	7,349	5,764	5,762	5,490
TOTAL ACCUMULATED NET COST	13003	19261	26,610	32,374	38,136	43,626

Table 2. Costs per Acre to Establish an Avocado Orchard in Riverside County using Organic Production Practices in 2011

OPERATING COSTS:	Year 1	Year2	Year 3	Year 4	Year 5	Year 6
Pre-plant:						
Clear Land, Road Built, Orchard Layout	2500					
TOTAL Pre-plant COSTS	2500					
Plant:						
Avocado Trees, Stakes, & Labor	4,814					
Gypsum & Labor	194.1					
Mulch & Labor	700					
TOTAL Plant COSTS	5,708					
Replant:						
Replacement Trees & Labor (5 trees/acre)		155				
TOTAL Replant COSTS		155				
Cultural:						
Mulch & Labor			700			
Erosion Control (2x/yr.)	42	42	42	42	42	42
Weed Control - weed whipping	70	70	70	70	70	28
Rodent Control for Gophers - traps & labor (12x/yr.)	33	33	33			
Rodent Control for Squirrels - trap, bait station, baits, labor (12x/yr.)	27.65	27.65	27.65	27.65	27.65	27.65
Fertilizer - organic crumbles (Bio Flora 8-8-4+8% cal) & labor (3x/yr.)	167.61	294.90	422.19	549.62	676.9	804.19
Fertilizer - sulfate of potash 0-0-50	90	90	90	90	90	90
Irrigation & Walk Lines (58 irrigations/yr.)	527	797	1067	1337	1,607	1,931
Misc. pickup truck (labor, fuel, lube & repairs)	227	227	227	227	227	227
Misc. ATV (labor, fuel, lube & repairs)	450	450	450	450	450	450
Root Rot Treatment - gypsum & labor		194.10	194.10	194.10	194.10	194.10
Misc. Road Repair		38		38	38	
Pest Control - spinosad (Entrust), NR415 oil, helicopter rental			236.61	236.61	236.61	236.61
Pest Control Advisor			36	36	36	36
Orchard Pruning				203	236.74	304.5
TOTAL Cultural COSTS	1634	2264	3,596	3,501	3,932	4,371
Harvesting, Marketing, Organic Fees, & Reimbursement:						
Organic Certification Application & Inspection		77.5				
CDFA State Organic Registration fee			7.50	10	10	17.5
Organic Certification renewal fee (based on CCOF rates)			20	35	35	52.5
USDA - CDFA Cost Share Program Reimbursement		-58.13	-15	-26.25	-26.25	-39.38
Picking - Yr. 3-4 \$0.09/lb.; Yr. 5-7 \$0.18/lb.			54	225	666	900
Hauling - \$0.004/lb.			2.40	10	14.8	20
CAC assessment - \$0.011 x production value			8.38	34.93	51.69	69.85
TOTAL HARVESTING, MARKETING, AND ORGANIC FEES COSTS		19.38	77.28	289	751	1020
Interest on Operating Capital @ 5.75%	543.21	104.33	84.8	76.28	91.08	101.01
TOTAL OPERATING COSTS/ACRE	10,386	2543	3,758	3,866	4,775	5493

Table 2. Costs per Acre to Establish an Avocado Orchard in Riverside County using Organic Production Practices in 2011, cont.

CASH OVERHEAD:						
Liability Insurance	47.70	47.70	47.70	47.70	47.70	47.70
Interest on Operating Capital - cash overhead	25.32	25.32	25.32	25.32	25.32	25.32
Leaf Analysis	5.50	5.50	5.50	5.50	5.50	5.50
Soil Analysis	7	7	7	7	7	7
Office Expenses	120	120	120	120	120	120
Property Taxes	260	327	352	385	408	430
Property Insurance	230	283	302	327	345	362
Investment Repairs	81	81	81	81	81	81
Interest on Establishment		731	1061	1437	1707	1959
TOTAL CASH OVERHEAD COSTS/ACRE	777	1628	2001	2436	2747	3038
TOTAL CASH COSTS	11163	4171	5,759	6,302	7,522	8530
INCOME FROM PRODUCTION	0	0	762	3175	4699	6350
NET CASH COSTS FOR THE YEAR	11163	4171	4,997	3,127	2,823	2180
ACCUMULATED NET CASH COSTS	11163	15333	20,330	23,458	26,280	28,460
NON-CASH OVERHEAD:						
Land	1,045	1,045	1,045	1,045	1,045	1,045
Building	57.41	57.41	57.41	57.41	57.41	57.41
Tools	24.66	24.66	24.66	24.66	24.66	24.66
Irrigation System	152.7	152.7	152.7	152.7	152.7	152.7
Equipment	276.42	276.42	276.42	276.42	276.42	276.42
TOTAL NON-CASH OVERHEAD COSTS	1556	1556	1556	1556	1,556	1,556
TOTAL COSTS/ACRE	12719	5727	6,553	4,683	4,379	3,737
TOTAL ACCUMULATED NET COST	12719	18446	24,999	29,682	34,061	37,798

Table 3. Costs per Acre to Produce Avocados in San Diego County using Organic Production Practices in 2011

UC COOPERATIVE EXTENSION								
Operation	Cash and Labor Costs per Acre						Total Cost	Your Cost
	Operation Time (Hrs/A)	Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/Rent		
Cultural:								
Erosion Control (2x/yr.)	3	42	0	0	0	0	42	
Weed Control - weed whipping	2	28	0	0	0	0	28	
Rodent Control for Squirrels (12x/yr.)	1.5	21	0	0	6.65	0	27.65	
Fertilizer - sulfate of potash (0-0-50%)	0	0	0	0	90	0	90	
Fertilizer - organic crumbles (Bio flora 8-8-4+8% cal) & labor (3x/yr.)	10.8	151.2	0	0	780.28	0	931.48	
Irrigate & Walk Lines (58 irrigations/yr.)	14.5	203	0	0	4,200	0	4,403	
Misc. pickup truck (labor, fuel, lube & repairs)	7.5	162	43.31	22.03	0	0	227	
Misc. ATV (labor, fuel, lube & repairs)	15	324	83.19	42.66	0	0	450	
Root Rot Treatment - gypsum & labor	12	168	0	0	26.1	0	194.1	
Misc. Road Repair	0	0	0	0	0	38	38	
Pest Control - spinosad (Entrust), NR415 oil, helicopter rental	0	0	0	0	111.61	125	236.61	
Pest Control Advisor	0	0	0	0	0	36	36	
Orchard Pruning	38.66	541.24	0	0	0	0	541.24	
TOTAL CULTURAL COSTS	104.96	1640.44	126.5	64.69	5214.64	199	7245	
Harvesting, Marketing, Organic Fees, & Reimbursement:								
CDFA State Organic Registration fee	0	0	0	0	0	17.5	17.5	
Organic Certification renewal fee (based on CCOF rates)	0	0	0	0	0	52.5	52.5	
USDA - CDFA Cost Share Program Reimbursement	0	0	0	0	0	-39.38	-39.38	
Picking - \$.18/lb.	0	1386	0	0	0	0	1,386	
Hauling - \$.004/lb.	0	30.8	0	0	0	0	30.8	
CAC assessment - \$.011 x production value	0	0	0	0	0	107.57	107.57	
TOTAL HARVESTING, MARKETING, AND ORGANIC FEES COSTS	0	1416.8	0	0	0	138.19	1,555	
Interest on Operating Capital @ 5.75%							142.00	
TOTAL OPERATING COSTS/ACRE	104.96	3057.24	126.5	64.69	5214.64	337.19	8942	
CASH OVERHEAD:								
Liability Insurance							47.7	
Interest on Operating Capital - cash overhead							25.32	
Leaf Analysis							5.5	
Soil Analysis							7	
Office Expenses							120	
Property Taxes							478	
Property Insurance							399	
Investment Repairs							81	
TOTAL CASH OVERHEAD COSTS/ACRE							1,164	
TOTAL CASH COSTS/ACRE							10,106	
NON-CASH OVERHEAD:								
	Per producing Annual Cost							
	Acre	Capital Recovery						
Land	22,000	1,045					1,045	
Building	1,000	57.41					57.41	
Tools	400	24.66					24.66	
Irrigation System	2,660	152.7					152.7	
Amortized Establishment Cost	43,626	2,758					2,758	
Equipment	2,860	276.42					276.42	
TOTAL NON-CASH OVERHEAD COSTS	72,546	4,314					4,314	
TOTAL COSTS/ACRE							14,420	

Table 4. Costs per Acre to Produce Avocados in Riverside County using Organic Production Practices in 2011

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		
Cultural:								
Erosion Control (2x/yr.)	3	42	0	0	0	0	42	
Weed Control - weed whipping	2	28	0	0	0	0	28	
Rodent Control for Squirrels (12x/yr.)	1.5	21	0	0	6.65	0	27.65	
Fertilizer - sulfate of potash (0-0-50%)	0	0	0	0	90	0	90	
Fertilizer - organic crumbles (Bio flora 8-8-4+8% cal) & labor (3x/yr.)	10.8	151.2	0	0	780.28	0	931.48	
Irrigate & Walk Lines (58 irrigations/yr.)	14.5	203	0	0	2,268	0	2,471	
Misc. pickup truck (labor, fuel, lube & repairs)	7.5	162	43.31	22.03	0	0	227	
Misc. ATV (labor, fuel, lube & repairs)	15	324	83.19	42.66	0	0	450	
Root Rot Treatment - gypsum & labor	12	168	0	0	26.1	0	194.1	
Misc. Road Repair	0	0	0	0	0	38	38	
Pest Control - spinosad (Entrust), NR415 oil, helicopter rental	0	0	0	0	111.61	125	236.61	
Pest Control Advisor	0	0	0	0	0	36	36	
Orchard Pruning	38.66	541.24	0	0	0	0	541.24	
TOTAL CULTURAL COSTS	104.96	1640.44	126.5	64.69	3282.64	199	5313	
Harvesting, Marketing, Organic Fees, & Reimbursement:								
CDFA State Organic Registration fee	0	0	0	0	0	17.5	17.5	
Organic Certification renewal fee (based on CCOF rates)	0	0	0	0	0	52.5	52.5	
USDA - CDFA Cost Share Reimbursement	0	0	0	0	0	-39.38	-39.38	
Picking - \$.18/lb.	0	1386	0	0	0	0	1,386	
Hauling - \$.004/lb.	0	30.8	0	0	0	0	30.8	
CAC assessment - \$.011 x production value	0	0	0	0	0	107.57	107.57	
TOTAL HARVESTING, MARKETING, AND ORGANIC FEES COSTS	0	1416.8	0	0	0	138.19	1,555	
Interest on Operating Capital @ 5.75%							127.47	
TOTAL OPERATING COSTS/ACRE	104.96	3057.24	126.5	64.69	3282.64	337.19	6996	
CASH OVERHEAD:								
Liability Insurance							47.7	
Interest on Operating Capital - cash overhead							25.32	
Leaf Analysis							5.5	
Soil Analysis							7	
Office Expenses							120	
Property Taxes							449	
Property Insurance							377	
Investment Repairs							81	
TOTAL CASH OVERHEAD COSTS/ACRE							1,112	
TOTAL CASH COSTS/ACRE							8,108	
NON-CASH OVERHEAD:								
		Per producing Annual Cost						
		Acre	Capital Recovery					
Land		22,000	1,045				1,045	
Building		1,000	57.41				57.41	
Tools		400	24.66				24.66	
Irrigation System		2,660	152.7				152.7	
Amortized Establishment Cost		37,798	2,389				2,389	
Equipment		2,860	276.42				276.42	
TOTAL NON-CASH OVERHEAD COSTS		66,718	3,945				3,945	
TOTAL COSTS/ACRE							12,053	

Table 5. Costs and Returns per Acre to Produce Avocados in San Diego County using Organic Production Practices in 2011

UC COOPERATIVE EXTENSION				
	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre
GROSS RETURNS				
Organic Avocados	7,700	lb	\$1.27	\$9,779
TOTAL GROSS RETURNS	7,700	lb		\$9,779
OPERATING COSTS				
Custom:				199
Helicopter rental	1	acre	125	125
Pest Control Advisor	1	acre	36	36
Misc. Road Repairs	1	acre	38	38
Water:				4,200
San Diego Water	42	ac-in	100	4,200
Fertilizers:				896.38
Potassium Sulfate -SOP 0-0-50	100	lb	0.9	90
Organic Crumbles	1903.13	lb	0.41	780.28
Gypsum (Calcium Sulfate)	2175	lb	0.01	26.1
Insecticide:				111.61
Spinosad	3	oz	33.87	101.61
Narrow Range Oil	1	gal	10	10
Harvest:				1,524.37
Picking - \$0.18/lb	7700	lb	0.18	1,386
Hauling - \$0.004/lb	7700	lb	0.004	30.8
CAC Assessment fee - \$0.011	9779	production value	0.011	107.57
Rodenticide:				6.65
Squirrel Trap	1	acre	1	1
Squirrel Bait Station	1	acre	0.23	0.23
Organic Squirrel Bait	0.75	lb	7.23	5.42
Organic Assessment Fee:				30.6
CDFA Registration Fee	1	acre	17.5	17.5
Annual Certification Fee	1	acre	52.5	52.5
USDA - CDFA Cost Share Reimbursement	1	acre	-39.38	-39.38
Labor:				1,640.44
Equipment Operator Labor	27	hr	18	486
Manual Labor	67.96	hr	14	951.44
Irrigation Labor	14.5	hr	14	203
Machinery:				191.19
Fuel-Gas	32.86	gal	3.85	126.5
Fuel-Diesel	0	gal	3.44	0
Lube				18.98
Machinery Repair				45.72
Interest on Operating Capital (5.75%)				142.00
TOTAL OPERATING COSTS/ACRE				8,942
NET RETURNS ABOVE OPERATING COSTS				837
CASH OVERHEAD COSTS				
Liability Insurance			47.7	47.7
Leaf Analysis			5.5	5.5
Soil Analysis			7	7
Office Expenses			120	120
Property Taxes			478	449
Property Insurance			399	377
Interest on Operating Capital - cash overhead			25.32	25.32
Investment Repairs			81	81
TOTAL CASH OVERHEAD COSTS/ACRE				1,164
TOTAL CASH COSTS/ACRE				10,106
NET RETURNS ABOVE CASH COSTS				-327
NON-CASH OVERHEAD COSTS (Capital Recovery)				
Land			1,045	1,045
Building			57.41	57.41
Tools			24.66	24.66
Irrigation System			152.70	152.70
Amortized Establishment Cost			2,758	2,389
Equipment			276.42	276.42
TOTAL NON-CASH OVERHEAD COSTS				3,945
TOTAL COST/ACRE				14,420
TOTAL COST/Lb				1.87
NET RETURNS ABOVE TOTAL COST				-4,641

Table 6. Costs and Returns per Acre to Produce Avocados in Riverside County using Organic Production Practices in 2011

UC COOPERATIVE EXTENSION				
	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre
GROSS RETURNS				
Organic Avocados	7,700	lb	\$1.27	\$9,779
TOTAL GROSS RETURNS	7,700	lb		\$9,779
OPERATING COSTS				
Custom:				199
Helicopter rental	1	acre	125	125
Pest Control Advisor	1	acre	36	36
Misc. Road Repairs	1	acre	38	38
Water:				2,268
Riverside Water	42	ac-in	54	2,268
Fertilizers:				896.38
Potassium Sulfate -SOP 0-0-50	100	lb	0.9	90
Organic Crumbles	1903.13	lb	0.41	780.28
Gypsum (Calcium Sulfate)	2175	lb	0.01	26.1
Insecticide:				111.61
Spinosad	3	oz	33.87	101.61
Narrow Range Oil	1	gal	10	10
Harvest:				1,524.37
Picking - \$0.18/lb	7700	lb	0.18	1,386
Hauling - \$0.004/lb	7700	lb	0.004	30.8
CAC Assessment fee - \$0.011	9779	production value	0.011	107.57
Rodenticide:				6.65
Squirrel Trap	1	acre	1	1
Squirrel Bait Station	1	acre	0.23	0.23
Organic Squirrel Bait	0.75	lb	7.23	5.42
Organic Assessment Fee:				30.6
CDFA Registration Fee	1	acre	17.5	17.5
Annual Certification Fee	1	acre	52.5	52.5
USDA - CDFA Cost Share Reimbursement	1	acre	-39.38	-39.4
Labor:				1,640.44
Equipment Operator Labor	27	hr	18	486
Manual Labor	67.96	hr	14	951.44
Irrigation Labor	14.5	hr	14	203
Machinery:				191.19
Fuel-Gas	32.86	gal	3.85	126.5
Fuel-Diesel	0	gal	3.44	0
Lube				18.98
Machinery Repair				45.72
Interest on Operating Capital (5.75%)				127.47
TOTAL OPERATING COSTS/ACRE				6,996
NET RETURNS ABOVE OPERATING COSTS				2,783
CASH OVERHEAD COSTS				
Liability Insurance			47.7	47.7
Leaf Analysis			5.5	5.5
Soil Analysis			7	7
Office Expenses			120	120
Property Taxes			478	449
Property Insurance			399	377
Interest on Operating Capital - cash overhead			25.32	25.32
Investment Repairs			81	81
TOTAL CASH OVERHEAD COSTS/ACRE				1,112.30
TOTAL CASH COSTS/ACRE				8,108
NET RETURNS ABOVE CASH COSTS				1,671
NON-CASH OVERHEAD COSTS (Capital Recovery)				
Land			1,045	1,045
Building			57.41	57.41
Tools			24.66	24.66
Irrigation System			152.70	152.70
Amortized Establishment Cost			2,758	2,389
Equipment			276.42	276.42
TOTAL NON-CASH OVERHEAD COSTS				3,945
TOTAL COST/ACRE				12,053
TOTAL COST/Lb				1.57
NET RETURNS ABOVE TOTAL COST				-2,274

Table 7. Monthly Cash Costs per Acre to Produce Avocados in San Diego County using Organic Production Practices in 2011

UC COOPERATIVE EXTENSION														
Beginning 12-10	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending 12-11	10	11	11	11	11	11	11	11	11	11	11	11	11	
Cultural:														
Erosion Control (2x/yr.)	21	21												42
Weed Control - weed whipping				28										28
Rodent Control for Squirrels - trap, bait station, bait, labor (12x/yr.)		2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	27.65
Pest Control - spinosad (Entrust), NR415 oil, helicopter rental					236.61									236.61
Pest Control Advisor				36										36
Fertilizer - sulfate of potash				90										90
Fertilizer - organic crumbles (Bio flora 8-8-4+8% cal), labor (3x/yr.)			310.49				310.49			310.49				931.48
Irrigate & Walk Lines (58 irrigations/yr.)				379.5	304	304	759	607	759	607	304	379.5		4403
Root Rot Treatment - gypsum & labor									194.1					194.10
Misc. pickup truck (labor, fuel, lube & repairs)		18.95	18.95	18.95	18.95	18.95	18.95	18.95	18.95	18.95	18.95	18.95	18.95	227
Misc. ATV (labor, fuel, lube & repairs)		37.49	37.49	37.49	37.49	37.49	37.49	37.49	37.49	37.49	37.49	37.49	37.49	450
Orchard Pruning		372.12					169.12							541.24
Misc. Road Repair				38										38
TOTAL CULTURAL COSTS	21	451.86	369.23	630.24	599.35	362.74	1297.35	665.74	1011.84	976.23	362.74	438.24	58.74	7,245
Harvest, Marketing, Organic Fees, & Reimbursement:														
CDFA Organic Registration		17.50												17.5
Organic Certification Fee		52.50												52.5
USDA - CDFA Cost Share Program Refund													-39.38	-39.38
Picking - \$0.18/lb.		173.25	173.25	173.25	173.25	173.25	173.25	173.25	173.25	173.25				1,386
Hauling - \$0.004/lb.		3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85				30.8
CAC Assessment fee - \$0.011 x production value		13.45	13.45	13.45	13.45	13.45	13.45	13.45	13.45	13.45				107.57
TOTAL HARVESTING, MARKETING, AND ORGANIC FEES COSTS	0	260.55	190.55	190.55	190.55	190.55	190.55	190.55	190.55	0	0	0	-39.38	1,555
Interest on Operating Capital (5.75%)	0.34	11.50	9.03	16.38	12.75	8.93	24.01	13.82	16.27	15.75	5.85	7.07	0.31	142.00
TOTAL OPERATING COSTS/ACRE	21.34	723.90	568.81	837.16	802.64	562.21	1511.90	870.10	1218.65	991.98	368.59	445.31	19.67	8,942
CASH OVERHEAD														
Liability Insurance							47.7							47.70
Interest on Operating Capital - cash overhead		2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	25.32
Leaf Analysis										5.5				5.5
Soil Analysis										7				7
Office Expenses		10	10	10	10	10	10	10	10	10	10	10	10	120
Property Taxes			239					239						478
Property Insurance			200					200						399
Investment Repairs		6.77	6.77	6.77	6.77	6.77	6.77	6.77	6.77	6.77	6.77	6.77	6.77	81
TOTAL CASH OVERHEAD COSTS	0	18.88	457.53	18.88	18.88	18.88	66.58	457.53	18.88	31.38	18.88	18.88	18.88	1164
TOTAL CASH COSTS/ACRE	21.34	742.77	1026.34	856.04	821.52	581.09	1578.48	1327.63	1237.53	1023.36	387.47	464.18	38.55	10106

Table 8. Monthly Cash Costs per Acre to Produce Avocados in Riverside County using Organic Production Practices in 2011

UC COOPERATIVE EXTENSION														
Beginning 12-10	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending 12-11	10	11	11	11	11	11	11	11	11	11	11	11	11	
Cultural:														
Erosion Control (2x/yr.)	21	21												42
Weed Control - weed whipping				28										28
Rodent Control for Squirrels - trap, bait station, bait, labor (12x/yr.)		2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	27.65
Pest Control - spinosad (Entrust), NR415 oil, helicopter rental					236.61									236.61
Pest Control Advisor				36										36
Fertilizer - sulfate of potash (0-0-50%)				90										90
Fertilizer - organic crumbles (Bio flora 8-8-4+8% cal), labor (3x/yr.)			310.49				310.49			310.49				931.48
Irrigate & Walk Lines (58 irrigations/yr.)				274.56	274.56	274.56	274.56	274.56	274.56	274.56	274.56	274.56	274.56	2471
Root Rot Treatment - gypsum & labor									194.1					194.10
Misc. pickup truck (labor, fuel, lube & repairs)		18.95	18.95	18.95	18.95	18.95	18.95	18.95	18.95	18.95	18.95	18.95	18.95	227
Misc. ATV (labor, fuel, lube & repairs)		37.49	37.49	37.49	37.49	37.49	37.49	37.49	37.49	37.49	37.49	37.49	37.49	450
Orchard Pruning		372.12					169.12							541.24
Misc. Road Repair				38										38
TOTAL CULTURAL COSTS	21	451.86	369.23	525.29	569.90	333.29	812.91	333.29	527.39	643.79	333.29	333.29	58.74	5,313
Harvest, Marketing, Organic Fees, & Reimbursement:														
CDFA Organic Registration		17.50												17.5
Organic Certification Fee		52.50												52.5
USDA - CDFA Cost Share Reimbursement													-39.38	-39.38
Picking - \$0.18/lb.		173.25	173.25	173.25	173.25	173.25	173.25	173.25	173.25					1,386
Hauling - \$0.004/lb.		3.85	3.85	3.85	3.85	3.85	3.85	3.85	3.85					30.8
CAC Assessment fee - \$0.011 x production value		13.45	13.45	13.45	13.45	13.45	13.45	13.45	13.45					107.57
TOTAL HARVESTING, MARKETING, AND ORGANIC FEES COSTS	0	260.55	190.55	190.55	190.55	190.55	190.55	190.55	190.55	0	0	0	-39.38	1,555
Interest on Operating Capital (5.75%)	0.39	13.22	10.39	16.89	14.11	9.72	18.62	9.72	9.72	11.95	6.19	6.19	0.36	127.47
TOTAL OPERATING COSTS/ACRE	21.39	725.62	570.17	732.73	774.56	533.56	1022.08	533.56	727.66	655.73	339.48	339.48	19.72	6,996
CASH OVERHEAD														
Liability Insurance							47.7							47.70
Interest on Operating Capital - cash overhead		2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	2.11	25.32
Leaf Analysis										5.5				5.5
Soil Analysis										7				7
Office Expenses		10	10	10	10	10	10	10	10	10	10	10	10	120
Property Taxes			224					224						449
Property Insurance			188					188						377
Investment Repairs		6.77	6.77	6.77	6.77	6.77	6.77	6.77	6.77	6.77	6.77	6.77	6.77	81
TOTAL CASH OVERHEAD COSTS	0	18.88	431.67	18.88	18.88	18.88	66.58	431.67	18.88	31.38	18.88	18.88	18.88	1112
TOTAL CASH COSTS/ACRE	21.39	744.50	1001.83	751.60	793.44	552.44	1088.65	965.23	746.54	687.11	358.35	358.35	38.59	8108

Table 9. Range Analysis: Income and Cost Analyses for Producing Avocados in San Diego County using Organic Production Practices in 2011

UC COOPERATIVE EXTENSION							
COSTS PER ACRE AND PER POUND AT VARIOUS YIELDS OF PRODUCTION							
	YIELD (Lbs/acre)						
	5,500	6,000	6,900	7,700	8,500	9,200	10,000
OPERATING COSTS:							
Cultural	7,245	7,245	7,245	7,245	7,245	7,245	7,245
Harvest	1,119	1,218	1,397	1,555	1,728	1,866	2,025
Interest on operating capital @ 5.75%	134.97	136.57	139.44	142.00	144.79	147.02	149.58
TOTAL OPERATING COSTS/ACRE	8,500	8,600	8,781	8,942	9,118	9,259	9,420
Total Operating Costs/Lb	1.55	1.43	1.27	1.16	1.07	1.01	0.94
CASH OVERHEAD COSTS/ACRE	1,164	1,164	1,164	1,164	1,164	1,164	1,164
TOTAL CASH COSTS/ACRE	9,664	9,764	9,945	10,106	10,282	10,423	10,584
Total Cash Costs/Lb	1.76	1.63	1.44	1.31	1.21	1.13	1.06
NON-CASH OVERHEAD COSTS/ACRE	4,314	4,314	4,314	4,314	4,314	4,314	4,314
TOTAL COSTS/ACRE	13,978	14,078	14,259	14,420	14,596	14,736	14,897
Total Costs/Lb	2.54	2.35	2.07	1.87	1.72	1.60	1.49

RETURNS PER ACRE ABOVE OPERATING COSTS AT VARIOUS YIELDS AND PRICE COMBINDATION

PRICE(\$/Lb)	YIELD(Lb/acre)						
	5500	6000	6900	7700	8500	9200	10000
Avocados							
0.97	-3,165	-2,780	-2,088	-1,473	-873	-335	280
1.07	-2,615	-2,180	-1,398	-703	-23	585	1,280
1.17	-2,065	-1,580	-708	67	827	1,505	2,280
1.27	-1,515	-980	-18	837	1,677	2,425	3,280
1.37	-965	-380	672	1,607	2,527	3,345	4,280
1.47	-415	220	1,362	2,377	3,377	4,265	5,280
1.57	135	820	2,052	3,147	4,227	5,185	6,280

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

PRICE(\$/Lb)	YIELD(Lb/acre)						
	5500	6000	6900	7700	8500	9200	10000
Avocados							
0.97	-4,329	-3,944	-3,252	-2,637	-2,037	-1,499	-884
1.07	-3,779	-3,344	-2,562	-1,867	-1,187	-579	116
1.17	-3,229	-2,744	-1,872	-1,097	-337	341	1,116
1.27	-2,679	-2,144	-1,182	-327	513	1,261	2,116
1.37	-2,129	-1,544	-492	443	1,363	2,181	3,116
1.47	-1,579	-944	198	1,213	2,213	3,101	4,116
1.57	-1,029	-344	888	1,983	3,063	4,021	5,116

RETURNS PER ACRE ABOVE TOTAL COSTS AT VARIOUS YIELD AND PRICE COMBINDATION
(RETURN TO MANAGEMENT)

PRICE(\$/Lb)	YIELD(Lb/acre)						
	5500	6000	6900	7700	8500	9200	10000
Avocados							
0.97	-8,643	-8,258	-7,566	-6,951	-6,351	-5,812	-5,197
1.07	-8,093	-7,658	-6,876	-6,181	-5,501	-4,892	-4,197
1.17	-7,543	-7,058	-6,186	-5,411	-4,651	-3,972	-3,197
1.27	-6,993	-6,458	-5,496	-4,641	-3,801	-3,052	-2,197
1.37	-6,443	-5,858	-4,806	-3,871	-2,951	-2,132	-1,197
1.47	-5,893	-5,258	-4,116	-3,101	-2,101	-1,212	-197
1.57	-5,343	-4,658	-3,426	-2,331	-1,251	-292	803

Table 10. Range Analysis: Income and Cost Analyses for Producing Avocados in Riverside County using Organic Production Practices in 2011

UC COOPERATIVE EXTENSION

COSTS PER ACRE AND PER POUND AT VARIOUS YIELDS OF PRODUCTION

	YIELD (Lbs/acre)						
	5,500	6,000	6,900	7,700	8,500	9,200	10,000
OPERATING COSTS:							
Cultural	5,313	5,313	5,313	5,313	5,313	5,313	5,313
Harvest	1,119	1,218	1,397	1,555	1,728	1,866	2,025
Interest on operating capital @ 5.75%	119.39	121.22	124.53	127.47	130.68	133.25	136.19
TOTAL OPERATING COSTS/ACRE	6,552	6,653	6,834	6,996	7,172	7,313	7,474
Total Operating Costs/Lb	1.19	1.11	0.99	0.91	0.84	0.79	0.75
CASH OVERHEAD COSTS/ACRE	1,112	1,112	1,112	1,112	1,112	1,112	1,112
TOTAL CASH COSTS/ACRE	7,664	7,765	7,947	8,108	8,284	8,425	8,586
Total Cash Costs/Lb	1.39	1.29	1.15	1.05	0.97	0.92	0.86
NON-CASH OVERHEAD COSTS/ACRE	3,945	3,945	3,945	3,945	3,945	3,945	3,945
TOTAL COSTS/ACRE	11,610	11,711	11,892	12,053	12,229	12,371	12,532
Total Costs/Lb	2.11	1.95	1.72	1.57	1.44	1.34	1.25

RETURNS PER ACRE ABOVE OPERATING COSTS AT VARIOUS YIELDS AND PRICE COMBINDATION

PRICE(\$/Lb)	YIELD(Lb/acre)						
	5500	6000	6900	7700	8500	9200	10000
Avocados							
0.97	-1,217	-833	-141	473	1,073	1,611	2,226
1.07	-667	-233	549	1,243	1,923	2,531	3,226
1.17	-117	367	1,239	2,013	2,773	3,451	4,226
1.27	433	967	1,929	2,783	3,623	4,371	5,226
1.37	983	1,567	2,619	3,553	4,473	5,291	6,226
1.47	1,533	2,167	3,309	4,323	5,323	6,211	7,226
1.57	2,083	2,767	3,999	5,093	6,173	7,131	8,226

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

PRICE(\$/Lb)	YIELD(Lb/acre)						
	5500	6000	6900	7700	8500	9200	10000
Avocados							
0.97	-2,329	-1,945	-1,254	-639	-39	499	1,114
1.07	-1,779	-1,345	-564	131	811	1,419	2,114
1.17	-1,229	-745	126	901	1,661	2,339	3,114
1.27	-679	-145	816	1,671	2,511	3,259	4,114
1.37	-129	455	1,506	2,441	3,361	4,179	5,114
1.47	421	1,055	2,196	3,211	4,211	5,099	6,114
1.57	971	1,655	2,886	3,981	5,061	6,019	7,114

RETURNS PER ACRE ABOVE TOTAL COSTS AT VARIOUS YIELDS AND PRICE COMBINATION
(RETURN TO MANAGEMENT)

PRICE(\$/Lb)	YIELD(Lb/acre)						
	5500	6000	6900	7700	8500	9200	10000
Avocados							
0.97	-6,275	-5,891	-5,199	-4,584	-3,984	-3,447	-2,832
1.07	-5,725	-5,291	-4,509	-3,814	-3,134	-2,527	-1,832
1.17	-5,175	-4,691	-3,819	-3,044	-2,284	-1,607	-832
1.27	-4,625	-4,091	-3,129	-2,274	-1,434	-687	168
1.37	-4,075	-3,491	-2,439	-1,504	-584	233	1,168
1.47	-3,525	-2,891	-1,749	-734	266	1,153	2,168
1.57	-2,975	-2,291	-1,059	36	1,116	2,073	3,168

Table 11. Hourly Costs for Equipment used in Avocados Production in San Diego and Riverside Counties in 2011

UC COOPERATIVE EXTENSION									
Description	Organic Avocados Hours Used	Total Hours Used	COSTS PER HOUR					Total Oper.	Total Costs/Hr.
			Capital Recovery	Cash Overhead Insurance	Taxes	Operating Lube & Repairs	Fuel		
Truck	75	150	14.99	0.76	0.98	1.9	5.78	7.68	24.42
ATV	165	221	2.33	0.1	0.13	2.12	5.04	7.16	9.72

Table 12. Farm Investment for Producing Avocados: Values and Annual Costs based on 10 Acres in San Diego and Riverside Counties in 2011 using Organic Production Practices

UC COOPERATIVE EXTENSION								
Description	Price	Yrs Life	Salvage Value	ANNUAL EQUIPMENT COSTS				Total
				Capital Recovery	Insurance	Taxes	Repairs	
Truck	23,600	12	5,900.31	2,249.18	114.31	147.5	2,511	
ATV	5,000	12	646.36	515	21.88	28.23	565.11	
TOTAL	28,600		6,546.68	2,764.18	136.19	175.73	3,076.11	
60% of new cost*	17,160		3,928.01	1,658.51	81.714	105.438	1,845.67	

*Used to reflect a mix of new and used equipment

San Diego County

ANNUAL INVESTMENT COSTS								
Description	Price	Yrs Life	Salvage Value	Capital Recovery	Insurance	Taxes	Repairs	Total
INVESTMENT								
Land	220,000	36	220,000	10,450	1,906.50	2,200	0	14,556.50
Building	10,000	36	1,000	574.06	63.94	55	200	893
Tools	4,000	30	400	246.55	25.57	22	80	374.12
Irrigation System	26,600	36	2,660	1,527	170.07	146.3	532	2,375.37
Amortized Establishment Cost	436,260	30	0	27,575.76	1,690.51	2,181.30	0	31,447.57
TOTAL INVESTMENT	696,860		224,060	40,373.37	3,856.59	4,604.60	812.00	49,646.56

Riverside County

ANNUAL INVESTMENT COSTS								
Description	Price	Yrs Life	Salvage Value	Capital Recovery	Insurance	Taxes	Repairs	Total
INVESTMENT								
Land	220,000	36	220,000	10,450	1,906.50	2,200	0	14,556.50
Building	10,000	36	1,000	574.06	63.94	55	200	893
Tools	4,000	30	400	246.55	25.57	22	80	374.12
Irrigation System	26,600	36	2,660	1,527	170.07	146.3	532	2,375.37
Amortized Establishment Cost	377,980	30	0	23,891.91	1,464.67	1,889.90	0	27,246.48
TOTAL INVESTMENT	638,580		224,060	36,689.53	3,630.75	4,313.20	812	45,445.48

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/Farm	Unit	Price/Unit	Total Cost
Liability Insurance	10	acre	47.7	477
Interest on Operating Capital	10	acre	25.32	253.2
Leaf Analysis	10	acre	5.5	55
Soil Analysis	10	acre	7	70
Office Expenses	10	acre	120	1,200

Table 13. Operations with Equipment for Avocados Production in San Diego and Riverside Counties in 2011

UC COOPERATIVE EXTENSION

Operation	Operation		Labor		Material	Rate/App/Acre	Unit
	Month	Tractor	Implement	Labor Type			
Erosion Control	Dec			Manual Labor	1.5		
Erosion Control	Jan			Manual Labor	1.5		
Weed Control -weed whipping	Mar			Manual Labor	2		
Squirrel Control	Jan			Manual Labor	0.13	Squirrel Trap	1 acre
Squirrel Control						Squirrel Bait Station	1 acre
Squirrel Control						Organic Squirrel Bait	0.06 lb
Squirrel Control	Feb			Manual Labor	0.13	Organic Squirrel Bait	0.06 lb
Squirrel Control	Mar			Manual Labor	0.13	Organic Squirrel Bait	0.06 lb
Squirrel Control	Apr			Manual Labor	0.13	Organic Squirrel Bait	0.06 lb
Squirrel Control	May			Manual Labor	0.13	Organic Squirrel Bait	0.06 lb
Squirrel Control	June			Manual Labor	0.13	Organic Squirrel Bait	0.06 lb
Squirrel Control	July			Manual Labor	0.13	Organic Squirrel Bait	0.06 lb
Squirrel Control	Aug			Manual Labor	0.13	Organic Squirrel Bait	0.06 lb
Squirrel Control	Sept			Manual Labor	0.13	Organic Squirrel Bait	0.06 lb
Squirrel Control	Oct			Manual Labor	0.13	Organic Squirrel Bait	0.06 lb
Squirrel Control	Nov			Manual Labor	0.13	Organic Squirrel Bait	0.06 lb
Squirrel Control	Dec			Manual Labor	0.13	Organic Squirrel Bait	0.06 lb
Pest Control - helicopter rental	Apr					Helicopter rental	1 acre
Pest Control - insecticide						Spinosad (Entrust)	3 oz
Pest Control - insecticide						Narrow Range 415 Oil	1 gal
Pest Control Advisor	Mar					Pest Control Advisor	1 acre
Fertilizer SOP	Mar					Potassium Sulfate -SOP 0-0-50	100 lb
Fertilizer - organic crumbles	Feb			Manual Labor	3.6	Organic Crumbles (Bio Flora)	634.38 lb
Fertilizer - organic crumbles	June			Manual Labor	3.6	Organic Crumbles (Bio Flora)	634.38 lb
Fertilizer - organic crumbles	Sept			Manual Labor	3.6	Organic Crumbles (Bio Flora)	634.38 lb
Irrigation & Walk Line	Mar			Irrigation Labor	1.25	Water	3.62 ac-in
Irrigation & Walk Line	Apr			Irrigation Labor	1	Water	2.9 ac-in
Irrigation & Walk Line	May			Irrigation Labor	1	Water	2.9 ac-in
Irrigation & Walk Line	June			Irrigation Labor	2.5	Water	7.24 ac-in
Irrigation & Walk Line	July			Irrigation Labor	2	Water	5.79 ac-in
Irrigation & Walk Line	Aug			Irrigation Labor	2.5	Water	7.24 ac-in
Irrigation & Walk Line	Sept			Irrigation Labor	2	Water	5.79 ac-in
Irrigation & Walk Line	Oct			Irrigation Labor	1	Water	2.9 ac-in
Irrigation & Walk Line	Nov			Irrigation Labor	1.25	Water	3.62 ac-in
Root Rot Treatment - gypsum	Aug			Manual Labor	12	Gypsum (Calcium Sulfate)	2,175 lb
Misc. Pickup truck	Jan		Truck	Equip. Operator Labor	0.75		
Misc. Pickup truck	Feb		Truck	Equip. Operator Labor	0.75		
Misc. Pickup truck	Mar		Truck	Equip. Operator Labor	0.75		
Misc. Pickup truck	Apr		Truck	Equip. Operator Labor	0.75		
Misc. Pickup truck	May		Truck	Equip. Operator Labor	0.75		
Misc. Pickup truck	June		Truck	Equip. Operator Labor	0.75		
Misc. Pickup truck	July		Truck	Equip. Operator Labor	0.75		
Misc. Pickup truck	Aug		Truck	Equip. Operator Labor	0.75		
Misc. Pickup truck	Sept		Truck	Equip. Operator Labor	0.75		
Misc. Pickup truck	Oct		Truck	Equip. Operator Labor	0.75		
Misc. Pickup truck	Nov		Truck	Equip. Operator Labor	0.75		
Misc. Pickup truck	Dec		Truck	Equip. Operator Labor	0.75		
Misc. ATV	Jan		ATV	Equip. Operator Labor	1.5		
Misc. ATV	Feb		ATV	Equip. Operator Labor	1.5		
Misc. ATV	Mar		ATV	Equip. Operator Labor	1.5		
Misc. ATV	Apr		ATV	Equip. Operator Labor	1.5		
Misc. ATV	May		ATV	Equip. Operator Labor	1.5		
Misc. ATV	June		ATV	Equip. Operator Labor	1.5		
Misc. ATV	July		ATV	Equip. Operator Labor	1.5		
Misc. ATV	Aug		ATV	Equip. Operator Labor	1.5		
Misc. ATV	Sept		ATV	Equip. Operator Labor	1.5		
Misc. ATV	Oct		ATV	Equip. Operator Labor	1.5		
Misc. ATV	Nov		ATV	Equip. Operator Labor	1.5		
Misc. ATV	Dec		ATV	Equip. Operator Labor	1.5		
Orchard Pruning	Jan			Manual Labor	26.58		
Orchard Pruning	June			Manual Labor	12.08		
Misc. Road Repair	Mar					Misc. Road Repairs	1 acre
CDFA Registration Fee	Jan					CDFA Registration Fee	17.5 acre
Certification Fee	Jan					Annual Certification Fee	52.5 acre
USDA - CDFA Cost Share Reimbursement	Dec					Cost Share Reimbursement	-39.38 acre
Picking	Jan					Picking - \$0.18/lb	962.5 lb
Picking	Feb					Picking - \$0.18/lb	962.5 lb
Picking	Mar					Picking - \$0.18/lb	962.5 lb
Picking	Apr					Picking - \$0.18/lb	962.5 lb
Picking	May					Picking - \$0.18/lb	962.5 lb
Picking	June					Picking - \$0.18/lb	962.5 lb
Picking	July					Picking - \$0.18/lb	962.5 lb
Picking	Aug					Picking - \$0.18/lb	962.5 lb
Hauling	Jan					Hauling - \$0.004/lb	962.5 lb
Hauling	Feb					Hauling - \$0.004/lb	962.5 lb
Hauling	Mar					Hauling - \$0.004/lb	962.5 lb
Hauling	Apr					Hauling - \$0.004/lb	962.5 lb
Hauling	May					Hauling - \$0.004/lb	962.5 lb
Hauling	June					Hauling - \$0.004/lb	962.5 lb
Hauling	July					Hauling - \$0.004/lb	962.5 lb
Hauling	Aug					Hauling - \$0.004/lb	962.5 lb
CAC	Jan					CAC Assessment fee - \$0.011	\$1,222.38 production value
CAC	Feb					CAC Assessment fee - \$0.011	\$1,222.38 production value
CAC	Mar					CAC Assessment fee - \$0.011	\$1,222.38 production value
CAC	Apr					CAC Assessment fee - \$0.011	\$1,222.38 production value
CAC	May					CAC Assessment fee - \$0.011	\$1,222.38 production value
CAC	June					CAC Assessment fee - \$0.011	\$1,222.38 production value
CAC	July					CAC Assessment fee - \$0.011	\$1,222.38 production value
CAC	Aug					CAC Assessment fee - \$0.011	\$1,222.38 production value

Etaferahu Takele
Area Farm Advisor, Agricultural Economics
UCCE - Southern California
21150 Box Springs Road
Moreno Valley, CA 92557-8718
Phone (951) 683-6491 ext.221
Fax (951) 788-2615
E-mail: ettakele@ucanr.edu

Gary S. Bender
Farm Advisor, Subtropical Horticulture
UCCE - San Diego County
151 E. Carmel St.
San Marcos, CA 92078
Phone: 760-752-4711
Fax: (760) 752-4725
E-mail: gsbender@ucdavis.edu

Published: Nov 2012

The University of California prohibits discrimination against or harassment of any person employed by or seeking employment with the University on the basis of race, color, national origin, religion, sex, physical or mental disability, medical condition (cancer related or genetic characteristics), ancestry, marital status, age, sexual orientation, citizenship, or status as a covered veteran (special disabled veteran, Vietnam-era veteran, or any other veteran who served on active duty during a war or in a campaign or expedition for which a campaign badge has been authorized). University Policy is intended to be consistent with the provisions of applicable State and Federal laws. Inquiries regarding the University's nondiscrimination policies may be directed to the Affirmative Action/Staff Personnel Services Director, University of California, Agriculture and Natural Resources, 1111 Franklin Street, 6th Floor, Oakland, CA 94607-5200, (510) 987-0096.