
UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2012

**SAMPLE COSTS TO ESTABLISH AN
ORCHARD AND PRODUCE**

ALMONDS



SACRAMENTO VALLEY

Micro-Sprinkler Irrigation

Joseph H. Connell
William H. Krueger
Richard P. Buchner
Franz Niederholzer
Carolyn J. DeBuse
Karen M. Klonsky

Farm Advisor, UC Cooperative Extension, Butte County
Farm Advisor, UC Cooperative Extension, Glenn County
Farm Advisor, UC Cooperative Extension, Tehama-Shasta Counties
Farm Advisor, UC Cooperative Extension, Sutter-Yuba Counties
Farm Advisor, UC Cooperative Extension, Solano-Yolo Counties
Extension Specialist, Department of Agricultural and Resource Economics,
UC Davis
Staff Research Associate, Department of Agricultural and Resource Economics,
UC Davis

Richard L. De Moura

UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

SAMPLE COSTS TO ESTABLISH AN ORCHARD and PRODUCE ALMONDS Sacramento Valley – 2012

CONTENTS

INTRODUCTION	2
ASSUMPTIONS.....	3
Establishment Cultural Practices and Material Inputs	3
Production Cultural Practices and Material Inputs	5
Labor, Equipment and Interest.....	7
Cash Overhead.....	8
Non-Cash Overhead.....	9
REFERENCES	11
Table 1. COSTS PER ACRE TO ESTABLISH AN ALMOND ORCHARD	12
Table 2. COSTS PER ACRE TO PRODUCE ALMONDS	14
Table 3. COSTS AND RETURNS PER ACRE TO PRODUCE ALMONDS	15
Table 4. MONTHLY CASH COSTS – ALMONDS	17
Table 5. RANGING ANALYSIS	18
Table 6. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT & BUSINESS OVERHEAD	19
Table 7. HOURLY EQUIPMENT COSTS	19
Table 8. OPERATIONS WITH EQUIPMENT AND MATERIALS	20

INTRODUCTION

Sample costs to establish an almond orchard and produce almonds under microsprinkler or low volume irrigation in the Sacramento Valley are presented in this study. This study is intended as a guide only, and can be used in making production decisions, determining potential returns, preparing budgets and evaluating production loans. Practices described are based on those production practices considered typical for a well managed orchard in the area, but will not apply to every situation. Sample costs for labor, materials, equipment and custom services are based on current figures. A blank column, “*Your Costs*”, in Tables 2 and 3 is provided to enter your costs.

The hypothetical farm operation, production practices, overhead, and calculations are described under the assumptions. For additional information or an explanation of the calculations used in the study call the Department of Agricultural and Resource Economics, University of California, Davis, (530) 752-3589 or your local UC Cooperative Extension office.

Sample Cost of Production Studies for many commodities can be downloaded at <http://coststudies.ucdavis.edu>, requested through the Department of Agricultural and Resource Economics, UC Davis, (530) 752-4424 or obtained from the local county UC Cooperative Extension offices. Many archived studies are also available on the website.

The University of California does not discriminate in any of its policies, procedures or practices. The university is an affirmative action/equal opportunity employer.
University of California and USDA, Risk Management Cooperating.

ASSUMPTIONS

The assumptions refer to Tables 1 to 8 and pertain to sample costs to establish an orchard and produce almonds under micro sprinkler irrigation or low volume irrigation in the Sacramento Valley. The cultural practices described represent production operations and materials considered typical for a well managed farm in the region. Costs, materials, and practices in this study will not apply to all farms. Timing of and types of cultural practices will vary among growers within the region and from season to season due to variables such as weather, soil, insect and disease pressure. The study is intended as a guide only. **The use of trade names and cultural practices in this report does not constitute an endorsement or recommendation by the University of California nor is any criticism implied by omission of other similar products or cultural practices.**

Farm. The hypothetical farm consists of 105 contiguous acres farmed by the owner. Smaller non-contiguous parcels may have additional costs for travel time and equipment re-calibration. Larger farms will have increased efficiencies and lower per acre costs. Almonds are being established on 100 acres; roads, irrigation systems and farmstead occupy five acres.

Establishment Cultural Practices and Material Inputs

Site Preparation. The orchard is planted on land previously planted to a tree crop. Land preparation begins with ripping in two directions, two to three feet deep, to break up underlying compaction. The ground is disced two times and then leveled to provide for winter drainage. All operations that prepare the orchard for planting are done in the year prior to planting, but costs are shown in the first year. The ripping and leveling operations are done by a custom operator. Soil diseases are recurring in almonds and fumigation may be necessary.

Trees. Almond orchards will include at least two or more varieties in which pollen shedding and bloom periods' overlap to insure adequate pollination. The Non-Pareil variety is the dominant variety planted in California and planted on approximately 50% of the acreage. Planting densities may range from 75 to 180 trees per acre. In this study, 124 trees per acre are planted on a 16 foot x 22 foot spacing (tree x row spacing). The life of the orchard at the time of planting is estimated to be 25 years.

Plant. The trees are planted in February. Prior to planting, the trees are treated for crown gall prevention by spraying the roots with Galltrol or similar product. Two men spray the trees at the rate of 500 trees per gallon (one Galltrol plate). A commercial planting crew marks the tree sites with a small stake, then plants, whitewashes, wraps, tops and stakes the trees. Costs are not included for the wraps, because they are furnished free by the nursery. For tree support on north-south rows, the trees are trellised and the cost includes custom installation, the tree ties and tying the trees. Staking is another option for tree support used in east-west plantings, but may have potentially higher costs. In the second year, 1% of the orchard or approximately one tree per acre will be replanted.

Train/Prune. Pruning begins in the first year when newly planted trees are topped by the planting crew and is included in the planting costs. In early summer of that year, the trees are suckered and the cost is included with the winter training and pruning. Training and pruning are done annually in the winter (December) through the fifth year. In the second year, some summer pruning and/or sucker removal may occur, but is not included as a cost in this study. Beginning in the sixth year, winter pruning is done in alternate years and one-half the cost is allocated to each year. Prunings in the first year are placed in the row middles and shredded with the regular mowing. Beginning in the second year, the prunings are pushed to the edge of the orchard and burned.

Winter Sanitation. In January of the fourth year and subsequent years, the mummy nuts are shaken from the trees and blown into the row middles for shredding. A custom operator shakes and blows the mummies, which are shredded by the grower.

Fertilize. Nitrogen fertilizer as dry urea is applied by hand within the drip line of the tree during the first two years. From the third year to the fifth year, liquid UN-32 is applied through the irrigation system in equal amounts in April and July. In the sixth year equal amounts are applied in April, May and July. Costs to apply the fertilizer are assumed to be included in the irrigation labor. Annual rates of actual nitrogen (N) applied are shown in Table A. Beginning in the fall of the second year, zinc sulfate is applied as a foliar spray. In the sixth and subsequent years, potassium sulfate is banded along the tree row in the fall (November). Starting in the sixth year, one sample per 25 acres, leaves are collected annually in July for tree nutrition analysis.

Year	Pounds of N/Acre
1	15
2	30
3	60
4	120
5	160
6+	220

Irrigate. In this study, the electrical cost for pumping well water is calculated to cost \$37.00 per acre-foot or \$3.08 per acre inch. Price per acre-foot of water will vary by grower depending on water source – well or district water, well characteristics, and water district. It is assumed soil stored water from rainfall will supply a portion of the early season water requirements. The field is irrigated an average of once per week from April to October. Amounts will vary each year depending upon the environment. The average water applied to an almond orchard is shown in Table B.

Year	AcIn/Year
1-2	18
3	26
4	32
5+	38

Frost Protection. Frost protection begins in February or March of the fourth year and assumes two acre-inches of water will be applied annually. Frost protection may not be required every year and the amount of protection needed will vary. In this study, frost protection occurs in February.

Pollinate. A commercial beekeeper sets out one-half hive per acre in the third year, one hive in the fourth year, two hives in the fifth year and two and one-half hives in the sixth year. Bee colony strength should be a minimum of 6 to 8 frames of bees per hive and the cost is \$150 per hive.

Pest Management. The pesticides and rates mentioned in this cost study as well as other materials available are listed in *Integrated Pest Management Guidelines, Almonds* at <http://ipm.ucdavis.edu>. Pesticides mentioned in the study are commonly used, but are not recommendations. Adjuvants or surfactants are recommended with many pesticides, but are not included as a cost in this study.

Weeds. In the first year, weeds are controlled in the row middles with two discings, one in May and one in June. The tree row (strip spray) is sprayed with Roundup in April, June, and August. In the second calendar year a dormant strip spray using Surflan and Roundup is applied in January. The row middles are mowed twice - February and June. Two spot or strip sprays with Roundup are applied to the tree row, one in April and one in July. From the third year on, the row middles are mowed five times, and a dormant season strip spray with Surflan, Goal, and Roundup is applied in January. Roundup is applied as a strip spray in May to pickup escaped weeds. Finally, a preharvest weed spray in July with Roundup is applied to the entire orchard floor (row middles and tree row).

Insects. In the first year, sprays are applied using a sprayer with a handgun. An insecticide treatment of Lorsban for peach twig borer (PTB) control and AgriMek for mites is made in May. Due to the small tree size, the applied rate is 10% of recommended total volume. Starting in the second year an airblast sprayer is used to apply the materials. Intrepid, and dormant oil are applied on alternate rows in late-January (delayed dormant) of the second year if complete coverage is possible. For PTB in the fourth, fifth and sixth year, a biological insecticide, Dipel, is added to the brown rot materials; two treatments are made, one at bloom in February and one at petal fall in early March.

Diseases. In the third, fourth and fifth years, Rovral is applied in February to control brown rot. In the fourth and fifth year, Ziram is applied in March/April to control shothole, scab and rust. In the sixth year, brown rot is controlled with Vanguard in February and shothole with Rovral in early March, and Ziram in late March. Inspire is applied in April for scab control. Additional fungicide sprays (Quash and/or Ph-D {5 wks after petal fall}) are applied in April or later for control of scab, rust and alternaria.

Vertebrate Pests. In the spring of the first year, a tractor and bait applicator is used to apply poison bait for gopher control. Spot treatments are made using the ATV to move around the field and distribute the bait during the following years. Treatments will vary depending upon rodent populations. For this study, the application in March takes 0.13 hours per acre and one-pound of bait per acre. This decreases to 0.11 hours in the second year and 0.8 hours in the third and following years. It is assumed the gopher population is under control by the third year and only spot treatments are necessary. Ground squirrels are managed using anti-coagulant bait stations on the field perimeter beginning in the fourth year and are maintained during April, May, June, September and October. Bait stations can be homemade from PVC pipe or various size stations purchased. Costs for the stations can range from \$5 to \$35. For this study we assume the grower constructed 15 PVC bait stations at a cost of \$10 per station and the costs are included in the Shop/Field Tools under Non-Cash Overhead. The bait stations are placed on two sides of the field approximately 300 feet apart. The grower uses an ATV to check the stations and fill with bait. The bait stations are checked weekly using the ATV and each month takes approximately 0.04 hours per acre and 0.15 pounds of bait. Rates and times for bait control are estimated and not based on any specific data. See the following websites for additional information http://ucanr.org/sites/Ground_Squirrel_BMP/ and <http://www.ipm.ucdavis.edu/PMG/menu.vertebrate.html>

Year	Kernel (meat)Pounds
3	400
4	800
5	1,400
6	2,000
7	2,200

Harvest. The crop is harvested by hand using rubber mallets and poles in the third year. The almonds are knocked to the ground, mechanically swept and hand raked to the centers, then mechanically picked up and hauled to the huller. In the following years, the crop is mechanically shaken, swept, and picked up.

Production Cultural Practices and Material Inputs

Winter Sanitation. Winter sanitation in January destroys overwintering sites for navel orangeworm (NOW). The trees containing mummy nuts are poled or mechanically shaken to drop the mummies to the orchard floor where they are blown into the middles and shredded with a flail mower. The shaking and blowing operations are custom hired and the grower does the shredding.

Prune. Hand pruning is done in alternate years during the winter months (December-January) to remove dead or diseased wood, control tree height, and facilitate orchard management. In this study, one-half of the cost is charged each year to the orchard operation. Prunings are placed into the row middles and pushed out of the orchard by a tractor with a brush rake and burned.

Tree Replacement. One or more trees per acre may die each year and are replaced in late winter. Costs in this study are basic costs that will vary with each orchard and type of tree loss. Tree replacement is included in investment repairs under Cash Overhead.

Pollinate. For maximum pollination, mature orchards require two and one-half hives (6 – 8 frames of bees per hive) per acre for pollination during February through mid-March.

Irrigate. Irrigation costs include pumping (water) and labor costs. The water is pumped from a well and passes through a filtration system into the low volume sprinkler system. Thirty-eight acre inches of water are applied to the orchard from April to October averaging one irrigation per week over the 25 week period. Irrigations early and late in the season may be less than once per week, while during the summer period the irrigations will exceed once per week. Water costs or pumping costs are \$3.08 per acre inch based on current grower costs. Rates will vary depending upon pump and well specifications and rate program selected. Irrigation labor is 0.09 hours per acre per irrigation.

Frost Protection. Frost protection may be needed in some years, usually in February and/or March. Two acre inches are applied for protection in February.

Fertilize. UN-32 is applied through the irrigation system at 220 pounds of N per acre and is split into equal applications in April, May and July. Potassium sulfate at 500 pounds per acre is banded along the tree row in late November. Also, in November zinc sulfate is applied as a foliar spray. Tree nitrogen status is determined by leaf analysis. One sample per 25 acres is collected in July using the ATV to move through the orchard. The leaf collecting is assumed to take .025 hours per acre and packaging 0.01 hours per acre.

Pest Management. The pesticides and rates mentioned in this cost study are listed in *UC Integrated Pest Management Guidelines, Almonds*. For more information on other pesticides available, pest identification, monitoring, and management visit the UC IPM website at www.ipm.ucdavis.edu. Written recommendations are required for many pesticides and are made by licensed pest control advisors. For information and pesticide use permits, contact the local county agricultural commissioner's office. Adjuvants or surfactants may be recommended for use with some pesticides, but are not included in this study. Pesticide costs vary by location and grower volume. Pesticide costs in this study are from grower input and are the typical price with the grower discounts.

Pest Control Adviser (PCA). The PCA or crop consultant monitors the field for agronomic problems including pests and nutrition and writes pesticide recommendations. Growers may hire private PCAs or receive the service as part of a service agreement with an agricultural chemical and fertilizer company. A private Crop Consultant is hired in this study.

Weeds. In this study, weeds in mature orchards are controlled in the tree row (strip spray) in the winter (January) using Surflan, Goal and Roundup. Also one strip spray with Rely is made during May. Row middles are mowed five times (February, April, May, June, August) to control resident vegetation. To prepare the orchard floor for harvest, a herbicide application of Roundup is made in late July. The grower uses an ATV and pull sprayer for spraying the herbicides.

Insects and Mites. Several insect and mite pests are controlled each year using integrated pest management. It is assumed that biological insecticides such as Dipel applied at bloom and post bloom will control peach twig borer (PTB), therefore dormant sprays are not needed. The materials are applied with the disease sprays in early to late March. An insecticide application of Lorsban for navel orange worm (NOW) and

Omite for mites is applied in July. This spray may not be done every year, other insecticides and timings may be utilized depending upon insect type and timing.

Diseases. Four fungicide applications are made to control brown rot, shothole, scab, alternaria and anthracnose. Applications for brown rot control are made with Vanguard during bloom in February. Rovral is applied at petal fall for shothole in March and Ziram for scab and anthracnose later in March. Quash and Ph-D are applied in April or later for scab, alternaria and anthracnose. Alternate fungicides with different modes of action should be used to protect against chemical resistance. See *Efficacy and Timing of Fungicides, Bactericides, and Biologicals for Deciduous Tree Fruit, Nut Crops, and Grapevines* at <http://ipm.ucdavis.edu/PDF/PMG/fungicideefficacytiming.pdf>.

Vertebrate Pests. Gophers are baited in March. The grower uses the ATV to move around the field and distribute the bait where needed. It takes about 0.8 hours per acre to cover the field. Ground squirrels are managed using anti-coagulant bait stations on the field perimeter. For this study we assume the grower constructed 15 PVC traps at a cost of \$10.00 per trap and the costs are included in the Shop/Field Tools under Non-Cash Overhead. The traps are placed on two sides of the field approximately 300 feet apart. The grower uses an ATV to check the traps and apply the baits. The bait stations are checked weekly from April, May, June, September and October using the ATV and taking approximately 0.04 hours per acre per month and 0.15 pounds of bait. See the Vertebrate paragraph in the Establishment Section for further assumptions.

Harvest. A farm of this size may own their own harvesting equipment, but in this study the grower contracts to have the almond crop custom harvested. The grower furnishes labor for hand raking to move nuts missed by the sweeper into the windrows. Harvest is in August. A shaker head attaches to the tree trunk to shake the nuts from the tree. The nuts fall to the ground, are allowed to dry and in a separate operation are blown from around the tree and swept into windrows. A pickup machine gathers the nuts from the windrow and loads them into a cart or bankout wagon. In this study the nuts are elevated or dumped into bottom dump trailers for delivery to the huller.

Yields and Returns. Typical annual yields for almonds are measured in pounds of kernels (meats) per acre and are shown in Table C. In this study, the almonds are sold for \$1.85 per pound based on reported current returns. Yields will vary by location, grower, year, and age of orchard; for this study, it is assumed the well managed orchard will average 2,200 pounds over the remaining life. A range of returns and yields are shown in the Ranging Analysis in Table 6.

Assessment. The Almond Board of California (ABC) assesses all almonds commercially grown in the state to pay for almond promotions and research. The mandatory assessment is paid by processors and is not reflected in grower costs.

Pickup/ATV. The study assumes business use mileage of 9,500 miles per year for the pickup. The ATV is used for weed spraying, baiting squirrels and gophers and is included in those costs. Additional ATV uses for checking the orchard, diseases and irrigation system are shown as a line item. The travel is estimated and not taken from any specific data.

Labor, Equipment, and Interest

Labor. Hourly wages for workers are \$12.50 for machine operators and \$9.00 per hour non-machine labor. Adding 33% for the employer's share of federal and state payroll taxes, workers compensation insurance, for nut crops and other possible benefits gives the labor rates shown of \$16.63 and \$11.97 per hour

for machine labor and non-machine labor, respectively. Workers' compensation costs will vary among growers, but for this study the cost is based upon the average industry final rate as of January 1, 2012 (California Department of Insurance). Labor for operations involving machinery are 20% higher than the operation time given in Table 3 to account for the extra labor involved in equipment set up, moving, maintenance, work breaks, and field repair.

Equipment Operating Costs. Repair costs are based on purchase price, annual hours of use, total hours of life, and repair coefficients formulated by American Society of Agricultural Engineers (ASAE). Fuel and lubrication costs are also determined by ASAE equations based on maximum power takeoff (PTO) horsepower, and fuel type. Prices for on-farm delivery of diesel and gasoline are \$3.44 and \$3.85 per gallon, respectively. The costs are based on January through June 2011, Department of Energy (DOE) monthly data. The cost includes a 2.5% local sales tax on diesel fuel and 7.5% sales tax on gasoline. Gasoline also includes federal and state excise tax, which are refundable for on-farm use when filing your income tax. The fuel, lube, and repair cost per acre for each operation in Table 2 is determined by multiplying the total hourly operating cost in Table 7 for each piece of equipment used for the selected operation by the hours per acre. Tractor time is 10% higher than implement time for a given operation to account for setup, travel and down time.

Interest on Operating Capital. Interest on operating capital is based on cash operating costs and is calculated monthly until harvest at a nominal rate of 5.75% per year. A nominal interest rate is the typical market cost of borrowed funds. The interest cost of post harvest operations is discounted back to the last harvest month using a negative interest charge. The rate will vary depending upon various factors, but the rate in this study is considered a typical lending rate by a farm lending agency as of January 2011.

Risk. The risks associated with crop production should not be minimized. 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 profitability and economic viability.

Cash Overhead

Cash overhead consists of various cash expenses paid out during the year that are assigned to the whole farm and not to a particular operation. These costs include property taxes, interest on operating capital, office expense, liability and property insurance, sanitation services, and equipment repairs.

Property Taxes. Counties charge a base property tax rate of 1% on the assessed value of the property. In some counties special assessment districts exist and charge additional taxes on property including equipment, buildings, and improvements. For this study, county taxes are calculated as 1% of the average value of the property. Average value equals new cost plus salvage value divided by 2 on a per acre basis. Salvage value for investments will vary.

Insurance. Insurance for farm investments varies depending on the assets included and the amount of coverage. Property insurance provides coverage for property loss and is charged at 0.775% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$728 for the entire farm.

Office Expense. Office and business expenses are estimated at \$110 per acre. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, road maintenance, and miscellaneous farm expense.

Sanitation Services. Sanitation services provide portable toilets and washing facilities for the orchard and cost the farm \$560 annually. This cost includes delivery and four months of weekly toilet service.

Management Salary. Wages for management are not included as a cash cost. Any return above total costs is considered a return to management.

Non-Cash Overhead

Non-cash overhead is calculated as the capital recovery cost for equipment and other farm investments.

Capital Recovery Costs. Capital recovery cost is the annual depreciation and interest costs for a capital investment. It is the amount of money required each year to recover the difference between the purchase price and salvage value (unrecovered capital). It is equivalent to the annual payment on a loan for the investment with the down payment equal to the discounted salvage value. This is a more complex method of calculating ownership costs than straight-line depreciation and opportunity costs, but more accurately represents the annual costs of ownership because it takes the time value of money into account (Boehlje and Eidman). The formula for the calculation of the annual capital recovery costs is $((\text{Purchase Price} - \text{Salvage Value}) \times \text{Capital Recovery Factor}) + (\text{Salvage Value} \times \text{Interest Rate})$.

Salvage Value. Salvage value is an estimate of the remaining value of an investment at the end of its useful life. For farm machinery (tractors and implements) the remaining value is a percentage of the new cost of the investment (Boehlje and Eidman). The percent remaining value is calculated from equations developed by the American Society of Agricultural Engineers (ASAE) based on equipment type and years of life. The life in years is estimated by dividing the wearout life, as given by ASAE by the annual hours of use in this operation. For other investments including irrigation systems, buildings, and miscellaneous equipment, the value at the end of its useful life is zero. The salvage value for land is the purchase price because land does not depreciate. The purchase price and salvage value for equipment and investments are shown in Table 7.

Capital Recovery Factor. Capital recovery factor is the amortization factor or annual payment whose present value at compound interest is 1. The amortization factor is a table value that corresponds to the interest rate used and the life of the machine.

Interest Rate. An interest rate of 4.75% is used to calculate capital recovery. The rate will vary depending upon loan amount and other lending agency conditions, but is the basic suggested rate by a farm lending agency as of January 2011.

Land. Crop or bare land values range from \$4,000 to \$8,000. The orchard site is assumed to be on previously farmed open agricultural ground and in this study is valued at \$7,000 per acre.

Irrigation System. The pump and well cost is based on one 75 horsepower electric pump lifting 36 acre-inches from a water level depth of 75 feet. The pump and 300-foot deep well already existed on the site, and the cost of the irrigation system is for the recasing of the well, refurbishment of the pump. The sprinkler system costs include the installation of a new filtration system and micro sprinklers. Water is pumped through the filtration station into micro sprinkler system or low volume irrigation system. The life of both irrigation systems is estimated to be 25 years. The irrigation system is considered an improvement and is shown in the non-cash overhead sections of the tables and the investment portion of Table 7.

Establishment Cost. Costs to establish the orchard are used to determine the non-cash overhead expenses, capital recovery, and interest on investment for the production years. The establishment cost is the sum of cash costs for land preparation, planting, trees, production expenses, and cash overhead for growing almond trees through the first year nuts are harvested less returns from production. The *Accumulated Net Cash Cost* in the third year shown in Table 1 represents the establishment cost per acre. For this study, this cost is \$3,760 per acre or \$376,000 for the 100-acre orchard. Establishment cost is amortized beginning in the fourth year over the remaining 22 years of production. Tree replacement or repairs is \$3.18 per acre based on 0.10% of the establishment cost.

Equipment. Farm equipment is purchased new or used, but the study shows the current purchase price for new equipment. The new purchase price is adjusted to 60% to indicate a mix of new and used equipment. Annual ownership costs for equipment and other investments are shown in Table 6. Equipment costs are composed of three parts: non-cash overhead, cash overhead, and operating costs. Both of the overhead factors have been discussed in previous sections. The operating costs consist of repairs, fuel, and lubrication and are discussed under operating costs.

Table Values. Due to rounding, the totals may be slightly different from the sum of the components.

REFERENCES

- American Society of Agricultural Engineers. (ASAE). 1992. *American Society of Agricultural Engineers Standards Yearbook*. St. Joseph, MO.
- Boehlje, Michael D., and Vernon R. Eidman. 1984. *Farm Management*. John Wiley and Sons. New York, NY.
- California Chapter of the American Society of Farm Managers and Rural Appraisers. 2011. *Trends in Agricultural Land and Lease Values*. California Chapter of the American Society of Farm Managers and Rural Appraisers, Inc. Woodbridge, CA.
- California State Board of Equalization. *Fuel Tax Division Tax Rates*. Internet accessed January 2011. <http://www.boe.ca.gov/sptaxprog/spftdrates.htm>
- Connell, Joe H., John P. Edstrom, William H. Krueger, Richard P. Buchner, Franz Niederholzer, Karen M. Klonsky, and Richard L. De Moura. 2006. *Sample Costs to Establish and Produce Almonds, Sacramento Valley*. University of California, Cooperative Extension. Department of Agricultural and Resource Economics. Davis, CA.
- Doanes Editors. *Facts and Figures for Farmers*. 1977. Doane Publishing, St. Louis, MO. P 292.
- Energy Information Administration. 2011. *Weekly Retail Gasoline and on Highway Diesel Prices*. Internet accessed July 2011. <http://tonto.eia.doe.gov/oog/info/wohdp>
- Schwankl, Larry, Terry Pritchard, Blanine Hanson, Ilene Wellman. 2000. *Costs of Pressurized Irrigation Systems for Tree Crops*. Pub. 21585. University of California, Division of Agriculture and Natural Resources. Oakland, CA.
- University of California Statewide Integrated Pest Management Program. *UC Pest Management Guidelines, Almonds*. 2010. University of California, Davis, CA. <http://www.ipm.ucdavis.edu>
- University of California, Division of Agriculture and Natural Resources. 1996. *Almond Production Manual*. University of California, Division of Agriculture and Natural Resources. Oakland, California. Publication 3364.

For information concerning the above or other University of California publications, contact UC DANR Communications Services at 1-800-994-8849, online at www.ucop.edu, or your local county UC Cooperative Extension office.

UC COOPERATIVE EXTENSION
Table 1. COSTS TO ESTABLISH AN ALMOND ORCHARD
 SACRAMENTO VALLEY 2012

	Cost Per Acre						
	Year:	1st	2nd	3rd	4th	5th	6th
Meat Pounds Per Acre:				400	800	1,400	2,000
Planting Costs:							
Land Preparation: Subsoil 2X 3' depth (Custom)		200					
Land Preparation: Disc 2X		17					
Land Preparation: Laser Level 2X (Custom)		200					
Plant: Mark, Dip, Plant, Top, Whitewash, Wrap Trees		386	6				
Plant: Trees, 124 Per Acre (1% Replant In 2nd Year)		682	3				
Plant: Tree Support (Stakes \$250 or Trellis \$150)		150					
TOTAL PLANTING COSTS		1,635	9				
Cultural Costs:							
Vertebrate: Gopher (Bait)		11	6	4	4	4	4
Fertilize N (Yr 1-2, 46-0-0. Yr 3+, UN32)		17	28	44	89	118	163
Weed: Disk (Yr, 2X)		17					
Irrigate: (water + labor)		81	81	106	127	145	145
Weed: Inseason Strip Spray (Roundup) (Yr 1, 3X. Yr 2, 2X. Yr 3+, 1X)*		23	15	8	8	8	8
Prune and/or Train and/or Sucker (Yr 6+ done in alternate years)		48	42	38	38	38	51
Insect: PTB (Yr 1, Lorsban. Yr 2, Intrepid, Oil). Mites (Yr 1, AgriMek)		17	37				
PCA: PCA/Consultant Service		15	15	15	30	30	30
Pickup Truck Use		108	108	108	108	108	108
ATV Truck Use		50	50	50	50	50	50
Weed: Winter Strip (Yr 2, (Surflan, Roundup. Yr 3+, Surflan, Goal, Roundup)			47	75	75	75	75
Weed: Mow (Yr 2, 2X. Yr 3+, 5X)			17	42	42	42	42
Fertilize: Zinc (foliar)			19	26	41	41	41
Prune: Push & Burn (Yr 6, alternate years)			12	44	50	50	48
Pollination: Hives				75	150	300	375
Disease: Brown Rot/Shothole (Rovral).				22			
Weed: Orchard Floor (Roundup) Preharvest				9	9	9	9
Disease: Brownrot/Shothole (Rovral) Insect: PTB (Dipel)					33	35	35
Disease: Brownrot/Shothole (Ziram) Insect: PTB (Dipel)					48	51	51
Irrigate: Frost Protection					10	10	10
Vertebrate: Squirrel (Bait)					8	8	8
Fertilize: Leaf Samples for NPK (ATV, labor, analysis)					2	2	2
Winter Sanitation: Knock Mummies, Blow, Rake, Shred)					173	173	173
Disease: Scab (Inspire)							34
Disease: Shothole/Brown Rot (Vanguard)							31
Insect: Worm/Mite (Lorsban/Omite) Hull Split							66
Fertilize: Potassium Sulfate							185
TOTAL CULTURAL COSTS		387	477	666	1,095	1,297	1,744
Harvest Costs:							
Pole Trees				36			
Shake Trees					95	95	95
Sweep Nuts				70	70	70	70
Hand Rake				6	5	12	13
Pick Up and Haul				36	96	168	240
Hull & Shell Nuts				18	48	84	120
TOTAL HARVEST COSTS				166	314	429	538
Interest On Operating Capital @ 5.75%		112	16	10	23	29	38
TOTAL OPERATING COSTS/ACRE		2,134	502	842	1,432	1,755	2,320

UC COOPERATIVE EXTENSION

Table 1. continued

	Cost Per Acre						
	Year:	1st	2nd	3rd	4th	5th	6th
Meat Pounds Per Acre;				400	800	1,400	2,000
Cash Overhead Costs:							
Office Expense		110	110	110	110	110	110
Liability Insurance		7	7	7	7	7	7
Sanitation Fees		6	6	6	6	6	6
Environmental/Safety Training		1	1	1	1	1	1
Property Taxes		91	92	92	92	92	92
Property Insurance		71	71	71	64	71	71
Investment Repairs		54	54	54	54	54	54
TOTAL CASH OVERHEAD COSTS		340	341	341	334	341	341
TOTAL CASH COSTS/ACRE		2,474	843	1,183	1,766	2,096	2,661
INCOME/ACRE FROM PRODUCTION				740	1,480	2,590	3,700
NET CASH COSTS/ACRE FOR THE YEAR		2,474	843	443	286		
PROFIT/ACRE ABOVE CASH COSTS						494	1,039
ACCUMULATED NET CASH COSTS/ACRE		2,474	3,317	3,760	4,046	3,552	2,513
Non-Cash Overhead (Capital Recovery):							
Buildings 2400 sqft		63	63	63	63	63	63
Land		349	349	349	349	349	349
Fuel Tanks 2-500 gal		5	5	5	5	5	5
Shop/Field Tools/Equipment		14	14	14	14	14	14
Pump Refurbished		13	13	13	13	13	13
Micro-Sprinkler Irrigation System		104	104	104	104	104	104
Equipment		68	72	72	81	72	79
TOTAL NON-CASH OVERHEAD COST/ACRE		616	620	620	629	620	627
TOTAL COST/ACRE FOR THE YEAR		3,090	1,463	1,803	2,395	2,716	3,288
INCOME/ACRE FROM PRODUCTION				740	1,480	2,590	3,700
TOTAL NET COST/ACRE FOR THE YEAR		3,090	1,463	1,063	915	126	
NET PROFIT/ACRE ABOVE TOTAL COST							412
TOTAL ACCUMULATED NET COST/ACRE		3,090	4,553	5,616	6,531	6,657	6,245

*Tree row is either solid strip spray or spot spray depending on weed population.

UC COOPERATIVE EXTENSION
Sacramento Valley 2012
Table 2. COSTS PER ACRE TO PRODUCE ALMONDS

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:								
Weed: Dormant Strip (Goal Surflan Roundup)	0.23	5	1	0	69	0	75	
Winter Sanitation	0.21	4	2	2	0	165	173	
Crop Consultant Fees	0.00	0	0	0	0	30	30	
Disease: Brown Rot (Vanguard)	0.31	6	4	2	19	0	31	
Weed: Mow Middles 5X	1.03	21	12	9	0	0	42	
Pollination: (hives)	0.00	0	0	0	0	375	375	
Irrigation: Frost Protection	0.36	4	0	0	6	0	10	
Disease/Insect: Shothole/Worm (Rovral/Dipel)	0.31	6	4	2	23	0	35	
Disease/Insect: Shothole/Worm (Ziram/Dipel)	0.31	6	4	2	39	0	51	
Vertebrate: Gophers Spot Treat (bait)	0.08	2	0	0	2	0	4	
Disease: Misc Diseases (Quash, Ph-D)	0.31	6	4	2	61	0	73	
Fertilize: N in irrigation (UN32)	0.00	0	0	0	163	0	163	
Irrigate	2.34	28	0	0	117	0	145	
Vertebrate: Squirrel (Bait)	0.20	4	1	0	3	0	8	
Weed: Strip Spray (Rely)	0.23	5	1	0	21	0	27	
Fertilize: Leaf Samples 1/25ac	0.03	1	0	0	0	1	2	
Insect: Mite/NOW (Omite/Lorsban)	0.31	6	4	2	54	0	66	
Weed: Preharvest Spray Middles (Roundup)	0.23	5	1	0	3	0	9	
Fertilize: Potash (500 lbs)	0.11	2	1	1	180	0	185	
Fertilize Zinc Sulfate Foliar	0.31	6	4	2	29	0	41	
Pruning (Alternate Years)	4.26	51	0	0	0	0	51	
Brush Disposal (Alternate Yrs)	0.17	45	2	1	0	0	48	
Pickup Truck Use	3.25	65	31	11	0	0	108	
ATV Use	2.00	40	8	2	0	0	50	
TOTAL Cultural COSTS	16.60	318	84	42	788	571	1,803	
Harvest:								
Shake	0.00	0	0	0	0	95	95	
Hand Rake	1.25	13	0	0	0	0	13	
Sweep	0.00	0	0	0	0	70	70	
Pickup and Haul	0.00	0	0	0	0	264	264	
Hull and Shell	0.00	0	0	0	0	132	132	
TOTAL Harvest COSTS	1.25	13	0	0	0	561	574	
Interest on Operating Capital @ 5.75%							34	
TOTAL OPERATING COSTS/ACRE	18	331	84	42	788	1,132	2,411	
CASH OVERHEAD:								
Environ/Safety							1	
Liability Insurance							7	
Office Expense							110	
Sanitation Fees							6	
Property Taxes							111	
Property Insurance							65	
Investment Repairs							58	
TOTAL CASH OVERHEAD COSTS/ACRE							357	
TOTAL CASH COSTS/ACRE							2,768	
NON-CASH OVERHEAD:								
		Per producing Acre		Annual Cost Capital Recovery				
Buildings 2400sqft		800		63			63	
Establishment Cost		3,760		279			279	
Fuel Tanks 2-500g		65		5			5	
Land		7,350		349			349	
Pump & Well		194		13			13	
Shop/Field Tools		150		14			14	
Sprinkler Irrigation		1,500		104			104	
Equipment		843		79			79	
TOTAL NON-CASH OVERHEAD COSTS		14,662		907			907	
TOTAL COSTS/ACRE							3,675	

UC COOPERATIVE EXTENSION
Sacramento Valley 2012

Table 3. COSTS AND RETURNS PER ACRE TO PRODUCE ALMONDS

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Production	2,200.00	lb	1.85	4,070	
TOTAL GROSS RETURNS	2,200.00	lb		4,070	
OPERATING COSTS					
Herbicide:					93
Surflan AS	3.00	pint	14.52	44	
Goal 2 XL	3.00	pint	7.96	24	
Roundup Power Max	2.22	pint	2.06	5	
Rely 200	2.16	pint	9.72	21	
Insecticide:					75
Dipel DF	2.00	lb	10.62	21	
Lorsban 4 E	4.00	pint	3.39	14	
Omite 30 WP	7.50	lb	5.39	40	
Fungicide:					121
Vanguard WG	5.00	oz	3.80	19	
Rovral 4 Flowable	1.00	pint	12.58	13	
Ziram WDG 76	8.00	lb	3.50	28	
Quash	3.00	oz	6.80	20	
Ph-D	6.20	oz	6.57	41	
Rodenticide:					5
Gopher Bait	0.25	lb	6.00	2	
Grnd Squirrel Bait	0.75	lb	4.50	3	
Fertilizer:					371
UN-32	220.00	lb N	0.74	163	
Potassium Sulfate	500.00	lb	0.36	180	
Zinc Sulfate 36%	30.00	lb	0.95	29	
Irrigation:					123
Water - Pumped (includes frost protection)	40.00	acin	3.08	123	
Custom:					1,132
Shake Trees	2.00	hour	95.00	190	
Sweep Nuts	2.00	hour	70.00	140	
PCA Fees	1.00	acre	30.00	30	
Pollination Fee	2.50	acre	150.00	375	
Leaf Analysis NPK	0.04	each	35.00	1	
Pickup Nuts	2,200.00	lb	0.10	220	
Haul Nuts	2,200.00	lb	0.02	44	
Hull and Shell	2,200.00	lb	0.06	132	
Labor:					331
Equipment Operator Labor	11.57	hrs	16.63	192	
Non-Machine Labor	11.72	hrs	11.97	138	
Machinery:					126
Fuel-Gas	11.13	gal	3.85	43	
Fuel-Diesel	11.90	gal	3.44	41	
Lube				13	
Machinery Repair				29	
Interest on Operating Capital (5.75%)				34	
TOTAL OPERATING COSTS/ACRE				2,411	
NET RETURNS ABOVE OPERATING COSTS				1,659	
CASH OVERHEAD COSTS					
Environ/Safety				1	
Liability Insurance				7	
Office Expense				110	
Sanitation Fees				6	
Property Taxes				111	
Property Insurance				65	
Investment Repairs				58	
TOTAL CASH OVERHEAD COSTS/ACRE				357	
TOTAL CASH COSTS/ACRE				2,768	

UC COOPERATIVE EXTENSION
 Sacramento Valley 2012
Table 3. continued

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
NON-CASH OVERHEAD COSTS (Capital Recovery)					
Buildings 2400sqft				63	
Establishment Cost				279	
Fuel Tanks 2-500g				5	
Land				349	
Pump & Well				13	
Shop/Field Tools				14	
Sprinkler Irrigation				104	
Equipment				79	
TOTAL NON-CASH OVERHEAD COSTS				907	
TOTAL COST/ACRE				3,675.00	
TOTAL COST/ lb				1.67	
NET RETURNS ABOVE TOTAL COST				395	

UC COOPERATIVE EXTENSION

Sacramento Valley 2012

Table 4. MONTHLY CASH COSTS PER ACRE TO PRODUCE ALMONDS

Beginning 01-12	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending 12-12	12	12	12	12	12	12	12	12	12	12	12	12	
Cultural:													
Weed: Dormant Strip (Goal Surflan Roundup)	75												75
Winter Sanitation	173												173
Crop Consultant Fees		10			10				10				30
Disease: Brown Rot (Vanguard)		31											31
Weed: Mow Middles 5X		8		8	8	8		8					42
Pollination		375											375
Irrigation : Frost Protection		10											10
Disease/Insect: Shothole/Worm (Rovral/Dipel)				35									35
Disease/Insect: Shothole/Worm (Ziram/Dipel)				51									51
Vertebrate: Gophers, Spot Treat (bait)				4									4
Disease: Misc Diseases (Quash, Ph-D)					73								73
Fertilize: N in irrigation (UN32)				54	54			54					163
Irrigate				14	18	27	32	25	18	11			145
Vertebrate: Squirrel (Bait)				2	2	2			2	2			8
Weed: Strip Spray (Rely)					27								27
Fertilize: Leaf Samples 1/25ac								2					2
Insect: Mite/NOW (Omite/Lorsban)								66					66
Weed: Preharvest Spray Middles (Roundup)								9					9
Fertilize: Potash (500 lbs)											185		185
Fertilize: Zinc Sulfate Foliar											41		41
Prune (Alternate Years)												51	51
Brush Disposal (Alternate Yrs)												48	48
Pickup Truck Use	9	9	9	9	9	9	9	9	9	9	9	9	108
ATV Use	4	4	4	4	4	4	4	4	4	4	4	4	50
TOTAL Cultural COSTS	261	448	103	165	133	50	177	47	43	26	238	112	1,803
Harvest:													
Shake								95					95
Hand Rake								13					13
Sweep								70					70
Pickup and Haul								264					264
Hull and Shell								132					132
TOTAL Harvest COSTS	0	0	0	0	0	0	0	574	0	0	0	0	574
Interest on Operating Capital (5.75%)	1	3	4	5	5	6	6	9	-2	-2	-2	-1	34
TOTAL OPERATING COSTS/ACRE	263	452	107	170	138	56	183	630	41	24	237	112	2,411
CASH OVERHEAD													
Environ/Safety													1
Liability Insurance													7
Office Expense	9	9	9	9	9	9	9	9	9	9	9	9	110
Sanitation Fees	0	0	0	0	0	0	0	0	0	0	0	0	6
Property Taxes		55					55						111
Property Insurance		65											65
Investment Repairs	5	5	5	5	5	5	5	5	5	5	5	5	58
TOTAL CASH OVERHEAD COSTS	14	135	14	14	14	14	70	14	14	14	14	14	357
TOTAL CASH COSTS/ACRE	277	586	121	184	153	70	253	645	55	39	251	126	2,768

UC COOPERATIVE EXTENSION
Table 5. RANGING ANALYSIS
 SACRAMENTO VALLEY- 2012

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE ALMONDS

	YIELD (lb/acre)						
	1,600	1,800	2,000	2,200	2,400	2,600	2,800
OPERATING COSTS/ACRE:							
Cultural Cost	1,803	1,803	1,803	1,803	1,803	1,803	1,803
Harvest Cost	421	472	523	574	625	676	726
Interest on operating capital @ 5.75%	33	33	34	34	34	34	35
TOTAL OPERATING COSTS/ACRE	2,258	2,309	2,360	2,411	2,462	2,513	2,564
TOTAL OPERATING COSTS/LB	1.41	1.28	1.18	1.10	1.03	0.97	0.92
CASH Overhead Costs/ACRE	355	355	355	355	355	355	355
TOTAL CASH COSTS/ACRE	2,613	2,664	2,715	2,766	2,817	2,868	2,919
TOTAL CASH COSTS/LB	1.63	1.48	1.36	1.26	1.17	1.10	1.04
NON-CASH Overhead Costs/ACRE	885	885	885	885	885	885	885
TOTAL COSTS/ACRE	3,498	3,549	3,600	3,651	3,702	3,753	3,804
TOTAL COSTS/LB	2.19	1.97	1.80	1.66	1.54	1.44	1.36

NET RETURNS PER ACRE ABOVE OPERATING COSTS

PRICE	YIELD (lb/acre)							
	\$/lb	1,600	1,800	2,000	2,200	2,400	2,600	2,800
1.00		-587	-427	-266	-106	54	215	375
1.25		-237	-27	184	394	604	815	1,025
1.50		113	373	634	894	1,154	1,415	1,675
1.75		463	773	1,084	1,394	1,704	2,015	2,325
2.00		813	1,173	1,534	1,894	2,254	2,615	2,975
2.25		1,163	1,573	1,984	2,394	2,804	3,215	3,625
2.50		1,513	1,973	2,434	2,894	3,354	3,815	4,275

NET RETURNS PER ACRE ABOVE CASH COSTS

PRICE	YIELD (lb/acre)							
	\$/lb	1,600	1,800	2,000	2,200	2,400	2,600	2,800
1.10		-853	-684	-515	-346	-177	-8	161
1.35		-453	-234	-15	204	423	642	861
1.60		-53	216	485	754	1,023	1,292	1,561
1.85		347	666	985	1,304	1,623	1,942	2,261
2.10		747	1,116	1,485	1,854	2,223	2,592	2,961
2.35		1,147	1,566	1,985	2,404	2,823	3,242	3,661
2.60		1,547	2,016	2,485	2,954	3,423	3,892	4,361

NET RETURNS PER ACRE ABOVE TOTAL COSTS

PRICE	YIELD (lb/acre)							
	\$/lb	1,600	1,800	2,000	2,200	2,400	2,600	2,800
1.10		-1,738	-1,569	-1,400	-1,231	-1,062	-893	-724
1.35		-1,338	-1,119	-900	-681	-462	-243	-24
1.60		-938	-669	-400	-131	138	407	676
1.85		-538	-219	100	419	738	1,057	1,376
2.10		-138	231	600	969	1,338	1,707	2,076
2.35		262	681	1,100	1,519	1,938	2,357	2,776
2.60		662	1,131	1,600	2,069	2,538	3,007	3,476

UC COOPERATIVE EXTENSION
Table 6. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS
 SACRAMENTO VALLEY - 2012

ANNUAL EQUIPMENT COSTS

Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead		Total
					Insur- ance	Taxes	
11 66 HP 2WD Tractor	46,230	20	5,932	3,447	202	261	3,910
11 ATV 4WD	5,790	7	2,196	720	31	40	791
11 Brush Rake - 9'	2,000	25	57	137	8	10	155
11 Front End Loader	5,500	15	528	496	23	30	550
11 Mower - Flail 10'	12,000	10	2,122	1,365	55	71	1,490
11 Orch.Sprayer 500 G	21,000	15	2,016	1,894	89	115	2,098
11 Pickup Truck 1/2 T	28,000	7	10,621	3,481	150	193	3,823
11 Spin/Spreader-Pull	16,000	20	834	1,231	65	84	1,380
11 Weed Sprayer 100 G	4,000	10	707	455	18	24	497
TOTAL	140,520		25,014	13,225	641	828	14,694
60% of new cost*	84,312		15,008	7,935	385	497	8,817

*Used to reflect a mix of new and used equipment

ANNUAL INVESTMENT COSTS

Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead			Total
					Insur- ance	Taxes	Repairs	
INVESTMENT								
Buildings 2400sqft	80,000	20	0	6,284	280	400	1,600	8,564
Establishment Cost	376,000	22	0	27,917	0	1,880	376	30,173
Fuel Tanks 2-500g	6,514	20	0	512	23	33	130	697
Land	735,000	25	735,000	34,913	5,145	7,350	0	47,408
Pump & Well	19,400	25	0	1,342	68	97	388	1,895
Shop/Field Tools	15,000	15	0	1,421	53	75	300	1,848
Sprinkler Irrigation	150,000	25	0	10,378	525	750	3,000	14,653
TOTAL INVESTMENT	1,381,914		735,000	82,766	6,093	10,585	5,794	105,238

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Environmental Fee	100	acre	1.00	100
Liability Insurance	100	acre	7.28	728
Office Expense	100	acre	110.00	11,000
Sanitation Fees	100	acre	5.60	560

UC COOPERATIVE EXTENSION
 Sacramento Valley 2012
Table 7. HOURLY EQUIPMENT COSTS

Description	Actual Hours Used	COSTS PER HOUR						
		Capital Recovery	Cash Overhead		Operating			Total Costs/Hr.
			Insur- ance	Taxes	Repairs	Fuel & Lube	Total Oper.	
11 66 HP 2WD Tractor	353.70	6.71	0.31	0.44	1.87	7.34	9.21	16.67
11 ATV 4WD	285.20	1.66	0.06	0.08	0.43	2.93	3.36	5.16
11 Brush Rake - 9'	16.10	5.91	0.27	0.38	0.27	0.00	0.27	6.83
11 Front End Loader	16.10	18.69	0.71	1.02	0.70	0.00	0.70	21.12
11 Mower - Flail 10'	117.40	6.66	0.22	0.32	4.34	0.00	4.34	11.54
11 Orch.Sprayer 500 G	177.80	7.13	0.27	0.39	3.21	0.00	3.21	11.00
11 Pickup Truck 1/2 T	308.80	6.87	0.24	0.35	1.91	7.33	9.24	16.70
11 Spin/Spreader-Pull	10.20	56.89	2.39	3.42	4.04	0.00	4.04	66.74
11 Weed Sprayer 100 G	65.80	4.53	0.15	0.21	1.07	0.00	1.07	5.96

UC COOPERATIVE EXTENSION

Sacramento Valley 2012

Table 8. OPERATIONS WITH EQUIPMENT

Operation	Operation Month	Tractor	Implement	Labor Type	Labor Hours	Material	Rate/acre	Unit
Weed: Dormant Strip (Goal Surflan RU)	Jan		ATV 4WD	Equipment Operator	0.28	Surflan AS	3.00	pint
			Weed Sprayer 100 G			Goal 2 XL	3.00	pint
						Roundup Power Max	0.72	pint
Winter Sanitation	Jan	66 HP 2WD	Mower - Flail 10'	Equipment Operator	0.25	Shake Trees	1.00	hour
Crop Consultant Fees	Feb					Sweep Nuts	1.00	hour
	May					PCA	0.33	acre
	Sept					PCA	0.33	acre
Disease: Brown Rot (Vanguard)	Feb	66 HP 2WD	Orch.Sprayer 500 G	Equipment Operator	0.38	Vanguard WG	5.00	oz
Weed Control - Mow Middles 5X	Feb	66 HP 2WD	Mower - Flail 10'	Equipment Operator	0.25			
	Apr	66 HP 2WD	Mower - Flail 10'	Equipment Operator	0.25			
	May	66 HP 2WD	Mower - Flail 10'	Equipment Operator	0.25			
	June	66 HP 2WD	Mower - Flail 10'	Equipment Operator	0.25			
	Aug	66 HP 2WD	Mower - Flail 10'	Equipment Operator	0.25			
Pollination	Feb					Pollination Fee	2.50	acre
Irrigation - Frost Protection	Feb			Non-Machine	0.36	Water - Pumped	2.00	acin
Pest-Shothole/Worm Rovral Dipel	Mar	66 HP 2WD	Orch.Sprayer 500 G	Equipment Operator	0.38	Rovral 4 Flowable	1.00	pint
						Dipel DF	1.00	lb
Pest-Shothole/Worm Ziram Dipel	Mar	66 HP 2WD	Orch.Sprayer 500 G	Equipment Operator	0.38	Ziram WDG 76	8.00	lb
						Dipel DF	1.00	lb
Pest Control-Gophers Spot Treat	Mar		ATV 4WD	Non-Machine		Gopher Bait	0.25	lb
Pest-Misc Diseases (Quash, Ph-D)	Apr	66 HP 2WD	Orch.Sprayer 500 G	Equipment Operator	0.38	Quash	3.00	oz
						Ph-D	6.20	oz
						UN-32	73.34	lb N
Fertilizer N in irrigation (UN32)	Apr					UN-32	73.34	lb N
	May			Non-Machine		UN-32	73.33	lb N
	July					UN-32	73.33	lb N
Irrigate	Apr			Non-Machine	0.18	Water - Pumped	3.89	acin
	May			Non-Machine	0.36	Water - Pumped	4.58	acin
	June			Non-Machine	0.54	Water - Pumped	6.64	acin
	July			Non-Machine	0.63	Water - Pumped	7.86	acin
	Aug			Non-Machine	0.36	Water - Pumped	6.77	acin
	Sept			Non-Machine	0.18	Water - Pumped	5.00	acin
	Oct			Non-Machine	0.09	Water - Pumped	3.26	acin
Pest-Squirrel (Bait)	Apr		ATV 4WD	Equipment Operator	0.05	Grnd Squirrel Bait	0.15	lb
	May		ATV 4WD	Equipment Operator	0.05	Grnd Squirrel Bait	0.15	lb
	June		ATV 4WD	Equipment Operator	0.05	Grnd Squirrel Bait	0.15	lb
	Sept		ATV 4WD	Equipment Operator	0.05	Grnd Squirrel Bait	0.15	lb
	Oct		ATV 4WD	Non-Machine		Grnd Squirrel Bait	0.15	lb
Weed: Strip Spray (Rely)	May		ATV 4WD	Equipment Operator	0.28	Rely 200	2.16	pint
			Weed Sprayer 100 G					
Fertilize: Leaf Samples 1/25ac	July		ATV 4WD	Non-Machine	0.01	Leaf Analysis NPK	0.04	each
Insect: Mite/NOW (Omite/Lorsban)	July	66 HP 2WD	Orch.Sprayer 500 G	Equipment Operator	0.38	Lorsban 4 E	4.00	pint
						Omite 30 WP	7.50	lb

UC COOPERATIVE EXTENSION

Sacramento Valley 2012

Table 8. continued

Operation	Operation Month	Tractor	Implement	Labor Type	Labor Hours	Material	Rate/ acre	Unit
Weed Preharvst Spry Middle RU	July		ATV 4WD Weed Sprayer 100 G	Equipment Operator	0.28	Roundup Power Max	1.50	pint
Fertilize: Potash (500 lbs)	Nov	66 HP 2WD	Spin/Spreader-Pull	Equipment Operator	0.13	Potassium Sulfate	500.00	lb
Fertilize Zinc Sulfate Foliar	Nov	66 HP 2WD	Orch.Sprayer 500 G	Equipment Operator	0.38	Zinc Sulfate 36%	30.00	lb
Pruning (Alternate Years)	Dec			Non-Machine	4.26			
Brush Disposal (Alternate Yrs)	Dec	66 HP 2WD	Front End Loader Brush Rake - 9'	Non-Machine	3.50			
Pickup Truck Use	Dec		Pickup Truck 1/2 T	Equipment Operator	3.90			
ATV Use	Dec		ATV 4WD	Equipment Operator	2.40			
Shake	Aug					Shake Trees	1.00	hour
Hand Rake	Aug			Non-Machine	1.25			
Sweep	Aug					Sweep Nuts	1.00	hour
Pickup and Haul	Aug					Pickup Nuts	2,200.00	lb
						Haul Nuts	2,200.00	lb
Hull and Shell	Aug					Hull and Shell	2,200.00	lb