

SAMPLE COSTS FOR LARGE LIMA BEANS



SACRAMENTO VALLEY AND SAN JOAQUIN VALLEY – North 2016

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CONTENTS

INTRODUCTION	2
ASSUMPTIONS	3
Production Operating Costs and Material Inputs	3
Labor, Equipment, and Interest	5
Cash Overhead	6
Non-Cash Overhead	7
Acknowledgements	8
REFERENCES	9
Table 1. Cost Per Acre to Produce Large Lima Beans	10
Table 2. Costs and Returns per Acre to Produce Large Lima Beans	12
Table 3. Monthly Cash Costs per Acre to Produce Large Lima Beans	14
Table 4. Ranging Analysis- Large Lima Beans	15
Table 5. Whole Farm Annual Equipment, Investment, and Business Overhead Costs	16
Table 6. Hourly Equipment Costs	17
Table 7. Operations with Equipment and Materials	18

INTRODUCTION

Sample costs to produce large lima beans in the Sacramento Valley and northern San Joaquin Valley are shown in this study. This study is intended as a guide only. It can be used to help guide production decisions, estimate potential returns, prepare budgets and evaluate production loans. Sample costs given for labor, materials, equipment and custom services are based on April 2016 figures. Practices described are based on production practices considered typical for the crop and region, but will not apply to every situation. A blank column titled Your Costs is provided in Tables 1 and 2 to enter your estimated costs.

For an explanation of calculations used in the study refer to the section titled Assumptions. For more information contact Jeremy Murdock, University of California Agriculture and Natural Resources, Agricultural Issues Center, Department of Agricultural and Resource Economics, at 530-752-4651, jmmurdock@ucdavis.edu.

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

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ASSUMPTIONS

The following assumptions refer to Tables 1 to 7 and pertain to sample costs to produce large lima beans in the Sacramento Valley and northern San Joaquin Valley. Cultural practices and costs for large lima beans vary considerably among growers within the region; therefore, many of the costs, practices, and materials in this study will not be applicable to every farm. The practices and inputs used in this 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.**

Farm. This report is based on a 1,500 non-contiguous acre farm on which 200 acres of rented land are producing large lima beans. The remaining acreage is rented and grower-owned land that is planted to alfalfa, hay, field corn, sunflowers, tomatoes, wheat, and orchard crops such as almonds. The grower maintains an equipment yard and shop on a portion of the owned land.

Production Cultural Practices and Material Inputs

Land Preparation. Primary tillage, which includes chiseling, discing, land leveling (laser and triplane), and listing beds is done from October through November. The land is chiseled in two directions to open the soil structure and breakup any hardpan. The field is then disced once with a stubble disc and once with a finish disc to create an adequate seedbed, and leveled in two passes with a triplane. The fields are laser leveled once every ten years and one-tenth of the cost is charged to the current bean crop. The 30-inch beds are listed by the grower. In the late winter, herbicides are applied to the fallow beds. In the spring the field is pre-irrigated and then the beds are worked and pre-emergent herbicides are applied and incorporated prior to planting.

Plant. Several varieties of bush and vine large limas are available for planting, but no specific variety is included in this study. Refer to the *2014 Lima Bean Production in California* manual for seed variety characteristics. A bush variety with 120-day maturity is planted in this study. Fungicide treated large lima bean seeds are purchased and inoculated with 10 lbs. per acre of large lima bean seed inoculant. Planting occurs in May using a six-row bean planter. The bean seed is planted at a rate of 120 lbs. per acre. The seed is planted two to three inches deep into moist soil on 30-inch beds and will emerge in seven to ten days depending on soil temperature. Planting costs include the seed, seed inoculant, tractor, and tractor driver.

Irrigation. The beans are furrow irrigated with one pre-irrigation and five regular season irrigations from June to August. A total of 30 acre-inches of water (5 acre-inches per irrigation event), which includes the pre-plant irrigation, is applied. Ditches are opened for the pre-irrigation, and then closed prior to planting. Ditches are opened again after the cultivation and closed prior to harvest. Water is delivered from the ditches to the furrows by siphon pipes. Irrigation includes the water costs and irrigation labor. Water at \$90 per acre-foot (\$7.50 per acre-inch) is assumed to be a typical cost. Most growers use a combination of surface water and well water. The cost of the surface water will vary by water district and can be adjusted in the 'your cost column' in tables 1 and 2.

Fertilization. Nitrogen (N) recommendations range from 80 to 120 lbs/acre, depending on existing nitrogen levels in the soil and irrigation water. A starter fertilizer (8-24-6 with 1% Zn) is applied at planting at 10 lbs of nitrogen per acre (10 gallons per acre). The fertilizer is banded with a shank two inches to the side and two inches deep from the seed. In June, 90 lbs of N (as UN-32) is side-dressed once the beans have reached the three to four leaf stage depending on the background nitrogen levels in the soils and irrigation water. This is

usually done at the same time as mechanical cultivation for weed control. Although not included in the study, soil amendments with gypsum or sulfur products are a routine practice and may be necessary every three to four years.

Pest Management. The pesticides and rates mentioned in this cost study are listed in *UC Integrated Pest Management Guidelines, Dry Beans*. For information on other pesticides available, pest identification, monitoring, and management visit the UC IPM website at www.ipm.ucdavis.edu. **Although growers commonly use the pesticides mentioned, many other pesticides are available. Check with your Pest Control Advisor (PCA) and/or the UC IPM website for current recommendations.** To purchase pesticides for commercial use, a grower must be a Certified Private Applicator to obtain a Pesticide Identification number. For information and pesticide use permits, contact the local county agricultural commissioner's office. Pesticides with different active ingredients, mode of action, and sites of action should be rotated as needed to combat species shift and resistance. Adjuvants are recommended for use with many pesticides for effective control, but the adjuvants and their costs are not included in this study.

Written recommendations are required for commercially applied pesticides by licensed pest control advisers. The PCA will monitor the field for problems including pests, diseases, and nutritional status. Growers may hire private consultants or receive this service as part of an agreement with an agricultural chemical and fertilizer company. Separate costs for a PCA are not included in this study.

Weeds. Both chemical and mechanical weed control are utilized in this study. In February, Roundup Ultra Max is applied at 2 pints per acre to the fallow beds. In May, pre-emergent herbicides (Dual Magnum and Treflan) are tank mixed and applied pre-plant to the listed beds and furrows with a 25-ft boom, then mixed in the soil with a rolling cultivator. The first pass applies and incorporates the herbicides (spray boom and cultivator attached to tractor); the second pass is for further incorporation. In June, the fields are cultivated for weed control and UN-32 is side-dressed in the same pass.

Insects and Mites. The major pests in lima beans are spider mites (*Tetranychus spp.*), lygus bugs (*Lygus spp.*), and aphids (*Aphis spp.*). In July, Acramite (miticide) is tank mixed with Warrior II (pyrethroid insecticide) and applied aerially by a custom operator. In August, lygus bugs are controlled with a custom air application of an OP (organophosphate) insecticide (e.g. Dimethoate) during bloom. The Dimethoate application also controls aphids. Additional lygus control may be needed until pod maturity. Worm control may be needed in some years for corn earworms and armyworms to prevent bean seed damage in the pod.

Diseases. Seedling diseases caused by rhizoctonia (*Rhizoctonia solani*) and pythium (*Pythium spp.*) root rot are prevented with seed treatments and good cultural practices, especially irrigation management. The fungicide seed protectants are applied to the seed by the bean warehouse and the cost is included in the seed price.

Harvest. The beans are cut and threshed by a custom operator. At maturity six rows per pass are cut at ground level with a set of tractor-mounted knives. One to two days later, depending on bean moisture, the cut beans are raked into windrows, pulling together six to eight rows. Lima beans are harvested using bean threshers equipped with two or three slow-turning cylinders. Beans are ready for harvest when they reach 12 percent moisture. Cutting and windrowing costs \$38 per acre and threshing/harvesting costs \$4.00 per hundredweight (cwt) based on field/dirt weight plus \$0.70 cwt for hauling. Other post-harvest bean costs include warehouse charges of \$5.50 per cwt for cleaning, storage and insurance.

Yields. The crop yield used in this study is 27 cwt field/dirt weight or 25 cwt per acre (2,500 lbs/acre) of cleaned beans at 12 percent moisture. A typical cleanout rate for field run beans is 5-10 percent.

Returns. Based on the 2013 through 2015 USDA Bean Market Reports a price of \$75 per cwt is used to calculate income. Prices for large lima beans during this period ranged from \$55.50 to \$90 per cwt. The prices are used to show a range of returns over a range of yields in the Ranging Analysis Table 4. Table 4 includes a yield range of 19 cwt to 31 cwt and a price range of \$45 to \$105 per cwt.

Assessments. The California Dry Bean Advisory Board (CDBAB) assesses \$0.27 per hundredweight (cwt) to all bean varieties (general assessment). Additional assessments are made by varietal councils formed for specific research on that variety. The large lima council assesses \$0.06 per cwt. The CDBAB promotes marketing and research in dry beans.

Pickup/ATV. Costs for a 3/4-ton pickup and ATV are included in the study. The pickup and ATV may be used by the irrigator, field foreman and/or the grower. The pickup travels 9,000 miles per year (1,500 miles for the beans) and the ATV 3,000 miles per year (500 miles for the beans). The miles are not based on any actual data, but the assumptions are used to calculate a vehicle cost for this study.

Labor, Equipment, and Interest

Labor. Hourly wages for workers are \$16.00 for machine operators and \$12.00 per hour non-machine labor. Adding 46 percent for the employer's share of federal and state payroll taxes, insurance, and other possible benefits gives the labor rates shown of \$23.36 and \$17.52 per hour for machine labor and non-machine labor, respectively. The overhead includes the employer's share of federal and California state payroll taxes, workers' compensation insurance for field crops and a percentage for other possible benefits. Workers' compensation insurance costs will vary among growers. The cost is based on the average industry rate as of April 2016. Labor for operations involving machinery are 20 percent higher than the operation time given in Table 2 to account for the extra labor involved in equipment set up, moving, maintenance, work breaks, and field repair.

Wages for management are not included as a cash cost. Any return above total costs is considered a return to management and risk. However, growers wanting to account for management may wish to add a fee. The manager makes all production decisions including cultural practices, pest management recommendations, and labor.

Equipment Operating Costs. Repair costs are based on purchase price, annual hours of use, total hours of life, and repair coefficients formulated by the 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. Average prices for on-farm delivery of diesel and gasoline based on August 2016 data from the Energy Information Administration are \$2.84 and \$2.76 per gallon, respectively. The cost includes a 9.25 percent sales tax and \$0.13/gal excise tax on diesel fuel, and an 8 percent sales tax and \$0.30/gal excise tax on gasoline. It is noted that federal and state excise taxes are refundable for on-farm use when filing the farm income tax return. The fuel, lube, and repair cost per acre for each operation is determined by multiplying the total hourly operating cost 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.

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 4.25 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 April 2016.

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 of large lima bean production. Because of so many potential risk factors, effective risk management must combine specific tactics in a detailed manner, in various combinations for a sustainable operation.

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 can include property taxes, interest on operating capital, office expense, liability and property insurance, sanitation services, equipment repairs, and management.

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 varies depending on the assets included and the amount of coverage.

Property Insurance. This provides coverage for property loss and is charged at 0.843 percent of the average value of the assets over their useful life.

Liability insurance. A standard farm liability insurance policy will help cover the expenses for which an employer becomes legally obligated to pay for bodily injury claims on the property and damages to another person's property as a result of a covered accident. Common liability expenses covered under the policy include attorney fees and court costs, medical expenses for people injured on the property, and injury or damage to another's property. In this study, liability insurance costs \$1,545 per year for the entire farm.

Crop Insurance. This is available to baby lima bean growers for any unavoidable loss of production, damage or poor quality resulting from adverse weather conditions such as cool wet weather, freeze, frost, hail, heat, rain, wind and damage from birds, drought, earthquakes and fire. Coverage levels are from 50-85 percent of the approved average yield as established by verifiable production records from the field. Actual insurance coverage is by unit, not by acre. A significant number of growers purchase crop insurance in this region. Due to variability in coverages no level is specified in this study. A large lima bean insurance program is administered by the Risk Management Agency of the USDA.

<http://www.rma.usda.gov/policies/2016policy.html>.

Office Expense. Office and business expenses are estimated at \$75 per acre. The total cost is \$15,000 for the 200 acres of large lima bean production. These expenses include office supplies, telephones, bookkeeping, accounting, shop and office utilities, and miscellaneous administrative charges. The cost is a

general estimate and not based on any actual data.

Land Rent. The 200 acres are leased on a share-rent basis with the land owner receiving 20 percent of the gross returns from the dry large lima bean crop. Therefore, land rent is based on the yield and the price. In this study the yield is 25 cwt/acre valued at \$75/cwt which equals a gross return of \$1,875/acre. The land rent in this scenario would be \$375/acre. The rented land includes developed wells and irrigation system that are maintained by the landlord.

Investment Repairs. Annual maintenance is calculated as two percent of the purchase price.

Non-Cash Overhead

Non-cash overhead costs, shown on an annual per-acre basis, are 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 the 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 5.

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 3.75 percent 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 April 2016.

Buildings. The metal building(s) are constructed on a cement slab totaling 2,400 square feet and are used for shop and/or storage.

Tools. This includes shop tools, hand tools, and miscellaneous field tools. The tools are an estimated value and not taken from any specific data.

Siphon Tubes. It is assumed the grower owns 720, 2-inch diameter siphon tubes for use on the ranch.

Fuel Tanks. Two 300-gallon fuel tanks using gravity feed are on metal stands. The tanks are setup in a cement containment pad that meets federal, state, and county regulations.

Land Values. Beans are planted on rented land; therefore, land values are not shown in this study. Cropland owned by the grower in the northern San Joaquin Valley and Sacramento Valley ranges in value from \$10,000 to \$22,000 per acre (2016 Trends & Leases).

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 percent to indicate a mix of new and used equipment. Annual ownership costs for equipment and other investments are shown in the Whole Farm Annual Equipment, Investment, and Business Overhead Costs table. 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.

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REFERENCES

- American Society of Agricultural and Biological Engineers (ASABE). *2013 ASABE Standards Book with 2015 Standards Supplement*. St. Joseph, MI: Curran Associates, Inc., 2015.
- Boehlje, Michael D., and Vernon R. Eidman. *Farm Management*. New York: John Wiley and Sons, 1984.
- California Chapter of the American Society of Farm Managers and Rural Appraisers. *Trends in Agricultural Land & Lease Values*. Woodbridge, CA: American Society of Farm Managers and Rural Appraisers, 2015.
- Canevari, W Mick, Karen M. Klonsky, and Richard L. De Moura. "Sample Costs to Produce Baby Lima Beans, northern San Joaquin Valley, 2010". UC Davis Cost Studies. <http://coststudies.ucdavis.edu/en/current/>.
- "Economic Research Service - Publications." United States Department of Agriculture. www.ers.usda.gov/data-products.aspx.
- "Identify and Manage Pests in Crops and Agriculture." University of California Statewide Integrated Pest Management Program. <http://www.ipm.ucdavis.edu/PMG/crops-agriculture.html>.
- Long, Rachael, Mark Lundy, Karen Klonsky, Don Stewart. "Sample Costs to Produce Beans- Single Cropped, Sacramento Valley, 2014". UC Davis Cost Studies. <http://coststudies.ucdavis.edu/en/current/>.
- Long, Rachael, Steve Temple, ET AL. *Lima Bean Production in California*, Oakland, CA: University of California, Division of Agriculture and Natural Resources, 2014. <http://anrcatalog.ucdavis.edu/Details.aspx?itemNo=8505>
- "National Agricultural Statistics Service." United States Department of Agriculture. www.nass.usda.gov/Quick_Stats/.
- "Tax Rates for Motor Vehicle and Diesel Fuels." California State Board of Equalization. Last modified April 2016. <http://www.boe.ca.gov/pdf/l413.pdf>.
- University of California Statewide Integrated Pest Management Program. *UC Pest Management Guidelines, Dry Beans*. 2008. University of California, Davis, CA. <http://www.ipm.ucdavis.edu>
- "U.S. Gasoline and Diesel Retail Prices." U.S. Energy Information Administration (EIA). Last modified April 2016. https://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_nus_m.htm.
- USDA Livestock and Seed Division, Market News Branch. *Bean Market News, CA Summary, 2013 - 2015*. www.ams.usda.gov/LSMarketNews
- "Workers' Compensation Rate Comparison." California Department of Insurance. <http://www.insurance.ca.gov/01-consumers/105-type/9-compare-prem/wc-rate/index.cfm>

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER
TABLE 1. COSTS PER ACRE TO PRODUCE LARGE LIMA BEANS
 SACRAMENTO AND NORTHERN SAN JOAQUIN VALLEY - 2016

Operation	Equipment	Cash and Labor Costs per Acre					Total Cost	Your Cost
	Time (Hrs/A)	Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/Rent		
Pre-Plant:								
Laser Level- 1X/10Yr.	0.00	0	0	0	0	16	16	
Chisel 18"	0.20	6	8	5	0	0	18	
Stubble Disc	0.15	4	6	3	0	0	13	
Finish Disc	0.09	3	4	2	0	0	8	
Landplane- 2X	0.24	7	4	2	0	0	13	
List 30" Beds	0.28	8	11	4	0	0	23	
Weed Control- Fallow Beds	0.10	3	1	1	9	0	14	
Open Ditch 1X	0.05	1	2	1	0	0	4	
Irrigation- Pre-plant	0.00	9	0	0	38	0	46	
Close Ditch 1X	0.05	1	1	0	0	0	2	
Weed Control- Apply & Incorporate	0.14	4	2	1	29	0	36	
TOTAL PRE-PLANT COSTS	1.31	45	38	18	75	16	193	
Cultural:								
Plant Beans- Starter Fertilizer	0.34	10	5	5	200	0	219	
Open Ditch 1X	0.05	1	2	1	0	0	4	
Irrigate 5X	0.00	44	0	0	188	0	231	
Cultivate & Sidedress Fertilizer	0.14	4	2	1	52	0	59	
Pests- Insect/Lygus & Mites	0.00	0	0	0	18	16	34	
Pests- Insect/Lygus & Aphids	0.00	0	0	0	7	16	23	
Close Ditch 1X	0.05	1	1	0	0	0	2	
Pickup	0.17	5	2	1	0	0	7	
ATV	0.17	5	0	0	0	0	5	
TOTAL CULTURAL COSTS	0.91	69	12	8	464	32	585	
Harvest:								
Cut & Rake Beans Custom	0.00	0	0	0	0	38	38	
Thresh Beans & Haul Custom	0.00	0	0	0	0	127	127	
Clean, Bag, Store & Insurance	0.00	0	0	0	0	138	138	
Assessments	0.00	0	0	0	8	0	8	
TOTAL HARVEST COSTS	0.00	0	0	0	8	302	311	
Interest on Operating Capital at 4.25%							15	
TOTAL OPERATING COSTS/ACRE	2.00	115	50	26	547	350	1,104	

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER
TABLE 1. CONTINUED
 SACRAMENTO AND NORTHERN SAN JOAQUIN VALLEY - 2016

Operation	Equipment	Cash and Labor Costs per Acre					Total Cost	Your Cost
	Time (Hrs/A)	Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/ Rent		
CASH OVERHEAD:								
Land Rent- Large Lima Beans							375	
Liability Insurance							1	
Office Expense							75	
Property Taxes							1	
Property Insurance							0	
Investment Repairs							2	
TOTAL CASH OVERHEAD COSTS/ACRE							454	
TOTAL CASH COSTS/ACRE							1,558	
NON-CASH OVERHEAD:								
		Per Producing Acre		Annual Cost Capital Recovery				
Building 2400 sq. ft.		48		3			3	
Fuel Tanks 2-300 gal.		5		0			0	
Shop Tools		10		1			1	
Siphon Tubes 720, 2"		44		5			5	
Equipment		317		31			31	
TOTAL NON-CASH OVERHEAD COSTS							40	
TOTAL COSTS/ACRE							1,598	

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER
TABLE 2. COSTS AND RETURNS PER ACRE TO PRODUCE LARGE LIMA BEANS
 SACRAMENTO AND NORTHERN SAN JOAQUIN VALLEY - 2016

	Quantity/ Acre	Unit	Price or Cost/Uni	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Large Lima	25.00	Cwt	75.00	1,875	
TOTAL GROSS RETURNS				1,875	
OPERATING COSTS					
Fertilizer:					
8-24-6-1%Zn	10.00	Lb N	3.48		35
UN32	90.00	Lb N	0.58		52
Herbicide:					
Roundup Ultra Max	2.00	Pint	4.31		9
Treflan HFP	1.50	Pint	4.45		7
Dual Magnum	1.50	Pint	15.00		23
Seed:					
Large Lima Seed- Treated	120.00	Lb	1.25		150
Seed Inoculant- Large Lima	10.00	Lb	1.50		15
Irrigation:					
Water- Well and District	30.00	Acln	7.50		225
Custom:					
Laser Level	0.10	Acre	160.00		16
Application Air20G	2.00	Acre	16.00		32
Cutting & Windrow	1.00	Acre	38.00		38
Threshing	27.00	Cwt	4.00		108
Haul (cwt)	27.00	Cwt	0.70		19
Clean, Store, Insurance	25.00	Cwt	5.50		138
Assessment:					
CA Dry Bean Board	25.00	Cwt	0.27		7
Large Lima Council	25.00	Cwt	0.06		2
Insecticide:					
Warrior II	1.92	floz	3.58		7
Acramite	20.00	floz	0.54		11
Dimethoate 4E	1.50	Pint	4.52		7
Labor					
Equipment Operator Labor	2.66	hrs	23.36		62
Irrigation Labor	3.00	hrs	17.52		53
Machinery					
Fuel-Gas	0.80	gal	2.76		2
Fuel-Diesel	16.78	gal	2.84		48
Lube					7
Machinery Repair					19
Interest on Operating Capital @ 4.25%					15
TOTAL OPERATING COSTS/ACRE				1,104	
TOTAL OPERATING COSTS/CWT					44
NET RETURNS ABOVE OPERATING COSTS					771

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TABLE 2. CONTINUED
 SACRAMENTO AND NORTHERN SAN JOAQUIN VALLEY - 2016

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
CASH OVERHEAD COSTS					
Land Rent- Large Lima Beans				375	
Liability Insurance				1	
Office Expense				75	
Property Taxes				1	
Property Insurance				0	
Investment Repairs				2	
TOTAL CASH OVERHEAD COSTS/ACRE				454	
TOTAL CASH OVERHEAD COSTS/CWT				18	
TOTAL CASH COSTS/ACRE				1,558	
TOTAL CASH COSTS/CWT				62	
NET RETURNS ABOVE CASH COSTS				317	
NON-CASH OVERHEAD COSTS (Capital Recovery)					
Building 2400 sq. ft.				3	
Fuel Tanks 2-300 gal.				0	
Shop Tools				1	
Siphon Tubes 720, 2"				5	
Equipment				31	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				40	
TOTAL NON-CASH OVERHEAD COSTS/CWT				2	
TOTAL COST/ACRE				1,598	
TOTAL COST/CWT				64	
NET RETURNS ABOVE TOTAL COST				277	

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER
TABLE 3. MONTHLY COSTS PER ACRE TO PRODUCE LARGE LIMA BEANS
 SACRAMENTO AND NORTHERN SAN JOAQUIN VALLEY – 2016

	OCT 15	NOV 15	DEC 15	JAN 16	FEB 16	MAR 16	APR 16	MAY 16	JUN 16	JUL 16	AUG 16	SEP 16	Total
Pre-Plant:													
Laser Level- 1X/10Yr.	16												16
Chisel 18 in.	18												18
Stubble Disc	13												13
Finish Disc	8												8
Landplane- 2X	13												13
List 30" Beds	23												23
Weed Control- Fallow Beds					14								14
Open Ditch 1X								4					4
Irrigation- Pre-plant								46					46
Close Ditch 1X								2					2
Weed Control- Apply & Incorporate								36					36
TOTAL PRE-PLANT COSTS	91				14			89					193
Cultural:													
Plant Beans- Starter Fertilizer								219					219
Open Ditch 1X									4				4
Irrigate 5X									93	93	46		231
Cultivate & Side-dress Fertilizer									59				59
Pests- Insect/Lygid & Mites										34			34
Pests- Insect/Lygid & Aphids											23		23
Close Ditch 1X											2		2
Pickup	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	7
ATV	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41	5
TOTAL CULTURAL COSTS	1	1	1	1	1	1	1	220	157	127	72	1	585
Harvest:													
Cut & Rake Beans Custom												38	38
Thresh Beans & Haul Custom												127	127
Clean, Bag, Store & Insurance												138	138
Assessments												8	8
TOTAL HARVEST COSTS	0	0	0	0	0	0	0	0	0	0	0	311	311
Interest on Operating Capital @ 4.25%	0	0	0	0	0	0	0	1	2	2	3	4	15
TOTAL OPERATING COSTS/ACRE	92	1	1	1	15	1	1	311	159	130	75	316	1,104
CASH OVERHEAD													
Land Rent- Large Lima Beans												375	375
Liability Insurance												1	1
Office Expense	6	6	6	6	6	6	6	6	6	6	6	6	75
Property Taxes				0						0			1
Property Insurance				0						0			0
Investment Repairs	0	0	0	0	0	0	0	0	0	0	0	0	2
TOTAL CASH OVERHEAD COSTS	6	6	6	7	6	6	6	6	6	7	6	382	454
TOTAL CASH COSTS/ACRE	98	8	8	8	21	8	8	317	165	137	82	698	1,558

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER
TABLE 4. RANGING ANALYSIS - LARGE LIMA BEANS
 SACRAMENTO AND NORTHERN SAN JOAQUIN VALLEY - 2016

COSTS PER ACRE AND PER CWT AT VARYING YIELDS TO PRODUCE LARGE LIMA BEANS

	YIELD (CWT)						
	19.00	21.00	23.00	25.00	27.00	29.00	31.00
OPERATING COSTS/ACRE:							
Pre-Plant	193	193	193	193	193	193	193
Cultural	585	585	585	585	585	585	585
Harvest	236	261	286	311	336	360	385
Interest on Operating Capital @ 4.25%	14.87	14.96	15.05	15.14	15.22	15.31	15.40
TOTAL OPERATING COSTS/ACRE	1,029	1,054	1,079	1,104	1,129	1,154	1,179
TOTAL OPERATING COSTS/CWT	54.17	50.20	46.92	44.16	41.82	39.79	38.03
CASH OVERHEAD COSTS/ACRE	454	454	454	454	454	454	454
TOTAL CASH COSTS/ACRE	1,483	1,508	1,533	1,558	1,583	1,608	1,633
TOTAL CASH COSTS/CWT	78.07	71.82	66.66	62.33	58.63	55.45	52.68
NON-CASH OVERHEAD COSTS/ACRE	40	40	40	40	40	40	40
TOTAL COSTS/ACRE	1,524	1,549	1,573	1,598	1,623	1,648	1,673
TOTAL COSTS/CWT	80.00	74.00	68.00	64.00	60.00	57.00	54.00

Net Return per Acre above Operating Costs for Large Lima Beans

PRICE (\$/cwt)	YIELD (cwt/acre)						
Large Lima	19.00	21.00	23.00	25.00	27.00	29.00	31.00
45.00	-174	-109	-44	21	86	151	216
55.00	16	101	186	271	356	441	526
65.00	206	311	416	521	626	731	836
75.00	396	521	646	771	896	1,021	1,146
85.00	586	731	876	1,021	1,166	1,311	1,456
95.00	776	941	1,106	1,271	1,436	1,601	1,766
105.00	966	1,151	1,336	1,521	1,706	1,891	2,076

Net Return per Acre above Cash Costs for Large Lima Beans

PRICE (\$/cwt)	YIELD (cwt/acre)						
Large Lima	19.00	21.00	23.00	25.00	27.00	29.00	31.00
45.00	-628	-563	-498	-433	-368	-303	-238
55.00	-438	-353	-268	-183	-98	-13	72
65.00	-248	-143	-38	67	172	277	382
75.00	-58	67	192	317	442	567	692
85.00	132	277	422	567	712	857	1,002
95.00	322	487	652	817	982	1,147	1,312
105.00	512	697	882	1,067	1,252	1,437	1,622

Net Return per Acre above Total Costs for Large Lima Beans

PRICE (\$/cwt)	YIELD (cwt/acre)						
Large Lima	19.00	21.00	23.00	25.00	27.00	29.00	31.00
45.00	-669	-604	-538	-473	-408	-343	-278
55.00	-479	-394	-308	-223	-138	-53	32
65.00	-289	-184	-78	27	132	237	342
75.00	-99	26	152	277	402	527	652
85.00	91	236	382	527	672	817	962
95.00	281	446	612	777	942	1,107	1,272
105.00	471	656	842	1,027	1,212	1,397	1,582

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER
TABLE 5. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS
 SACRAMENTO AND NORTHERN SAN JOAQUIN VALLEY - 2016

ANNUAL EQUIPMENT COSTS

Yr.	Description	Price	Years Life	Salvage Value	Capital Recovery	Cash Overhead		Total
						Insurance	Taxes	
16	215HP Tractor Trac	240,000	10	70,892	23,249	131	1,554	24,935
16	95 HP Tractor MFWD	82,698	10	24,428	8,011	45	536	8,592
16	ATV 4WD	8,350	10	2,466	809	5	54	868
16	Blade Rear 8'	7,500	10	1,326	801	4	44	849
16	CultivatorSled6R15	11,000	12	1,524	1,052	5	63	1,120
16	Disc - Stubble 16'	45,000	12	6,233	4,305	22	256	4,583
16	Pickup 3/4 Ton	32,000	10	9,452	3,100	17	207	3,325
16	Planter-6 Row 15'	34,480	10	6,097	3,685	17	203	3,905
16	Saddle Tanks 2-200 gal	5,033	10	949	533	3	30	565
16	Subsoiler - 16'	42,000	10	7,427	4,488	21	247	4,756
16	Triplane - 16'	38,000	12	5,263	3,635	18	216	3,870
16	Fertilizer Bar- 6 Row	2,200	6	634	320	1	14	335
16	Ditcher V 6'	10,200	12	1,413	976	5	58	1,039
16	CultivatorRol6R15'	11,500	12	1,593	1,100	6	65	1,171
16	Finish Disc 25'	48,000	12	6,648	4,592	23	273	4,888
16	Bed Lister 6 Row 30"	13,450	15	1,377	1,119	6	74	1,199
16	Spray Boom - 25'	3,460	10	612	370	2	20	392
TOTAL		634,871	-	148,336	62,144	330	3,916	66,390
60% of NewCost*		380,923	-	89,002	37,287	198	2,350	39,834

*Used to reflect a mix of new and used equipment

ANNUAL INVESTMENT COSTS

Description	Price	Years Life	Salvage Value	Capital Recovery	Cash Overhead			Total
					Insurance	Taxes	Repairs	
INVESTMENT								
Building 2400 sq. ft.	72,000	30	0	4,038	30	360	1,440	5,869
Fuel Tanks 2-300 gal	6,850	20	478	476	3	37	137	653
Shop Tools	15,000	20	1,050	1,043	7	80	300	1,430
Siphon Tubes 720, 2"	8,820	10	617	1,022	4	47	176	1,249
TOTAL INVESTMENT	102,670	-	2,145	6,580	44	524	2,053	9,201

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Land Rent- Large Lima Beans	200.00	Acre	375.00	75,000
Liability Insurance	1500.00	Acre	1.03	1,545
Office Expense	200.00	Acre	75.00	15,000

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER
TABLE 6. HOURLY EQUIPMENT COSTS
 SACRAMENTO AND NORTHERN SAN JOAQUIN VALLEY - 2016

Yr.	Description	Large Lima	Total	Cash Overhead			Operating		Total Oper.	Total Costs/Hr.
		Hours Used	Hours Used	Capital Recovery	Insurance	Taxes	Lube & Repairs	Fuel		
16	215HP Tractor Trac	182	1600	8.72	0.05	0.58	11.81	35.44	47.25	56.60
16	95 HP Tractor MFWD	233	1200	4.01	0.02	0.27	3.67	13.25	16.91	21.21
16	ATV 4WD	33	200	2.43	0.01	0.16	0.74	0.83	1.57	4.17
16	Blade Rear 8'	20	200	2.40	0.01	0.13	1.25	0.00	1.25	3.80
16	Cultivator Sled 6 row 15'	28	166	3.80	0.02	0.23	2.36	0.00	2.36	6.40
16	Disc - Stubble 16'	30	166	15.56	0.08	0.93	7.42	0.00	7.42	23.99
16	Pickup 3/4 Ton	33	200	9.30	0.05	0.62	4.22	12.42	16.64	26.61
16	Planter-6 Row 15'	68	150	14.74	0.07	0.81	9.68	0.00	9.68	25.29
16	Saddle Tanks 2-200 gal	143	800	0.40	0.00	0.02	0.57	0.00	0.57	1.00
16	Subsoiler - 16'	40	200	13.46	0.06	0.74	9.67	0.00	9.67	23.94
16	Triplane - 16'	48	250	8.72	0.04	0.52	5.85	0.00	5.85	15.14
16	Fertilizer Bar- 6 Row	95	200	0.96	0.00	0.04	0.87	0.00	0.87	1.87
16	Ditcher V 6'	20	166	3.53	0.02	0.21	2.89	0.00	2.89	6.64
16	Cultivator Roller 6 row 15'	28	166	3.98	0.02	0.24	2.46	0.00	2.46	6.70
16	Finish Disc 25'	18	166	16.60	0.08	0.99	7.92	0.00	7.92	25.59
16	Bed Lister 6 Row 30"	56	400	1.68	0.01	0.11	0.00	0.00	0.00	1.80
16	Spray Boom - 25'	48	150	1.48	0.01	0.08	0.94	0.00	0.94	2.51

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER
TABLE 7. OPERATIONS WITH EQUIPMENT & MATERIALS
 SACRAMENTO AND NORTHERN SAN JOAQUIN VALLEY – 2016

Operation	Operation Month	Tractor	Implement	Labor Type/ Material	Rate/ acre	Unit
Laser Level- 1X/10Yr	Oct			Laser Level	0.10	Acre
Chisel 18 in.	Oct	215HP Tractor Trac	Subsoiler - 16'	Equipment Operator Labor	0.24	hour
Stubble Disc	Oct	215HP Tractor Trac	Disc - Stubble 16'	Equipment Operator Labor	0.18	hour
Finish Disc	Oct	215HP Tractor Trac	Finish Disc 25'			
Landplane- 2X	Oct	95 HP Tractor MFWD	Triplane - 16'	Equipment Operator Labor	0.29	hour
List 30" Beds	Oct	215HP Tractor Trac	Bed Lister 6 Row 30"	Equipment Operator Labor	0.34	hour
Weed Control-Fallow	Feb	95 HP Tractor MFWD	Saddle Tanks 2-200gal	Equipment Operator Labor	0.12	hour
				Roundup Ultra Max	2.00	Pint
			Spray Boom - 25'			
Open Ditch 1X	May	215HP Tractor Trac	Ditcher V 6'	Equipment Operator Labor	0.06	hour
	June	215HP Tractor Trac	Ditcher V 6'	Equipment Operator Labor	0.06	hour
Irrigation- Pre-plant	May			Irrigation Labor	0.50	hour
				Water- Well and District	5.00	Acln
Close Ditch 1X	May	95 HP Tractor MFWD	Blade Rear 8'	Equipment Operator Labor	0.06	hour
	Aug	95 HP Tractor MFWD	Blade Rear 8'	Equipment Operator Labor	0.06	hour
Weed Control	May	95 HP Tractor MFWD	Saddle Tanks 2-200gal	Equipment Operator Labor	0.17	hour
				Treflan HFP	1.50	Pint
			Spray Boom - 25'			
			CultivatorRol6R 15'	Dual Magnum	1.50	Pint
Plant Beans- Starter Fert.	May	95 HP Tractor MFWD	Planter-6 Row 15'	Equipment Operator Labor	0.41	hour
				Seed- Large Lima Treated	120.00	Lb
			Saddle Tanks 2-200gal	Seed Inoculant- Large Lima	10.00	Lb
			Fertilizer Bar- 6 Row	8-24-6-1%Zn	10.00	Lb N
Open Ditch 1X	May	215HP Tractor Trac	Ditcher V 6'	Equipment Operator Labor	0.06	hour
	June	215HP Tractor Trac	Ditcher V 6'	Equipment Operator Labor	0.06	hour
Irrigate 5X	June			Irrigation Labor	0.50	hour
				Water- Well and District	5.00	Acln
	June			Irrigation Labor	0.50	hour
				Water- Well and District	5.00	Acln
	July			Irrigation Labor	0.50	hour
				Water- Well and District	5.00	Acln
	July			Irrigation Labor	0.50	hour
				Water- Well and District	5.00	Acln
	Aug			Irrigation Labor	0.50	hour
				Water- Well and District	5.00	Acln
Cultivate & Side-dress	June	95 HP Tractor MFWD	CultivatorSled6R 15	Equipment Operator Labor	0.17	hour
				UN32	90.00	Lb N
			Fertilizer Bar- 6 Row			
			Saddle Tanks 2-200g			
Pests- Insect/Lygyus	July			Warrior II	1.92	floz
				Application Air20G	1.00	Acre
				Acramite	20.00	floz
Pests- Insect/Lygyus	Aug			Application Air20G	1.00	Acre
				Dimethoate 4E	1.50	Pint
Close Ditch 1X	May	95 HP Tractor MFWD	Blade Rear 8'	Equipment Operator Labor	0.06	hour
	Aug	95 HP Tractor MFWD	Blade Rear 8'	Equipment Operator Labor	0.06	hour
Pickup	Aug		Pickup 3/4 Ton	Non-Machine Labor		
ATV	Aug		ATV 4WD	Equipment Operator Labor	0.20	hour
Cut & Rake Beans	Sept			Cutting & Windrow	1.00	Acre
Thresh Beans & Haul	Sept			Threshing	27.00	Cwt
				Haul (cwt)	27.00	Cwt
Clean, Bag, Store	Sept			Clean, Store, Insure	25.00	Cwt
Assessments	Sept			CA Dry Bean Board	25.00	Cwt
				Large Lima Council	25.00	Cwt