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**University of California Agriculture and Natural Resources  
Cooperative Extension and Agricultural Issues Center  
UC Davis Department of Agricultural and Resource Economics**

**2018**

**SAMPLE COSTS TO PRODUCE AND HARVEST  
FRESH MARKET BLACKBERRIES  
Primocane Bearing**



**Central Coast Region**

Santa Cruz, Monterey and San Benito Counties

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**INTRODUCTION**

Sample costs to produce and harvest primocane blackberries in Santa Cruz, Monterey and San Benito Counties are presented in this study. The study is intended as a guide only, and can be used to make production decisions, determine potential returns, prepare budgets, and evaluate production loans. The practices described are based on production and harvest procedures considered typical for this crop and area, and may not apply to every farm. Sample costs for labor, materials, equipment, and custom services are based on current figures. A blank column, "Your Cost", is provided to enter your actual costs on Tables 2, 3, 5, and 6.

The hypothetical farm operation, production and harvest practices, overhead, and calculations are described under assumptions. For additional information or explanation of calculations used in the study call the Agricultural Issues Center, University of California, Davis, (530) 752-4651, UC Cooperative Extension Santa Cruz County: Mark Bolda (831) 763-8025 and Laura Tourte (831) 763-8005.

Sample Cost of Production studies for many commodities are available and can be downloaded from the website <https://coststudies.ucdavis.edu>. Archived studies are also available on the website.

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## ASSUMPTIONS

The following assumptions refer to calculations in Tables 1 to 10 beginning on page 13 and pertain to sample costs to establish, produce, and harvest primocane blackberries in the Central Coast Region - Santa Cruz, Monterey, and San Benito Counties. Practices described represent methods considered typical for conventional blackberry production in the region. The costs, practices and materials will not be applicable to all situations every production year. Cultural practices, materials and blackberry production and harvest costs vary by grower and region, and differences can be significant. The practices and inputs used in the cost study serve 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.**

Blackberries are also produced using organic methods along the Central Coast; it is estimated that roughly 20 percent of the crop is produced and marketed as organic. Many of the same practices that are used in conventional blackberry production are also used in organic production. Differences between the two production systems are primarily, though not exclusively, found in approaches to crop fertilization and pest management.

**Farm.** The farm consists of 30 contiguous acres of rented land. Blackberries are planted on 15 acres. Other berries are planted on 12 acres; roads, the irrigation system and farm buildings account for three acres. The grower rents the land, which includes a small shop, for \$2,800 per acre per year, and owns the equipment and machinery.

### **Establishment Year: Cultural Practices and Material Inputs**

Tables 1, 2 and 3

**Crop Cycle.** Blackberries are a perennial crop that, when well-managed, can produce for up to 8 years in this area. For this study, we consider costs and returns associated with the establishment of a primocane bearing blackberry crop, along with four production and harvest cycles. This planting and production cycle is intended to ensure optimal productivity and fruit quality. On farming operations where plants remain healthy and productivity is high, some growers may choose to extend the production and harvest cycle by one or more years beyond the five total cycles described here. By contrast, in operations where crop vigor and health has declined, the crop cycle may be shortened.

**Land Preparation.** Two soil samples per 15 acres are taken for soil analysis prior to land preparation to help determine fertilization practices. For this study, land is prepared for planting by first disking three times, chiseling (ripping) three feet deep four times and disking three times. Six tons of composted greenwaste is applied and incorporated into the soil at the same time as the disking operations. The field is also chiseled one and one-half feet deep one day prior to soil fumigation for good fumigant penetration. The fumigation is a combination of chloropicrin and 1,3-dichloropropene for pest management purposes. Cost for a solid, tarped fumigation is estimated at \$4,400 per acre. After fumigation, the field is disked again and rototilled, if necessary, to break up cloddy soils. The field is prepared (layout) and beds are then listed and shaped.

**Plant Stock.** This study assumes that a primocane bearing blackberry variety is planted. Primocane blackberries can be managed and pruned such that they are able to produce fruit over an extended period of time each year. The price of tissue cultured plant stock depends on the variety selected, a possible storage charge, and shipping costs. Depending on the source of the plant material, a royalty may be included in the plant cost or be assessed separately. For this study the total cost for each plant is estimated at \$1.70.

**Planting.** In this study primocane blackberries are planted by hand in January, but can be planted as early as December and as late as March. Planting density is 2,178 plants per acre, using 8-foot rows spaced 30-inches apart. Labor is estimated at 24 hours per acre to plant.

**Trellis System.** Each acre of the blackberry production operation is assumed to be 200 feet wide and 218 feet long, with 25 rows per acre using 8-foot row spacing. A trellis system is installed in the establishment year as soon as possible after planting. The total cost is estimated at \$3,795 per acre, which includes materials and labor. Material costs include end posts, stakes (also referred to as pickets), and wire system. Because trellis materials can be used for other plantings, the material cost (estimated at roughly \$2,300 per acre) is included in the non-cash or investment overhead and amortized accordingly. Installation labor is estimated at 89 hours per acre for a cost of \$1,495 per acre.

**Irrigation System.** A drip irrigation system is installed during the establishment year as soon as possible after planting, with drip lines tied to the lower wire of the trellis system and emitters placed every 6-inches. During the winter, crop growth is generally dependent on seasonal rains. The total number of irrigations varies depending on climatic conditions. Irrigation practices during the establishment year are similar to those in all subsequent production years. Drip irrigations are assumed to be twice per week, usually beginning in April and ending in October. A total of 24 acre-inches per acre per year is applied. Total water use will vary depending upon factors such as irrigation method, soil type, weather, and the time of the year the crop is planted. The cost of water is estimated at \$22.50 per acre-inch, for a total of \$270 per acre-foot. Water costs vary considerably in the area depending upon the water district or agency, delivery, associated fees, and pumping variables.

**Tunnel Installation and Management.** Tunnels, also called hoop houses, are constructed over the planted blackberries. Each tunnel is 24 feet wide (covering three rows) and 200 feet long. The structures consist of a line of anchor posts, bridged by a metal frame, and covered with 5 mil thick semi-clear plastic, which is fastened down with a rope. Struts on each side of the tunnel maintain tension down the length of the tunnel. Labor to install tunnels is estimated at 40 hours per acre. Tunnels are actively managed during the establishment and all other production years. This includes managing the plastic cover, which is taken down and secured, and unfurled and put over the structures, as needed to ensure optimal growing conditions each year. Tunnel management takes place from March to October and is estimated at 38 hours per acre. The structures are removed with completion of the cropping cycle and all materials except the plastic can be used for a subsequent crop.

**Cane Management.** Plants are pruned and trained during the establishment and all subsequent production years. Pruning, also known as “heading back” or “hard pinch” takes place in April and May, to reduce each cane’s growing point to 3 or 4.5 feet tall. The practice stimulates growth of lateral or fruiting canes to ensure optimal yield. In May and June the canes are trained or propped up on the trellis system to support cane growth and help with fruit visibility and harvest efficiency. Labor for both practices combined is estimated at roughly 131 hours per acre for a total cost of \$2,201. In December of each year (after harvest), all canes are mowed to ground level with a bladed handheld weed eater. Labor for this practice is estimated at 71 hours per acre for a total cost of \$1,193. The canes are placed in row centers, shredded with a flail mower, and disked into the soil. Trellis system repairs, if needed, are also performed during this time.

**Fertilization.** In addition to the soil samples and composted greenwaste discussed above, an 18-13-16 fertilizer is applied at 400 pounds per acre and incorporated into the beds when shaped prior to planting. In March, 21-0-0-24 (ammonium sulfate) is injected through the irrigation system four times at the rate of 20 pounds per acre per irrigation. From early April to late July, a 3-18-18 fertilizer at 24 pounds per application is injected twice monthly. Labor hours for injecting the liquid fertilizer are assumed to be included in the irrigation labor.

**Weed Mats.** Weed mats are installed in tunnel anchor rows during the establishment year to assist with weed management, especially around anchor posts, for all five production and harvest cycles.

**Pest management and all subsequent practices during the establishment year are similar to those for all production years. To avoid duplication, text describing these practices and costs are found in the following section. Tables 1 to 3 also provide more information on establishment practices and costs.**

### **Production Years 1 to 4: Cultural Practices and Material Inputs** Tables 1 and 4-10

**Fertilization.** In each of the four production years two soil samples for each 15 acres are analyzed to assist with fertilizer decisions. Fertilizers are either injected through the drip system and/or applied mechanically, with nitrogen applied early in the season, and supplemented with phosphorus and potassium later in the season. Leaf samples for nutrient analysis are collected mid-season to determine the nutritional needs of the plants. With the exception of the establishment year, ammonium sulfate (21-0-0-24) is band applied twice in February in equal amounts (75 lbs each application) for a total application rate of 150 pounds per acre. Incorporation is expected with winter rains. In March, 17-0-0 is injected through the irrigation system four times at the rate of 20 pounds per acre per application. In all years, from early April to late July, 3-18-18 at 24 pounds per acre is applied twice monthly. Labor for liquid fertilizer practices is included with labor hours for irrigation.

**Irrigation.** Depending on effective rainfall and available soil moisture, plants are irrigated from April through October twice per week. Total irrigation water use during the season is estimated at two acre-feet per acre per year. The cost of water includes pumping costs and is estimated at \$270 per acre-foot or \$22.50 per acre-inch. Water costs vary considerably in the area depending upon the water district or agency, delivery, associated fees, and pumping variables. In this study, the lines are flushed and repaired in April prior to the first irrigation.

**Tunnel Management.** To ensure optimal growing conditions each year the plastic covers are taken down and secured, and unfurled and put over the structures, as needed. Tunnel management takes place from March to October; labor is estimated at 38 hours per acre for a total cost of \$638. The structures are removed with completion of the cropping cycle and all materials except the plastic can be used for a subsequent crop.

**Pest Management.** The pesticides and rates mentioned in this cost study are listed in *UC Integrated Pest Management Guidelines, Caneberries* and the *UC Fresh Market Caneberry Production Manual*. For additional information on pesticides, pest identification, monitoring, and management visit the UC IPM website at [www.ipm.ucanr.edu](http://www.ipm.ucanr.edu) or contact your local UCCE farm advisor. Information and pesticide use permits are available through the local county agricultural commissioner's office. Pesticides discussed in this study are commonly used in blackberry production and are those used to calculate rates and costs. However, they are not recommendations, and other pesticides may be available. Spray adjuvants are recommended for use with many pesticides, but are not shown in this study. Pesticide costs vary by location, brand, and volume purchased. Pesticide costs in this study are from a single dealer and shown as full retail.

**Pest Control Adviser (PCA).** A PCA monitors the field for pest problems and nutritional status during the establishment and all subsequent production years. Growers may hire private consultants on a per acre basis or as part of an agreement with an agricultural chemical and fertilizer company. In this study costs for a PCA are included at \$125 per acre per year.

**Weeds.** During the establishment and production years weeds are managed primarily by monthly hand weeding beginning in May and ending in October for a total cost per acre of \$588. Some growers report higher hand

weeding costs, which are determined by weed pressure and the use of weed mats in anchor rows. Row middles are disked in June and August.

*Diseases.* Several diseases are found in primocane blackberries, including downy and powdery mildew. In the establishment and all production years, Aliette and Ridomil are each applied once per season in February or March for downy mildew control. Pristine is applied twice per season, once in June and once in July, for powdery mildew control. All applications are made with an air-blast sprayer. Plants should be monitored for potential diseases during the growing season as production conditions will differ from year to year.

*Insects/Arthropods.* In the establishment and all production years, lepidopterous pests such as Light Brown Apple Moth (LBAM) and other leafrollers are controlled with the use of pheromone twist ties (for LBAM) and two applications of Success in April for LBAM and other leafrollers. Spotted Wing Drosophila (SWD) is managed by one application of Malathion during the first week in July, followed by one application of Mustang Max in August. Broad mites have emerged recently as a pest issue, though in the past were not typically found on blackberry. No treatment thresholds have yet been developed for broad mites. Therefore, control measures are limited. If mite numbers are high and/or increasing, a pesticide application may be warranted. The number of pest management applications and materials will vary depending upon the pest and infestation levels each year.

*Physiological disorders.* Blackberry fruit are subject to red duplet disorder, also called druplet reversion or reddening, after harvest (Edgley). This disorder is thought to be caused by fruit damage at harvest or during transportation to the cooler, combined with rapid changes in fruit temperature. Strategies to manage this disorder include harvesting during the coolest part of the day, along with quick delivery to the cooler.

**Pollination.** Bees are necessary for blackberry pollination. Cost for the establishment and all production years is estimated at \$375 per acre, or three hives at \$125 per hive. The grower contracts with a beekeeper; hives are set in the field in May and remain until September.

**Harvest.** Harvest in the establishment and each production year begins in late June or early July, and continues through October, optimal weather and production conditions permitting. Blackberries are harvested by hand every few days at an average seasonal cost of \$6.25 per tray, which accounts for both hourly and piece rate. Crew size and number of crews may vary through the season depending upon the yield. Harvest rate per person ranges from one to five trays per hour, with the lower rate early and late in the season. The fruit is picked using one-half gallon buckets. It is then field sorted and packed into a tray containing 12 six ounce plastic clam shells. Each tray weighs 4.5 pounds. A packing and sorting wagon/trailer with a stainless steel table-top and a shade structure is pulled by a small tractor to the picking area. The wagon is managed by a supervisor. Harvesters consist of one crew of 36 who hand pick the berries, a crew supervisor and a checker-loader who records the trays picked by each crew member and who also loads the trays on the truck. The truck holds up to two pallets with 144 trays per pallet and takes one hour round trip to deliver the fruit to the cooler. For this study, it is assumed that the truck makes at least one trip per day. To keep fruit at an optimal postharvest temperature, the truck may make deliveries to the cooler with less than full loads. The cooler charges \$0.85 per tray for cooling services.

**Yields and Returns.** This study assumes a yield range of 3,000 to 5,000 trays per acre, with a representative marketable yield of 4,000 trays per acre. The estimated unit price to growers is \$14 per tray based on the 2014 to 2018 Salinas-Watsonville shipping point prices from the USDA Agricultural Market Service. Prices range from a low of \$11 to a high of \$17 depending on market conditions. Estimated net returns to growers for a combination of yields and prices is shown on Table 8, Ranging Analysis.

**Cane Management.** New canes (for the next crop) begin to grow after the older (fruited) canes are mowed postharvest. They are trained or propped up on the trellis system to support cane growth and expose fruit for harvest efficiency. New canes are headed back each year in April and May to stimulate lateral growth or fruiting canes and ensure optimal yield. Labor cost for these two operations is estimated to be roughly \$2,201 per acre, or 131 labor hours per acre. In December of each year, all canes are mowed to ground level with a bladed handheld weed eater. Labor for this practice is estimated at 71 hours per acre for a total cost of \$1,193. The canes are placed in row centers, shredded with a flail mower, and disked into the soil. Trellis system repairs, if needed, are also performed during this time.

At the end of the fourth production year, blackberry canes are removed from the field, as are the tunnel, trellis and drip systems. Operations to prepare the field for the next new crop also take place during this time. Labor for these operations is estimated at 143 hours per acre for a total of \$2,302; a portion of this cost is shown for production years 1-4 on Table 4 under postharvest.

**Cover Crop.** In December of the Establishment Year and Production Years 1-3, Merced Rye is planted as a cover crop in 4-foot swaths in crop row middles for assistance with weed management and erosion control. Cover crop growth is dependent on fall and winter rains. The cover crop is mowed in March of each production year to reduce the above ground biomass. Seventy-five percent of the cover cropping cost has been included in this study because there is no cover cropping during the last crop cycle, production year 4.

**Growing Cost.** Some growers along the Central Coast of California prefer to focus on growing costs and therefore separate total harvest costs from total cash costs, equipment depreciation and replacement costs. For this study, growing cost is noted at the bottom of Table 4 and is calculated by subtracting total harvest costs from total costs. Growing cost depend upon many variables including location and grower.

### **Labor, Equipment, and Interest Costs**

**Labor.** The labor rates used in this study are \$22.40 per hour for machine operators and \$16.80 for general labor, which includes overhead of 40 percent. The basic hourly wages are \$16.00 for machine operators and \$12.00 for general labor. The overhead includes the employers' share of federal and California state payroll taxes, workers' compensation insurance for berry crops (code 0179), and a percentage for other possible benefits. Workers' compensation insurance costs will vary among growers, but for this study the cost is based upon the average industry rate as of January 1, 2018. Labor for operations involving machinery are 20% higher than the operation time given in Table 1 to account for the extra labor involved in equipment set up, moving, maintenance, work breaks, and field repair.

**California Minimum Wage and Overtime Rules.** In 2016, The California State Government passed new legislation concerning overtime and minimum wage rates that may affect farm labor costs. The California minimum wage rate for 2018 is \$11.00 per hour for companies with more than 25 employees and will rise each year by \$1.00 per hour until it reaches \$15.00 per hour in 2022. Businesses with 25 or fewer employees are given an additional year to comply with the changes. For businesses with 25 or fewer employees, the minimum wage rate is \$10.50 per hour for 2018 and increases to \$11.00 per hour in 2019; thereafter, their minimum wage rate increases by \$1.00 per hour each year from \$11.00 per hour in 2019 to \$15.00 per hour in 2023.

Recent California regulations also decrease the overtime threshold—the number of hours required to be worked before overtime benefits are received—for agricultural workers. Beginning January 2019, for businesses with more than 25 employees, the regulations decrease the overtime threshold for agricultural workers from 60 hours per week and 10 hours per day by 5.0 hours per week and 0.5 hours per day each year until it reaches 40 hours per week and 8.0 hours per day in 2022. Businesses with 25 or fewer employees are given an additional three years to comply with the regulation's changes. By January 1, 2019 (2022 for



employers with 25 or fewer employees) employees will also be entitled to overtime for 8 hours on the seventh consecutive day of work.

These regulations may cause increased cost of labor used on farms, whether as direct hires, as farm labor contractor employees or as a component of custom services. For more information and to view the California minimum wage and overtime phase-in schedules visit <http://aic.ucdavis.edu/>

**Federal H-2A Program.** Growers may also choose to use H-2A guestworker visa program to employ workers. Rates of pay are determined by the highest applicable wage rates that are in effect at the time work is performed: the adverse effect wage rate (AEWR), the applicable prevailing wage, the agreed-upon collective bargaining rate, or the Federal or State statutory minimum wage (US Department of Labor). Growers also need to comply with other requirements associated with the H-2A program, including those for housing, meals, transportation. Use of this program may result in labor costs that are higher than those shown in this study but may be necessary in order to assure a reliable supply of labor.

**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 5.00 percent 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 2018.

**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 and Biological Engineers (ASABE). Fuel and lubrication costs are also determined by ASABE equations based on maximum power takeoff (PTO) horsepower, and fuel type. Prices for on-farm delivery of red dye diesel and gasoline are \$3.60 (excludes excise taxes) and \$3.20 per gallon, respectively. The cost includes a 2 percent local sales tax on diesel fuel and 8 percent sales tax on gasoline. Gasoline costs also include federal and state excise taxes, which are refundable for on-farm use when filing income taxes. The fuel, lube, and repair cost per acre for each operation in Table 1 is determined by multiplying the total hourly operating cost in Table 6 for each piece of equipment used for the selected operation by the hours per acre. Tractor time is 10 percent higher than implement time for a given operation to account for setup, travel, and down time.

**Pickup Truck/ATV.** This study includes a cost for the use of a pickup truck and ATV for business purposes.

**Risk.** The risks associated with producing and marketing blackberries are considered high. While this study makes every effort to model a production system based on typical, real world practices, it cannot fully represent all risk associated with agriculture, including financial, production, market, legal, and human resource risks that ultimately affect the profitability and economic viability of blackberries. In this area invasive pests pose particular regulatory and management challenges and increase production and marketing risks for growers. In addition, labor availability, scheduling and cost is a noteworthy human resource risk. In recent years labor constraints have meant challenges in securing and retaining a sufficient number of workers to ensure timely and effective farm operations. Some growers report paying higher wages to attract and retain workers; others may pay overtime because of labor constraints. Overall profitability of the crop is negatively impacted in either case.



## 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. Because overhead costs are farm and ranch specific, costs will vary among growers.

**Property Taxes.** Counties charge a base property tax rate of 1 percent 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 percent of the average value of the property. Average value equals new cost plus salvage value divided by 2 on a per acre basis.

**Insurance.** Insurance for farm investments vary depending on the assets included and the amount of coverage. Property insurance provides coverage for property loss and is charged at 0.846 percent of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$640 for the entire farm.

**Office Expenses.** Annual office and business expenses are estimated at \$750 per acre. Costs include, but are not limited to, a variety of administration and office supplies, bookkeeping, accounting, road maintenance, utilities and other miscellaneous expenses.

**Land Rent.** Land rents in the three county area range from \$450 to \$3,300 per acre per year. In this study, land rent is assumed to be \$2,800 per acre per year. Land rent includes developed well(s) and irrigation system. In general, growers are responsible for the portion above ground such as the pump, and the landowner is responsible for what is below ground, such as the well running dry (please see the irrigation section for more information).

**Food Safety and Regulatory Programs.** To ensure the safety of fresh products, accommodate buyer requests, and comply with regulatory programs such as those for water and air quality, growers now have in house departments and/or staff specially dedicated to supervision and management of these programs. Part of a food safety program is participation in third party (independent) audits. Costs associated with food safety programs vary depending upon the farm and inspection circumstances, administrative costs and personnel training and hygiene needs and are estimated at \$100 per acre per year. In addition, a cost of \$80 per acre per year is included for management and compliance with regulatory programs.

**Field Sanitations.** Sanitation services provide a portable toilets and washing stations to the farm. The cost includes double toilets with washbasins, delivery and pickup, and 12 months of servicing. Costs include soap or other suitable cleaning agent, and single use towels. Separate potable water and single use drinking cups are also supplied.

**Farm Supervisor.** The grower hires a farm supervisor to oversee some of the cultural and harvest operations as well as fill in on some of the operations where temporary assistance is needed. The estimated cost for the supervisor is \$1,250 per acre. Larger operations may have multiple supervisory levels; associated costs will therefore differ.

**Investment Repair.** Repair costs are the annual maintenance costs for investments in non-cash overhead. For this study, annual repairs are calculated as 2 percent of the new cost, with the exception of drip system repairs, which are 5 percent of the total cost and include materials & labor.

## Non-Cash Overhead

Non-cash overhead, shown on an annual per acre basis, 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 and Biological Engineers (ASABE) based on equipment type and years of life. The life in years is estimated by dividing the wear out life, as given by ASABE 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 8.

*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.* The interest rate of 5.50 percent is used to calculate capital recovery. The rate will vary depending upon the size of the loan and other lending agency conditions, but is the basic suggested rate by a farm lending agency as of January 2018.

**Tunnels.** Some tunnel structure materials are used for more than one complete blackberry cropping cycle. For example, steel parts last for 10 years, while plastic coverings last for only for one cycle. A total of seven 24 feet wide by 200 feet long tunnel structures are constructed per acre. Additional information about tunnels is located in the section Establishment Year: Cultural Practices and Material Inputs.

**Trellis.** The trellis is installed in the establishment year soon after planting. The trellis is removed at the end of the last production year and can be used on other plantings. The cost includes the materials only, with labor costs found in establishment costs. Additional information about the trellis system is located in the section Establishment Year: Cultural Practices and Material Inputs.

**Tools.** This includes shop and field and harvest tools used on the farm. The value is estimated and does not represent any specific inventory.

**Cane Management Tools.** The weed eaters that are used to mow blackberry canes in December each year, and other relevant tools used in cane management are included in this study and shown under investments.

**Shade Structure.** A shade structure is set up in first year or by early spring of the second year to provide shade for the labor and for a sorting and packing area at harvest. The cost includes the setup labor and materials. A

packing and sorting wagon/trailer with a stainless steel table top and a shade structure is pulled by a small tractor to the picking area. The shade structure may also be used for future crops.

**Irrigation System.** The irrigation system is maintained by the landowner and assumed to be included in the land rental cost. In some cases the grower may be responsible for maintenance. The grower invests in and owns sprinkler pipe and drip system materials sufficient for irrigation needs. The grower also owns a trailer and other equipment needed for moving pipe and irrigation supplies to and from the field. Irrigation water is pumped from a well and delivered to the field through an underground pipe system. Main lines above ground are connected to the underground system to deliver water for the irrigations. Additional information about the drip system is located in the section Production Years 1 to 4: Cultural Practices and Material Inputs.

**Establishment.** Costs to establish blackberries are used to determine capital recovery expenses, depreciation, and interest on investment for the production years. Establishment cost is the sum of the costs for land preparation, trellis system labor, drip tape, planting, plants, cash overhead and expenses for establishing the canes. The Net Cash Cost on Table 1 represents the establishment cost, which is \$16,622 per acre or \$249,330 for the 15 acre field after the first harvest.

**Equipment Costs.** 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 70 percent to indicate a mix of new and used equipment. Annual ownership costs for equipment and other investments are in the Whole Farm Equipment, Investment and Business Overhead Tables. 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 and Biological Engineers. March 2011. *American Society of Agricultural Engineers Standards. Agricultural Machinery Management Data*. ASAE D497.7. St. Joseph, MI, <http://elibrary.asabe.org>. Internet accessed February 2013.
- Boehlje, Michael D., and Vernon R. Eidman. 1984. *Farm Management*. John Wiley and Sons. New York, NY.
- Bolda, Mark, Mark Gaskell, Elizabeth Mitcham and Michael Cahn. 2012. *UC Caneberry Production Manual*. University of California Agriculture and Natural Resources. Publication 3525.
- Bolda, Mark, Laura Tourte, Karen M .Klonsky and Richard L. De Moura. 2013. *Sample Costs to Establish and Produce Fresh Market Blackberries – Central Coast Region*. University of California Cooperative Extension. Davis, CA.
- California Chapter of the American Society of Farm Managers and Rural Appraisers. 2017. *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 February 2017. <http://www.boe.ca.gov/sptaxprog/spftdrates.htm>
- Edgley, Max. *Managing Red Drupelet Disorder*. Perennial Horticulture Fact Sheet. Tasmanian Institute of Agriculture. University of Tasmania. [http://www.utas.edu.au/data/assets/pdf\\_file/0011/978104/Blackberry-red-drupelet-fact-sheet-2017.pdf](http://www.utas.edu.au/data/assets/pdf_file/0011/978104/Blackberry-red-drupelet-fact-sheet-2017.pdf). Accessed December 8, 2017.
- Energy Information Administration. 2012. *Weekly Retail on Highway Diesel and Gasoline Prices*. Internet accessed January 2018. <http://tonto.eia.doe.gov/oog/info/wohdp>
- Santa Cruz County Agricultural Commissioner. 2013-2016. *Santa Cruz County Annual Crop and Livestock Report, Fruits*. Santa Cruz County, Watsonville, CA. <http://agdept.com>
- United States Department of Labor – Wage and Hour Division. 2018. Fact Sheet 26: Section H-2A of the Immigration and Nationality Act (INA). <https://www.dol.gov/whd/regs/compliance/whdfs26.htm>. Accessed August 15, 2018.
- University of California Statewide IPM Project. 2015. *UC Pest Management Guidelines, Caneberries*. University of California, Davis, CA. <http://www.ipm.ucdavis.edu>
- United States Department of Agriculture, Agricultural Marketing Service. <http://www.ams.usda.gov>. Accessed December 6, 2018.

**UC COOPERATIVE EXTENSION – AGRICULTURAL ISSUES CENTER**  
**TABLE 1. COSTS PER ACRE TO ESTABLISH, PRODUCE AND HARVEST**  
**PRIMOCANE BLACKBERRIES - 2018 – SUMMARY**

	Year:	Establish	1st
	4.5- Pound Trays Per Acre:	4,000	4,000
Cultural Costs:			
Cultural Costs		19,884	6,140
<b>TOTAL CULTURAL COSTS</b>		<b>19,884</b>	<b>6,140</b>
Harvest Costs:			
Harvest/Pack/Haul/Cool/Market		44,596	44,596
<b>TOTAL HARVEST COSTS</b>		<b>44,596</b>	<b>44,596</b>
Post Harvest:			
Post Harvest Operations		1,235	1,812
<b>TOTAL POSTHARVEST COSTS</b>		<b>1,235</b>	<b>1,812</b>
Interest On Operating Capital @ 5.00%		820	347
<b>TOTAL OPERATING COSTS/ACRE</b>		<b>66,535</b>	<b>52,894</b>
Cash Overhead Costs:			
Rent, Insurance, Taxes, etc.		6,087	6,087
<b>TOTAL CASH OVERHEAD COSTS</b>		<b>6,087</b>	<b>6,087</b>
<b>TOTAL CASH COSTS/ACRE</b>		<b>72,622</b>	<b>58,981</b>
<b>INCOME/ACRE FROM PRODUCTION</b>		<b>56,000</b>	<b>56,000</b>
<b>NET CASH COSTS/ACRE FOR THE YEAR</b>		<b>16,622</b>	<b>2,981</b>
<b>PROFIT/ACRE ABOVE CASH COSTS</b>			
Non-Cash Overhead (Capital Recovery Cost):			
Equipment/Investments		6,623	6,615
<b>TOTAL NON-CASH OVERHEAD COST/ACRE</b>		<b>6,623</b>	<b>6,615</b>
<b>TOTAL COST/ACRE FOR THE YEAR</b>		<b>79,245</b>	<b>65,597</b>
<b>INCOME/ACRE FROM PRODUCTION</b>		<b>56,000</b>	<b>56,000</b>
<b>TOTAL NET COST/ACRE FOR THE YEAR</b>		<b>23,245</b>	<b>9,597</b>
<b>NET PROFIT/ACRE ABOVE TOTAL COST</b>			
<b>TOTAL ACCUMULATED NET/ACRE</b>		<b>-23,245</b>	<b>-32,842</b>

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**Table 2. COSTS PER ACRE TO ESTABLISH AND HARVEST BLACKBERRIES**  
 Central Coast - 2018

Operation	Operation		Cash and Labor Costs per Acre				Total Cost	Your Cost
	Time (Hrs/A)	Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/Rent		
Cultural:								
Soil Samples (2 per 15 Ac)	0 07	2	0	0	0	10	12	
Disc 6X	1 03	28	11	5	0	0	44	
Chisel/Rip 4X (3 ft. deep)	0 52	14	6	3	0	0	23	
Compost Application (Greenwaste)	0 34	9	4	3	246	0	261	
Chisel 1X (1.5 ft. deep)	0 13	3	1	1	0	0	6	
Fumigation	0 00	0	0	0	0	4,400	4,400	
Fumigation Permit	0 00	0	0	0	0	25	25	
Tarp Retrieval/Disposal	0 00	0	0	0	0	100	100	
Disc 1X	0 17	5	2	1	0	0	7	
Layout Field	0 00	17	0	0	0	0	17	
List & Shape Beds	0 46	12	5	2	0	0	19	
Fertilize at Planting (18-13-16)	0 34	9	4	3	220	0	235	
Plant Blackberries	24 00	403	0	0	3,703	0	4,106	
Install Trellis (Labor Only)	89 00	1,495	0	0	0	0	1,495	
Install Drip System (Tape and Labor)	3 48	59	0	0	385	0	444	
Disease Management 3X (Mildew)	1 71	46	18	13	648	0	725	
LBAM Management (Pheromones)	0 00	17	0	0	165	0	182	
Install & Manage Tunnels (Labor Only)	78 00	1,310	0	0	0	0	1,310	
Drip Irrigate- Establishment	3 30	55	0	0	540	0	595	
Fertilize 4X (21-0-0-24)	0 00	0	0	0	26	0	26	
Insect Management 2X (Leafroller)	1 14	31	12	9	76	0	128	
Cane Management	131 00	2,201	0	0	0	0	2,201	
Fertilize 2X Monthly (3-18-18)	0 00	0	0	0	156	0	156	
Pollination (3 Hives)	0 00	0	0	0	0	375	375	
Install Weed Mats in Anchor Rows	14 00	235	0	0	1,800	0	2,035	
Hand Weed Cane Rows	36 00	605	0	0	0	0	605	
Disc Row Middles	0 43	12	5	2	0	0	18	
Insect Management 2X (SWD)	1 14	31	12	9	22	0	73	
PCA	0 00	0	0	0	0	125	125	
ATV	0 50	13	1	0	0	0	15	
Pickup	3 33	90	21	11	0	0	122	
<b>TOTAL CULTURAL COSTS</b>	<b>390.09</b>	<b>6,701</b>	<b>102</b>	<b>61</b>	<b>7,985</b>	<b>5,035</b>	<b>19,884</b>	
Harvest:								
Harvest Blackberries	0 00	2,117	0	0	8,400	25,000	35,517	
Load/Haul	27 30	734	262	203	0	0	1,199	
Cool/Palletize	0 00	0	0	0	3,400	0	3,400	
Market/Sales Fee	0 00	0	0	0	4,480	0	4,480	
<b>TOTAL HARVEST COSTS</b>	<b>27 30</b>	<b>2,851</b>	<b>262</b>	<b>203</b>	<b>16,280</b>	<b>25,000</b>	<b>44,596</b>	
Postharvest:								
Mow Canes	71 00	1,193	0	0	0	0	1,193	
Shred Prunings	0 26	7	3	2	0	0	12	
Disc Prunings	0 30	8	3	1	0	0	12	
Plant Cover Crop	0 22	6	2	1	9	0	19	
<b>TOTAL POSTHARVEST COSTS</b>	<b>71 78</b>	<b>1,214</b>	<b>8</b>	<b>4</b>	<b>9</b>	<b>0</b>	<b>1,235</b>	
Interest on Operating Capital at 5.00%							820	
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>39</b>	<b>10,766</b>	<b>372</b>	<b>268</b>	<b>24,274</b>	<b>30,035</b>	<b>66,535</b>	

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

**Table 2. CONTINUED**  
Central Coast – 2018

Operation	Operation	Cash and Labor Costs per Acre					Total Cost	Your Cost
	Time (Hrs/A)	Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/Rent		
<b>CASH OVERHEAD:</b>								
Food Safety Programs							100	
Land Rent							2,800	
Office Expense							750	
Liability Insurance							22	
Regulatory Programs							80	
Field Sanitation							44	
Farm Manager							1,250	
Property Taxes							224	
Property Insurance							19	
Investment Repairs							798	
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>							<b>6,087</b>	
<b>TOTAL CASH COSTS/ACRE</b>							<b>72,622</b>	
<b>NON-CASH OVERHEAD:</b>								
		<b>Per Producing Acre</b>	<b>Annual Cost</b>					
			<b>Capital Recovery</b>					
Irrigation System		1,400	102				102	
Pump and Well		5,556	411				411	
Shop Tools		481	46				46	
Harvest Supplies		53	12				12	
Trellis System		2,300	437				437	
Tunnel Plastic Sheeting		4,969	1,842				1,842	
Tunnel Metal Support Materials		24,542	3,123				3,123	
Sort/Pack Trailer		370	47				47	
Shade Structure		78	10				10	
Weed Eaters (3)		160	35				35	
Equipment		3,809	556				556	
<b>TOTAL NON-CASH OVERHEAD COSTS</b>		<b>43,719</b>	<b>6,623</b>				<b>6,623</b>	
<b>TOTAL COSTS/ACRE</b>							<b>79,245</b>	



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**Table 3. MATERIAL COSTS PER ACRE TO ESTABLISH AND HARVEST PRIMOCANE BLACKBERRIES**

Central Coast – 2018

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>GROSS RETURNS</b>					
Establish	4,000		14.00	56,000	
<b>TOTAL GROSS RETURNS</b>				56,000	
<b>OPERATING COSTS</b>					
<b>Custom:</b>				<b>30,035</b>	
Soil Analysis	0 13	each	75.00	10	
Fumigation	1.00	acre	4400.00	4,400	
Fumigation Permit	1.00	acre	25.00	25	
Tarp Disposal	1.00	acre	100.00	100	
Bee Hives	3.00	each	125.00	375	
Per Tray Harvest Rate	4000.00	each	6.25	25,000	
PCA	1.00	acre	125.00	125	
<b>Fertilizer:</b>				<b>647</b>	
Composted Greenwaste	6.00	ton	41.00	246	
18-13-16	400.00	lb	0 55	220	
21-0-0-24	80.00	lb	0 32	26	
3-18-18	192.00	lb	0 81	156	
<b>Plants/Seed:</b>				<b>3,712</b>	
Blackberry Plants	2178.00	each	1 70	3,703	
Merced Rye	16 88	lb	0 55	9	
<b>Water:</b>				<b>925</b>	
Drip Tape	5500.00	foot	0 07	385	
Water-Pumped	24 00	acin	22 50	540	
<b>Fungicide:</b>				<b>648</b>	
Aliette	5 00	lb	18 45	92	
Ridomil	3 60	pint	109 95	396	
Pristine	46 00	oz	3 47	160	
<b>Insecticide:</b>				<b>262</b>	
Isomate Pheromones (300 lures per acre)	1 00	acre	165 00	165	
Success	10 00	floz	7 58	76	
Malathion 5EC	2 00	pint	5 80	12	
Mustang Max	4 00	floz	2 49	10	
<b>Pest Management:</b>				<b>1,800</b>	
Weed Mats and Pins	9 00	roll	200 00	1,800	
<b>Harvest:</b>				<b>16,280</b>	
Tray & Clamshells	4000 00	each	2 10	8,400	
Cool/Palletize	4000 00	each	0 85	3,400	
Market/Sales Fee	4000 00	each	1 12	4,480	
<b>Labor</b>				<b>10,766</b>	
Equipment Operator Labor	47 27	hrs	22 40	1,059	
Non-Machine Labor	577 80	hrs	16 80	9,707	
<b>Machinery</b>				<b>641</b>	
Fuel-Gas	88 95	gal	3 20	285	
Fuel-Diesel	24 32	gal	3 60	88	
Lube				56	
Machinery Repair				213	
Interest on Operating Capital @ 5.00%				820	
<b>TOTAL OPERATING COSTS/ACRE</b>				66,535	
<b>TOTAL OPERATING COSTS/</b>				17	
<b>NET RETURNS ABOVE OPERATING COSTS</b>				-10,535	

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**Table 3. CONTINUED**  
Central Coast – 2018

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>CASH OVERHEAD COSTS</b>					
Food Safety Programs				100	
Land Rent				2,800	
Office Expense				750	
Liability Insurance				22	
Regulatory Programs				80	
Field Sanitation				44	
Farm Manager				1,250	
Property Taxes				224	
Property Insurance				19	
Investment Repairs				798	
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>				<b>6,087</b>	
<b>TOTAL CASH OVERHEAD COSTS/</b>				<b>2</b>	
<b>TOTAL CASH COSTS/ACRE</b>				<b>72,622</b>	
<b>TOTAL CASH COSTS/</b>				<b>18</b>	
<b>NET RETURNS ABOVE CASH COSTS</b>				<b>-16,622</b>	
<b>NON-CASH OVERHEAD COSTS (Capital Recovery)</b>					
Irrigation System				102	
Pump and Well				411	
Shop Tools				46	
Harvest Supplies				12	
Trellis System				437	
Tunnel Plastic Sheeting				1,842	
Tunnel Metal Support Materials				3,123	
Sort/Pack Trailer				47	
Shade Structure				10	
Weed Eaters (3)				35	
Equipment				556	
<b>TOTAL NON-CASH OVERHEAD COSTS/ACRE</b>				<b>6,623</b>	
<b>TOTAL NON-CASH OVERHEAD COSTS/</b>				<b>2</b>	
<b>TOTAL COST/ACRE</b>				<b>79,245</b>	
<b>TOTAL COST/</b>				<b>20</b>	
<b>NET RETURNS ABOVE TOTAL COST</b>				<b>-23,245</b>	

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TABLE 4. MONTHLY COSTS PER ACRE TO ESTABLISH, PRODUCE AND HARVEST PRIMOCANE BLACKBERRIES

	DEC 16	JAN 17	FEB 17	MAR 17	APR 17	MAY 17	JUN 17	JUL 17	AUG 17	SEP 17	OCT 17	NOV 17	DEC 17	Total
<b>Cultural:</b>														
Soil Samples (2 per 15 Ac)	12													12
Disc 6X	44													44
Chisel/Rip 4X (3 ft. deep)	23													23
Compost Application (Greenwaste)	261													261
Chisel 1X (1.5 ft. deep)		6												6
Fumigation		4,400												4,400
Fumigation Permit		25												25
Tarp Retrieval/Disposal		100												100
Disc 1X		7												7
Layout Field		17												17
List & Shape Beds		19												19
Fertilize at Planting (18-13-16)		235												235
Plant Blackberries		4,106												4,106
Install Trellis (Labor Only)		1,495												1,495
Install Drip System (Tape and Labor)		444												444
Disease Management 3X (Mildew)				514			106	106						725
LBAM Management (Pheromones)				182										182
Install & Manage Tunnels				672	91	91	91	91	91	91	91			1,310
Drip Irrigate- Establishment				13	52	63	74	85	97	85	126			595
Fertilize 4X (21-0-0-24)				26										26
Insect Management 2X (Leafroller)					128									128
Cane Management					550	1,100	550							2,201
Fertilize 2X Monthly (3-18-18)					39	39	39	39						156
Pollination (3 Hives)						375								375
Install Weed Mats in Anchor Rows						2,035								2,035
Hand Weed Cane Rows						101	101	101	101	101	101			605
Disc Row Middles							9		9					18
Insect Management 2X (SWD)								37	36					73
PCA	10	10	10	10	10	10	10	10	10	10	10	10	10	125
ATV	1	1	1	1	1	1	1	1	1	1	1	1	1	15
Pickup	9	9	9	9	9	9	9	9	9	9	9	9	9	122
<b>TOTAL CULTURAL COSTS</b>	<b>360</b>	<b>10,874</b>	<b>20</b>	<b>918</b>	<b>1,502</b>	<b>3,897</b>	<b>512</b>	<b>552</b>	<b>426</b>	<b>370</b>	<b>411</b>	<b>20</b>	<b>20</b>	<b>19,884</b>
<b>Harvest:</b>														
Harvest Blackberries								5,926	11,832	11,832	5,926			35,517
Load/Haul								203	396	396	203			1,199
Cool/Palletize								567	1,133	1,133	567			3,400
Market/Sales Fee								747	1,493	1,493	747			4,480
<b>TOTAL HARVEST COSTS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>7,444</b>	<b>14,854</b>	<b>14,854</b>	<b>7,444</b>	<b>0</b>	<b>0</b>	<b>44,596</b>
<b>Postharvest:</b>														
Mow Canes													1,193	1,193
Shred Prunings													12	12
Disc Prunings													12	12
Plant Cover Crop													19	19
<b>TOTAL POSTHARVEST COSTS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1,235</b>	<b>1,235</b>

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TABLE 4. CONTINUED

	DEC 16	JAN 17	FEB 17	MAR 17	APR 17	MAY 17	JUN 17	JUL 17	AUG 17	SEP 17	OCT 17	NOV 17	DEC 17	Total
Interest on Operating Capital @ 5.00%	1	47	47	51	57	73	75	109	172	236	-38	-5	-5	820
TOTAL OPERATING COSTS/ACRE	361	10,921	67	969	1,559	3,970	588	8,105	15,453	15,460	7,816	15	1,250	66,535
CASH OVERHEAD														
Food Safety Programs	8	8	8	8	8	8	8	8	8	8	8	8	8	100
Land Rent							2,800							2,800
Office Expense	58	58	58	58	58	58	58	58	58	58	58	58	58	750
Liability Insurance		22												22
Regulatory Programs				80										80
Field Sanitation						44								44
Farm Manager	96	96	96	96	96	96	96	96	96	96	96	96	96	1,250
Property Taxes			112					112						224
Property Insurance			9					9						19
Investment Repairs	61	61	61	61	61	61	61	61	61	61	61	61	61	798
TOTAL CASH OVERHEAD COSTS	223	245	344	303	223	267	3,023	344	223	223	223	223	223	6,087
TOTAL CASH COSTS/ACRE	584	11,166	411	1,272	1,782	4,238	3,611	8,449	15,675	15,683	8,039	238	1,473	72,622

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

**Table 5. COSTS PER ACRE TO PRODUCE AND HARVEST BLACKBERRIES: PRODUCTION YEARS 1-4**  
Central Coast - 2018

Operation	Operation		Cash and Labor Costs per Acre					Total Cost	Your Cost
	Time (Hrs/A)	Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/Rent			
Cultural:									
Soil Sample (2 per 15 Ac)	0 00	0	0	0	0	10	10		
Fertilize 2X (21-0-0-24)	0 34	9	4	3	48	0	63		
Disease Management 3X (Mildew)	1 71	46	18	13	648	0	725		
Flush and Repair Drip System	0 00	7	0	0	13	0	20		
Mow Cover Crop	0 26	7	3	2	0	0	12		
Fertilize 4X (17-0-0)	0 00	0	0	0	17	0	17		
LBAM Management (Pheromones)	0 00	16	0	0	165	0	181		
Tunnel Management	38 00	638	0	0	0	0	638		
Drip Irrigate-Season	3 30	45	0	0	540	0	585		
Fertilize 2X Monthly (3-18-18)	0 00	0	0	0	156	0	156		
Insect Management 2X (Leafroller)	1 14	31	12	9	76	0	128		
Cane Management	131 00	2,201	0	0	0	0	2,201		
Pollination (3 Hives)	0 00	0	0	0	0	375	375		
Hand Weed	36 00	588	0	0	0	0	588		
Leaf Analysis	0 00	0	0	0	0	10	10		
Disc Row Middles	0 69	18	7	2	0	0	28		
Insect Management 2X (SWD)	1 14	31	12	9	22	0	73		
PCA	0 00	0	0	0	0	125	125		
ATV	0 75	20	2	1	0	0	22		
Pickup	5 00	134	32	17	0	0	183		
<b>TOTAL CULTURAL COSTS</b>	<b>219.33</b>	<b>3,792</b>	<b>90</b>	<b>55</b>	<b>1,683</b>	<b>520</b>	<b>6,140</b>		
Harvest:									
Harvest Blackberries	0 00	2,117	0	0	8,400	25,000	35,517		
Load/Haul	27.30	734	262	203	0	0	1,199		
Cool/Palletize	0 00	0	0	0	3,400	0	3,400		
Market/Sales Fee	0 00	0	0	0	4,480	0	4,480		
<b>TOTAL HARVEST COSTS</b>	<b>27.30</b>	<b>2,851</b>	<b>262</b>	<b>203</b>	<b>16,280</b>	<b>25,000</b>	<b>44,596</b>		
Postharvest:									
Mow Canes	71 00	1,193	0	0	0	0	1,193		
Shred Prunings	0 26	7	3	2	0	0	12		
Disc Prunings	0 30	8	3	1	0	0	12		
Plant Cover Crop	0 22	6	2	1	9	0	19		
Remove Trellis/Tunnels (4th year)	0 00	576	0	0	0	0	576		
<b>TOTAL POSTHARVEST COSTS</b>	<b>71 78</b>	<b>1,790</b>	<b>8</b>	<b>4</b>	<b>9</b>	<b>0</b>	<b>1,812</b>		
Interest on Operating Capital at 5.00%							347		
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>39</b>	<b>8,432</b>	<b>360</b>	<b>263</b>	<b>17,973</b>	<b>25,520</b>	<b>52,894</b>		

\*Growing Costs= Total Costs – Harvest Costs (\$64,597 – 44,596 = \$20,001)

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

**Table 5. CONTINUED**

Central Coast – 2018

Operation	Operation	Cash and Labor Costs per Acre					Total Cost	Your Cost
	Time (Hrs/A)	Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/ Rent		
<b>CASH OVERHEAD:</b>								
Food Safety Programs							100	
Land Rent							2,800	
Office Expense							750	
Liability Insurance							22	
Regulatory Programs							80	
Field Sanitation							44	
Farm Manager							1,250	
Property Taxes							224	
Property Insurance							19	
Investment Repairs							798	
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>							<b>6,087</b>	
<b>TOTAL CASH COSTS/ACRE</b>							<b>58,981</b>	
<b>NON-CASH OVERHEAD:</b>								
		Per Producing Acre		Annual Cost Capital Recovery				
Irrigation System		1,400		102			102	
Pump and Well		5,556		411			411	
Shop Tools		481		46			46	
Harvest Supplies		53		12			12	
Trellis System		2,300		437			437	
Tunnel Plastic Sheeting		4,969		1,842			1,842	
Tunnel Metal Support Materials		24,542		3,123			3,123	
Sort/Pack Trailer		370		47			47	
Shade Structure		78		10			10	
Weed Eaters (3)		160		35			35	
Equipment		3,693		549			549	
<b>TOTAL NON-CASH OVERHEAD COSTS</b>							<b>6,615</b>	
<b>TOTAL COSTS/ACRE</b>							<b>64,597</b>	

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

**Table 6. COSTS AND RETURNS PER ACRE TO PRODUCE AND HARVEST BLACKBERRIES:  
PRODUCTION YEARS 1-4**

Central Coast – 2018

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>GROSS RETURNS</b>					
Production	4,000	each	14.00	56,000	
<b>TOTAL GROSS RETURNS</b>	4,000	each		56,000	
<b>OPERATING COSTS</b>					
<b>Custom:</b>				<b>25,520</b>	
Soil Analysis	0 13	each	75.00	10	
Bee Hives	3.00	each	125.00	375	
Leaf Analysis	0 13	each	75.00	10	
Per Tray Harvest Rate	4000.00	each	6.25	25,000	
PCA	1.00	acre	125.00	125	
<b>Fertilizer:</b>				<b>220</b>	
21-0-0-24	150.00	lb	0.32	48	
17-0-0	80.00	lb	0.21	17	
3-18-18	192.00	lb	0.81	156	
<b>Fungicide:</b>				<b>648</b>	
Aliette	5.00	lb	18.45	92	
Ridomil	3.60	pint	109.95	396	
Pristine	46.00	oz	3.47	160	
<b>Water:</b>				<b>553</b>	
Water-Flush Lines	0 25	acin	22 50	6	
Drip Repair Material	1.00	acre	7 50	8	
Water-Pumped	24.00	acin	22 50	540	
<b>Insecticide:</b>				<b>262</b>	
Isomate Pheromones (300 lures per lure)	1.00	acre	165.00	165	
Success	10.00	floz	7 58	76	
Malathion 5EC	2.00	pint	5.80	12	
Mustang Max	4.00	floz	2.49	10	
<b>Harvest:</b>				<b>16,280</b>	
Tray & Clamshells	4000.00	each	2 10	8,400	
Cooling	4000.00	each	0.85	3,400	
Market/Sales Fee	4000.00	each	1.12	4,480	
<b>Plants/Seed:</b>				<b>9</b>	
Merced Rye	16.88	lb	0 55	9	
<b>Labor</b>				<b>8,432</b>	
Equipment Operator Labor	46 93	hrs	22.40	1,051	
Non-Machine Labor	442.00	hrs	16.80	7,381	
<b>Machinery</b>				<b>623</b>	
Fuel-Gas	92.40	gal	3 20	296	
Fuel-Diesel	18.00	gal	3.60	65	
Lube				54	
Machinery Repair				209	
Interest on Operating Capital @ 5.00%				347	
<b>TOTAL OPERATING COSTS/ACRE</b>				<b>52,894</b>	
<b>TOTAL OPERATING COSTS/EACH</b>				<b>13</b>	
<b>NET RETURNS ABOVE OPERATING COSTS</b>				<b>3,106</b>	



UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

**Table 6. CONTINUED**  
Central Coast – 2018

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>CASH OVERHEAD COSTS</b>					
Food Safety Programs				100	
Land Rent				2,800	
Office Expense				750	
Liability Insurance				22	
Regulatory Programs				80	
Field Sanitation				44	
Farm Manager				1,250	
Property Taxes				224	
Property Insurance				19	
Investment Repairs				798	
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>				<b>6,087</b>	
<b>TOTAL CASH OVERHEAD COSTS/EACH</b>				<b>2</b>	
<b>TOTAL CASH COSTS/ACRE</b>				<b>58,981</b>	
<b>TOTAL CASH COSTS/EACH</b>				<b>15</b>	
<b>NET RETURNS ABOVE CASH COSTS</b>				<b>-2,981</b>	
<b>NON-CASH OVERHEAD COSTS (Capital Recovery)</b>					
Irrigation System				102	
Pump and Well				411	
Shop Tools				46	
Harvest Supplies				12	
Trellis System				437	
Tunnel Plastic Sheeting				1,842	
Tunnel Metal Support Materials				3,123	
Sort/Pack Trailer				47	
Shade Structure				10	
Weed Eaters (3)				35	
Equipment				549	
<b>TOTAL NON-CASH OVERHEAD COSTS/ACRE</b>				<b>6,615</b>	
<b>TOTAL NON-CASH OVERHEAD COSTS/EACH</b>				<b>2</b>	
<b>TOTAL COST/ACRE</b>				<b>65,597</b>	
<b>TOTAL COST/EACH</b>				<b>16</b>	
<b>NET RETURNS ABOVE TOTAL COST</b>				<b>-9,597</b>	

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

**Table 7. MONTHLY CASH COSTS PER ACRE TO PRODUCE AND HARVEST BLACKBERRIES: PRODUCTION YEARS 1-4**  
Central Coast – 2018

	JAN 18	FEB 18	MAR 18	APR 18	MAY 18	JUN 18	JUL 18	AUG 18	SEP 18	OCT 18	NOV 18	DEC 18	Total
<b>Cultural:</b>													
Soil Sample (2 per 15 Ac)	10												10
Fertilize 2X (21-0-0-24)		63											63
Disease Management 3X (Mildew)			514			106	106						725
Flush and Repair Drip System			20										20
Mow Cover Crop			12										12
Fertilize 4X (17-0-0)			17										17
LBAM Management (Pheromones)			181										181
Tunnel Management			80	80	80	80	80	80	80	80			638
Drip Irrigate-Season				63	85	96	108	96	85	51			585
Fertilize 2X Monthly (3-18-18)				39	39	39	39						156
Insect Management 2X (Leafroller)				128									128
Cane Management				550	1,100	550							2,201
Pollination (3 Hives)					375								375
Hand Weed					97	97	101	97	97	101			588
Leaf Analysis					10								10
Disc Row Middles						14		14					28
Insect Management 2X (SWD)							37	36					73
PCA	10	10	10	10	10	10	10	10	10	10	10	10	125
ATV	2	2	2	2	2	2	2	2	2	2	2	2	22
Pickup	15	15	15	15	15	15	15	15	15	15	15	15	183
<b>TOTAL CULTURAL COSTS</b>	<b>37</b>	<b>91</b>	<b>851</b>	<b>1,437</b>	<b>1,813</b>	<b>459</b>	<b>498</b>	<b>350</b>	<b>289</b>	<b>260</b>	<b>28</b>	<b>28</b>	<b>6,140</b>
<b>Harvest:</b>													
Harvest Blackberries							5,926	11,832	11,832	5,926			35,517
Load/Haul							203	396	396	203			1,199
Cool/Palletize							567	1,133	1,133	567			3,400
Market/Sales Fee							747	1,493	1,493	747			4,480
<b>TOTAL HARVEST COSTS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>7,444</b>	<b>14,854</b>	<b>14,854</b>	<b>7,444</b>	<b>0</b>	<b>0</b>	<b>44,596</b>
<b>Postharvest:</b>													
Mow Canes												1,193	1,193
Shred Prunings												12	12
Disc Prunings												12	12
Plant Cover Crop												19	19
Remove Trellis/Tunnels (4th year)											576		576
<b>TOTAL POSTHARVEST COSTS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>576</b>	<b>1,235</b>	<b>1,812</b>
Interest on Operating Capital @ 5.00%	0	1	4	10	18	20	53	116	179	-40	-8	-5	347
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>37</b>	<b>92</b>	<b>855</b>	<b>1,447</b>	<b>1,831</b>	<b>479</b>	<b>7,994</b>	<b>15,320</b>	<b>15,322</b>	<b>7,664</b>	<b>596</b>	<b>1,258</b>	<b>52,894</b>

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

**Table 7. CONTINUED**

Central Coast - 2018

	JAN 18	FEB 18	MAR 18	APR 18	MAY 18	JUN 18	JUL 18	AUG 18	SEP 18	OCT 18	NOV 18	DEC 18	Total
CASH OVERHEAD													
Food Safety Programs	8	8	8	8	8	8	8	8	8	8	8	8	100
Land Rent						2,800							2,800
Office Expense	63	63	63	63	63	63	63	63	63	63	63	63	750
Liability Insurance	22												22
Regulatory Programs			80										80
Field Sanitation					44								44
Farm Manager	104	104	104	104	104	104	104	104	104	104	104	104	1,250
Property Taxes		112					112						224
Property Insurance		9					9						19
Investment Repairs	67	67	67	67	67	67	67	67	67	67	67	67	798
<b>TOTAL CASH OVERHEAD COSTS</b>	<b>263</b>	<b>363</b>	<b>322</b>	<b>242</b>	<b>286</b>	<b>3,042</b>	<b>363</b>	<b>242</b>	<b>242</b>	<b>242</b>	<b>242</b>	<b>242</b>	<b>6,087</b>
<b>TOTAL CASH COSTS/ACRE</b>	<b>301</b>	<b>454</b>	<b>1,176</b>	<b>1,688</b>	<b>2,117</b>	<b>3,520</b>	<b>8,357</b>	<b>15,562</b>	<b>15,564</b>	<b>7,905</b>	<b>838</b>	<b>1,499</b>	<b>58,981</b>

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**Table 8. RANGING ANALYSIS: PRODUCTION AND HARVEST YEARS 1-4**  
 Central Coast – 2018

COSTS PER ACRE AND PER TRAY AT VARYING YIELDS TO PRODUCE AND HARVEST PRIMOCANE BLACKBERRIES

	YIELD (TRAY)						
	3,000	3,250	3,500	4,000	4,500	4,750	5,000
<b>OPERATING COSTS/ACRE:</b>							
Cultural	6,140	6,140	6,140	6,140	6,140	6,140	6,140
Harvest	33,747	36,459	39,171	44,596	50,021	52,733	55,445
Post	1,812	1,812	1,812	1,812	1,812	1,812	1,812
Interest on Operating Capital @ 5.00%	286	302	317	347	377	392	407
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>41,985</b>	<b>44,712</b>	<b>47,440</b>	<b>52,894</b>	<b>58,350</b>	<b>61,076</b>	<b>63,804</b>
<b>TOTAL OPERATING COSTS/EACH</b>	<b>13.99</b>	<b>13.76</b>	<b>13.55</b>	<b>13.22</b>	<b>12.97</b>	<b>12.86</b>	<b>12.76</b>
<b>CASH OVERHEAD COSTS/ACRE</b>	<b>6,087</b>	<b>6,087</b>	<b>6,087</b>	<b>6,087</b>	<b>6,087</b>	<b>6,087</b>	<b>6,087</b>
<b>TOTAL CASH COSTS/ACRE</b>	<b>48,072</b>	<b>50,799</b>	<b>53,527</b>	<b>58,981</b>	<b>64,437</b>	<b>67,163</b>	<b>69,891</b>
<b>TOTAL CASH COSTS/EACH</b>	<b>16.02</b>	<b>15.63</b>	<b>15.29</b>	<b>14.75</b>	<b>14.32</b>	<b>14.14</b>	<b>13.98</b>
<b>NON-CASH OVERHEAD COSTS/ACRE</b>	<b>6,615</b>	<b>6,615</b>	<b>6,615</b>	<b>6,615</b>	<b>6,615</b>	<b>6,615</b>	<b>6,615</b>
<b>TOTAL COSTS/ACRE</b>	<b>54,687</b>	<b>57,415</b>	<b>60,142</b>	<b>65,597</b>	<b>71,052</b>	<b>73,779</b>	<b>76,506</b>
<b>TOTAL COSTS/EACH</b>	<b>18.00</b>	<b>18.00</b>	<b>17.00</b>	<b>16.00</b>	<b>16.00</b>	<b>16.00</b>	<b>15.00</b>

Net Return per Acre above Operating Costs for Blackberry

PRICE (\$/tray)	YIELD (tray/acre)						
Production	3,000	3,250	3,500	4,000	4,500	4,750	5,000
11 00	-8,985	-8,962	-8,940	-8,894	-8,850	-8,826	-8,804
12 00	-5,985	-5,712	-5,440	-4,894	-4,350	-4,076	-3,804
13 00	-2,985	-2,462	-1,940	-894	150	674	1,196
14 00	15	788	1,560	3,106	4,650	5,424	6,196
15 00	3,015	4,038	5,060	7,106	9,150	10,174	11,196
16 00	6,015	7,288	8,560	11,106	13,650	14,924	16,196
17 00	9,015	10,538	12,060	15,106	18,150	19,674	21,196

Net Return per Acre above Cash Costs for Blackberry

PRICE (\$/tray)	YIELD (tray/acre)						
Production	3,000	3,250	3,500	4,000	4,500	4,750	5,000
11 00	-15,072	-15,049	-15,027	-14,981	-14,937	-14,913	-14,891
12 00	-12,072	-11,799	-11,527	-10,981	-10,437	-10,163	-9,891
13 00	-9,072	-8,549	-8,027	-6,981	-5,937	-5,413	-4,891
14 00	-6,072	-5,299	-4,527	-2,981	-1,437	-663	109
15 00	-3,072	-2,049	-1,027	1,019	3,063	4,087	5,109
16 00	-72	1,201	2,473	5,019	7,563	8,837	10,109
17 00	2,928	4,451	5,973	9,019	12,063	13,587	15,109

Net Return per Acre above Total Costs for Blackberry

PRICE (\$/tray)	YIELD (tray/acre)						
Production	3,000	3,250	3,500	4,000	4,500	4,750	5,000
11 00	-21,687	-21,665	-21,642	-21,597	-21,552	-21,529	-21,506
12 00	-18,687	-18,415	-18,142	-17,597	-17,052	-16,779	-16,506
13 00	-15,687	-15,165	-14,642	-13,597	-12,552	-12,029	-11,506
14 00	-12,687	-11,915	-11,142	-9,597	-8,052	-7,279	-6,506
15 00	-9,687	-8,665	-7,642	-5,597	-3,552	-2,529	-1,506
16 00	-6,687	-5,415	-4,142	-1,597	948	2,221	3,494
17 00	-3,687	-2,165	-642	2,403	5,448	6,971	8,494

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**Table 9. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS**  
**PRIMOCANE BLACKBERRIES**  
 Central Coast – 2018

ANNUAL EQUIPMENT COSTS

Yr.	Description	Price	Yrs. Life	Salvage Value	Capital Recovery	Cash Overhead		Total
						Insurance	Taxes	
18	55HP 2WD Tractor	40,225	15	7,831	3,658	20	240	3,919
18	ATV 4WD	7,430	20	953	594	4	42	640
18	Disc-Harrow 5'	3,500	20	182	288	2	18	308
18	Mower-Flail 7'	9,600	20	500	789	4	51	844
18	Pickup 1/2 Ton	28,000	10	8,271	3,072	15	181	3,269
18	Spreader-Fertilize	12,000	15	1,152	1,144	6	66	1,215
18	Truck 1 Ton	52,000	4	20,000	10,229	30	360	10,620
18	Air Blast Sprayer - 300 gal	25,000	20	1,303	2,055	11	132	2,197
18	Seed Drill 4'	6,700	10	1,185	797	3	39	840
TOTAL		184,455	-	41,378	22,626	96	1,129	23,851
70% of New Cost*		129,118	-	28,965	15,838	67	790	16,696

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

ANNUAL INVESTMENT COSTS

Description	Price	Yrs. Life	Salvage Value	Capital Recovery	Cash Overhead			Total
					Insurance	Taxes	Repairs	
INVESTMENT								
Irrigation System	21,000	25	1,470	1,537	10	112	420	2,079
Pump and Well	150,000	25	3,750	11,109	65	769	3,000	14,943
Shop Tools	13,000	15	910	1,255	6	70	260	1,590
Harvest Supplies	800	5	0	187	0	4	16	208
Trellis System	34,500	6	2,415	6,556	16	185	690	7,446
Tunnel Plastic Sheeting	74,540	3	0	27,629	32	373	1,491	29,524
Tunnel Metal Support Materials	368,130	10	25,769	46,838	167	1,970	7,363	56,337
Sort/Pack Trailer	10,000	10	700	1,272	5	54	200	1,530
Shade Structure	2,100	10	147	267	1	11	42	321
Weed Eaters (3)	2,400	5	168	532	1	13	48	594
TOTAL INVESTMENT	676,470	-	35,329	97,181	301	3,559	13,530	114,571

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Food Safety Programs	15.00	acre	100	1,500
Land Rent	15.00	acre	2,800	42,000
Office Expense	15.00	acre	750	11,250
Liability Insurance	15.00	acre	22	326
Regulatory Programs	15.00	acre	80	1,200
Field Sanitation	15.00	acre	44	667
Farm Supervisor	15.00	acre	1,250	18,750

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**Table 10. HOURLY EQUIPMENT COSTS – PRIMOCANE BLACKBERRIES**  
 Central Coast – 2018

Yr.	Description	Hours Used	Total Hours Used	Capital Recovery	Cash Overhead		Operating		Total Oper.	Total Costs/Hr.
					Insurance	Taxes	Lube & Repairs	Fuel		
18	55HP 2WD Tractor	100	500	5.12	0.03	0.34	2.74	9.72	12.47	17.95
18	ATV 4WD	11	100	4.16	0.02	0.29	0.92	2.13	3.05	7.53
18	Disc-Harrow 5'	15	100	2.01	0.01	0.13	0.62	0.00	0.62	2.77
18	Mower-Flail 7'	8	100	5.52	0.03	0.35	4.88	0.00	4.88	10.79
18	Pickup 1/2 Ton	75	200	10.75	0.05	0.63	3.33	6.40	9.73	21.17
18	Spreader-Fertilize	5	80	10.01	0.05	0.58	5.29	0.00	5.29	15.93
18	Truck 1 Ton	410	500	14.32	0.04	0.50	7.44	9.60	17.04	31.91
18	Air Blast Sprayer - 300 gal	60	100	14.38	0.08	0.92	4.65	0.00	4.65	20.03
18	Seed Drill 4'	3	150	3.72	0.02	0.18	2.13	0.00	2.13	6.04