
UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2012

SAMPLE COSTS TO PRODUCE

COTTON

PIMA VARIETY



SAN JOAQUIN VALLEY

Robert B. Hutmacher
Steven D. Wright
Larry Godfrey
Daniel S. Munk
Brian H. Marsh
Karen M. Klonsky

UC Cooperative Extension Specialist, Plant Sciences Department, UC Davis
UC Cooperative Extension Farm Advisor, Tulare and Kings Counties
UC Cooperative Extension Specialist, Entomology Department, UC Davis
UC Cooperative Extension Farm Advisor, Fresno County
UC Cooperative Extension Farm Advisor, Kern County
UC Cooperative Extension Specialist, Department of Agricultural and Resource Economics, UC Davis
UC Cooperative Extension Staff Research Associate, Department of Agricultural and Resource Economics, UC Davis
UC Cooperative Extension Staff Research Associate, Department of Agricultural and Resource Economics, UC Davis

Richard L. De Moura

Kabir P. Tumber

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INTRODUCTION

Sample costs for Pima cotton production in the San Joaquin Valley (SJV) are presented in this study. This study is intended as a guide only, and can be used to make production decisions, determine potential returns, prepare budgets and evaluate production loans. Practices described are based on production procedures considered typical for growing conditions in the San Joaquin Valley. Sample costs given for labor, materials, equipment and contract services are based on current figures. Some costs and practices used in this study may not be applicable to all situations. A blank column titled, “*Your Cost*”, is provided to enter your own costs on Tables 1 and 2.

For an explanation of calculations used for the study refer to the “Assumptions” section, call the Department of Agricultural and Resource Economics, University of California, Davis at: (530) 752-3589, or your local UC Cooperative Extension Farm Advisor.

Sample cost and return studies for many commodities are available and can be requested through the Department of Agricultural and Resource Economics, UC Davis, downloaded from the department website at <http://coststudies.ucdavis.edu>, or obtained from selected county UC Cooperative Extension offices.

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ASSUMPTIONS

The following assumptions give background information relevant to the values shown in Tables 1 to 7 and pertain to sample costs for producing Pima cotton in the San Joaquin Valley. **The costs figures are based on typical cultural practices for 30-inch rows used by farmers in the San Joaquin Valley.** Some practices described may not be used in every production year, or on every farm, and some operations not described may be performed. *The use of trade names and cultural practices 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.*

Land. The farm consists of 1,500 acres of non-contiguous land valued at \$8,500 per acre. Seven hundred fifty acres are planted to cotton and the remaining acres are planted to other field and row crops including processing tomatoes, corn, wheat, alfalfa, onions, garlic, pistachios and almonds. The owner manages the farm.

Production Operating Costs

Tables 1 through 3 show costs associated with ground preparation, planting, growing, and harvesting cotton. Land preparation is done from November to March, and the crop is harvested in October and November. The crop year in this study is November to November.

Land Preparation. The ground is ripped or subsoiled in two passes, 2 to 3 feet deep, to break up compaction, which affects root penetration and water infiltration. In this study subsoiling is done once every three years and one-third of the cost is allocated to the crop each year. The ground is then disced twice with a stubble disc to break up large clods and smooth the surface. The ground is disced again with a finish (offset) disc to incorporate the herbicide and smooth the surface. Afterwards the beds are listed.

Row Spacing. Cotton row spacings range from 30-inch to 40-inch rows. Carefully consider and examine local experience with row spacing. Examine several row spacing options to determine the best systems and the likely impacts on yields and production costs. The optimal row spacing will vary depending on soil types, rotation crops (especially with drip irrigation systems, available equipment, and factors impacting plant vigor—e.g. salinity, compaction, nutrient status). In this study, cotton is planted on 30-inch beds. Some field trials in the 1980's and 1990's done by University of California researchers indicated that yields could increase as much as 7% by changing from 38 or 40-inch row spacing to 30-inch rows. In the research evaluations, these yield improvements were achieved without increases in water or fertilizer requirements. The yield improvements were most commonly observed in the northern part of the San Joaquin Valley, with less consistent results or even no reported yield increases in other parts of the San Joaquin Valley.

Planting. A Pima cotton variety is seeded at a rate of 15 to 20 pounds per acre. This study assumes 18.0 pounds per acre are seeded in April. Cotton is planted using a six-row planter. Seed populations range from 35,000 to as much as 85,000 per acre, with an optimum stand of 40,000 to 55,000 plants per acre. Yields are generally not significantly affected by plant populations ranging from about 30,000 to 60,000 plants per acre, but average final plant population targets for most growers and varieties in 30-inch row cotton production areas are generally in the 45,000 to 60,000 plants per acre range. The seed cost includes the San Joaquin Valley Cotton Board assessment (see "Assessment" section).

Irrigation. In this study, water costs \$100 per acre-foot. Assumed water cost reflects a mix of district water supplies and pumped groundwater. Grower applied water ranges from 2.0 to 3.5 acre feet based on soil type, irrigation method, water application uniformity, crop rooting depth in some soils, evaporation, and runoff. Based on current information it is estimated that 2.5 acre-feet of water is applied during the growing season for cotton in the region. Irrigation water application amounts should be adjusted according to on-farm rainfall measurements. Price per acre-foot for water will vary by grower depending on the irrigation district and its limits on available water, increased costs and competition for water, and increased energy costs for running irrigation wells where groundwater is available as a backup water supply and rainfall. Water costs depending on irrigation district or pumping variables can range from \$20 to over \$175 per acre-foot for late season irrigation in water-short districts.

For the purposes of this evaluation, the irrigation system used is a ditch-based furrow irrigation system, with the farm already having installed water delivery mainlines or primary ditches to move water to the fields. Other types of systems used in cotton production include level basin irrigation, gated pipe furrow irrigation, subsurface drip irrigation and various types of hand-move sprinkler systems. Many growers in clay loam soils use hand-move sprinklers to allow them to apply lower amounts of irrigation water for preplant and first within-season irrigations, then switch over to furrow irrigation for the remaining irrigations.

Fertilization. Nitrogen (N) is the primary nutrient applied to cotton throughout the growing season. UN-32 (32-0-0) is sidedressed at a rate of 150 pounds of N per acre during the month of May. A fertilizer applicator is rented from the fertilizer dealer. Thirty pounds of N as UN-32 is water run in July. The labor cost for applying the water run N is included in the irrigation costs.

Cotton is very responsive to nitrogen, but excessive applications can cause rank or vegetative growth and lead to increased pest problems, poor defoliation, lower yields, and nitrate leaching. The desirability of the water run nitrogen in July is largely dependent upon the yield potential of the plant and relative plant vigor (i. e. the better the yield potential on the plant, or the lower the vigor, the more likely that a favorable and cost-effective response will be obtained with later water-run nitrogen applications). Care must be exercised in particular with late-season nitrogen management in Pima cotton, as many Pima varieties have a pronounced tendency to sustain vegetative growth well into late-summer and early fall, and can be hard to prepare for a timely harvest.

If the crop rotation includes heavily-fertilized vegetable crops or alfalfa, or if dairy waste or manure applications are common practices on individual fields, residual soil nitrogen and even potassium may be high. These situations would then present an opportunity to reduce input costs and lower applied nitrogen, resulting in fewer problems with excessive growth and leaching losses.

Pest Management. The pesticides, rates, and cultural practices mentioned in this cost study are listed in the *UC IPM Pest Management Guidelines, Cotton*. **Pesticides mentioned in this study are not recommendations, but those commonly used in the region.** For information and pesticide use permits, contact the local county Agricultural Commissioner's office. For information on other pesticides available, pest identification, monitoring, and management, visit the UC IPM website at www.ipm.ucdavis.edu. **Pest control costs can vary considerably each year depending upon local conditions and pests in any given year. Ranges can be as dramatic as \$50 per acre for one year and over \$200 the next.**

Pest Control Adviser (PCA). Written recommendations are required for many pesticides and are made by licensed pest control advisers. In addition, the PCA or an agronomist consultant will monitor the field for agronomic problems including pests and nutrition. Growers may hire private PCAs or receive the service as part of a service agreement with an agricultural chemical and/or fertilizer company. In this study, a fee is allocated for a PCA.

In the absence of clear data to the contrary, Pima cotton should be monitored for insects and mites using the same techniques and economic thresholds as for Upland varieties, which are varieties that are native to Mexico and Central America (e.g. Acala). Common observations among University researchers as well as PCAs are that: (1) Pima varieties typically exhibit lower spider mite populations and a higher tolerance to spider mites than Acala cotton; (2) cotton aphids and silverleaf whitefly build up faster and can cause more problems in Pima than in Acala cotton; and (3) fruit loss in Pima varieties can be worse than in Acala types at similar Lygus bug populations. Since under typical management, most Pima varieties require a longer growing season to mature than Acala types, Pima has a longer potential period of exposure to late-season insect pests than typical for Acala cotton, which could increase insect control costs. This information should be kept in mind when planning for Pima production costs, but without clear documentation of higher costs in University studies, assumed insect management practices will be the same as in the Acala cost study: “2012 Sample Costs to Produce Cotton – Acala”.

Insects. In this study, pest management is for mites, aphids, lygus, and thrips. Seeds are treated with Orthene at planting in April to control thrips. An aerial application of Carbine plus Zephyr are made in June for lygus and mite control, and Assail in July for aphid and whitefly control. A ground application of Radiant is made in May for thrip control. Monitoring of insect populations is necessary to determine if and when to treat the crop.

Lygus bugs feed on the squares (flower buds) and small fruit (bolls). Damaged squares will usually drop off while damaged bolls at a minimum may have stained lint and damaged seeds, or can be lost if damaged when bolls are less than 10 to 12 days of age past the flower stage. In cases where there are repeated or sustained infestations of lygus bugs, it is not uncommon for growers to need more than the assumed one insecticide application for lygus control.

Aphids cause physical damage to the leaves and/or contaminate the lint with their honeydew production. Also, their feeding may reduce the carbohydrates needed for boll maturation, resulting in yield loss. Mites feeding on the leaves reduce plant vigor and result in extensive defoliation.

Cost estimates do not include insecticide applications for beet armyworm control. In some years and/or locations, beet armyworm can develop populations capable of significant yield reductions, and their control will be an additional expense.

Cost estimates also do not include control measures for silverleaf whitefly, which can be a major late-season pest in parts of the southern and even central San Joaquin Valley. Silverleaf whitefly has the potential to cause sticky cotton and reduce the value of cotton lint (fiber). Insect growth regulators and insecticides are available to aid in control, but costs are highly variable by location and timing of infestations, choice of control measures, and the number of applications required. Similarly, if aphid problems continue into the late-season when bolls open and cotton lint is exposed to aphid honeydew, another insecticide application in addition to the assumed application may be required to prevent sticky cotton.

Weeds. In February a contact herbicide, glyphosate (Roundup), is applied. Some growers may apply additional herbicides such as Shark; however, careful timing consideration must be taken to minimize chemical drift into neighboring crops. In March, a pre-emergent herbicide (Triflurex) is applied and incorporated in the fields with discing. This application will control many early season annual broadleaves and grasses. In May, an “over-the-top” herbicide (Staple) is applied to control broadleaves. Cultivations begin in late April (depending upon planting date) and continue until the end of June. A total of four cultivations are done in this study, using rolling cultivators. The first cultivation is made prior to planting in March and the remaining three are done from April to June. Hand hoeing is done in June and a post-directed herbicide/layby treatment is made in June with Shark.

Growth Regulator & Defoliation. A plant growth regulator (mepiquat chloride, also known as “Stance”, variations on the name “PIX”, or other trade names) is applied at one pint per acre in late June or July and again a second time at one-half pint in late-July or early August. Plant growth regulators control excessive vegetative growth and promote a balance between vegetative and reproductive growth. Their use can result in a more uniform boll set for once-over harvesting. The total number of applications and rates used can vary with a number of factors in the range of practices used in the SJV. Considerations include: (1) the degree to which growers use delayed irrigations to aid in limiting vegetative growth; (2) the lateness of the crop, and; (3) soil factors such as as prevailing nitrogen levels or salinity levels. Under low vigor conditions such as in saline soil, or compacted soil conditions, caution is warranted to avoid negative impacts of too high a rate of growth regulator application.

Harvest aid chemicals, often called by the group names “defoliant” and “desiccant”, are applied in September and/or October. Typical harvest aid applications include two application timings with materials such as Ethephon (Prep, Finish) and Ginstar applied in the first application, and a second application 10 to 14 days or more later with materials such as Defol, Shark, or ET.

Defoliant is applied prior to picking to aid harvest by causing the leaves to drop. Desiccants are applied to help reduce the presence of green, high water content leaves that can cause fiber staining and other damage to harvested fiber. Defoliation reduces the amount of trash collected with the cotton, and reduces staining of the lint. Because of the more indeterminate growth than Upland varieties, the Pima varieties may need additional applications as well as the use of higher rates. Defoliation is more critical in appearance, which directly correlates to the quality of cotton.

Harvest. The farm in this study owns two six-row cotton harvesters and two module builders. The cotton is dumped from the harvester directly into the module builder that presses loose seed cotton into a dense and economical unit for transportation to the gin. A tractor and tractor driver monitor each module. Two laborers maintain the area – cleaning cotton off the ground, placing a tarp on the finished module, etc. – during the harvest operations.

The assumption for this cost study is that Pima cotton requires two harvests, with the second harvest required to collect seed-cotton from late-maturing bolls. For the second harvest, the grower again uses two pickers, but only one module builder due to reduced yields per acre. Harvest time is reduced due to faster harvesting speeds compared to the first picking and less time required for dumping. Pima cotton matures over a longer time than Upland cotton; better quality is obtained in the first pick due to favorable weather conditions earlier in the season. However, depending on the value of Pima seed and lint, in years with good early boll set and warm pre-harvest weather, many newer Pima varieties can mature more evenly and require only one pick for harvest. Growers may choose to adjust the harvest costs accordingly if that is the typical harvest experience in their area.

Typical custom picking costs for Pima cotton are \$115 per acre. Growers may choose to own cotton pickers and module builders, purchased either new or used, or hire a custom harvester to perform the harvest. Many factors are important in deciding which harvesting option a grower uses. The decision to invest in cotton harvesting equipment requires consideration of differences in production practices and equipment requirements for all of the crops in rotation as well as the direct cost of the harvesting equipment. These factors and appropriate method of analysis are discussed by Blank et al, (1992). Though their report specifically addresses hay harvesting, the same principles and methodology can be used with cotton harvesting.

Yields. The crop yield used in this study is 1,500 pounds of lint and 2,655 pounds of seed per acre for San Joaquin Valley Pima cotton. Returns for various lint yields are shown in Table 4.

Returns. An estimated price of \$1.30 per pound of lint is used to calculate returns. The price is based on current returns and from county averages over the last five years. Some cooperative cotton gins pay growers as much as \$30 to \$45 per bale for seed credit above grower ginning costs, and this study assumes growers receive \$35 per 500 pound bale. Table 4 shows grower returns for varying returns.

Revenue from federal government programs. The typical revenue available for the Acala's (Upland cotton) is not available to the Pima (Extra Long Staple [ELS]) producers. Pima growers may be eligible for Nonrecourse Marketing Assistance Loans, however this study assumes the grower does not receive governmental assistance. For additional information, contact your local county USDA Farm Service Agency.

Transportation. Transportation costs are based on roundtrip distances from the field to the gin. Most gins within a close radius of the field do not charge because the cost is included in the ginning fee. Longer hauls (over 40 miles round trip) may have a hauling charge. Hauling companies may also have a surcharge for modules less than a minimum weight. This study assumes the grower does not have additional transportation costs.

Ginning. Commercial cotton gins normally keep cottonseed and give growers a credit to cover ginning and transportation costs so most growers do not see a ginning charge. In this study, ginning fees are covered by the seed credit and are not included as a line-item cost. Some gins may return to the grower a net difference of \$30 to \$45 per bale between the seed value and ginning costs. In this study, we assume that growers receive \$35 per bale return from the cotton gin.

Some cotton gins charge growers for compressing lint into universal density (UD) bales for shipping, merchant samples, a loading charge, or an invoice fee. This study assumes no additional ginning charges.

Assessments. Most assessments are collected by the gin or handler and deducted from the growers' gross returns. Both mandatory and voluntary assessments are discussed below.

USDA-HVI. The USDA levies a fee for High Volume Instrumentation (HVI) classing. This determines the marketing classification cotton grade. Growers are mandated with a \$2.15 per bale fee.

Pink Bollworm Project. The California State Department of Food and Agriculture (CDFA) manages and enforces the Pink Bollworm Project. This program, which through detection and legislated postharvest practices, controls pink bollworm in the San Joaquin Valley and other cotton growing districts in the state. The Pink Bollworm Project maintains several control districts to administer the program. Under the project growers are assessed a fee only if cotton is ginned within a project district. CDFA has a current charge of \$2.00 per bale.

National Cotton Council. The National Cotton Council, a voluntary organization, collects an assessment to provide lobbying, advocacy, and public relations for the cotton industry at the national level. The current assessment rate paid by growers is \$0.55 per bale.

California Cotton Growers And Ginners Association. The California Cotton Growers And Ginners Association assists California cotton growers in advocating their position in the legislature. The growers are charged \$0.25 per bale and the ginners are charged \$0.25 per bale. Participation in this organization is voluntary.

San Joaquin Valley Cotton Board. The board reviews test program data and approves variety releases. The assessment is added to the seed price. As of March, 2012, the assessment paid by the grower is \$4.72 per planting seed hundredweight.

Supima Association. The Supima Association, composed of American Pima cotton growers, promotes U.S. Pima cotton, and is also involved in quality assurance, research programs, and working with government agencies to maintain a viable marketing environment. The voluntary assessment is \$3.00 per bale. The funds are collected by the first post-ginning handler of the cotton.

Pickup. Two pickups – one-half ton and three-quarter ton – are used on the ranch. It is assumed that each pickup travels 4,998 miles each year for total ranch use.

Labor, Equipment and Interest

Labor. Basic hourly wages for workers are \$10.50 per hour for machine operators and \$8.50 per hour for non-machine workers. Adding 37% for the employers share of federal and state payroll taxes and other benefits raises the total labor costs to \$14.39 per hour for machine operators and \$11.65 per hour non-machine labor. The overhead includes the employers' share of federal and California state payroll taxes, workers' compensation insurance for field crops, and a percentage for other possible benefits. Workers' compensation costs will vary among growers, but for this study the cost is based upon the average industry final rate as of January 1, 2011 (personal email from California Department of Insurance, March 2011, unreferenced). Machinery labor cost is approximately 20% higher than general labor prices, which accounts for the extra labor involved in equipment set up, moving, maintenance, work breaks, and field repair.

Equipment Operating Costs. Repair costs are based on purchase price, annual hours of use, total hours of life, and repair coefficients formulated by the American Society of Agricultural Engineers (ASAE). Fuel and lubrication costs are also determined by ASAE equations based on maximum PTO horsepower, and fuel type. Prices for on-farm delivery of diesel and gasoline are \$3.43 and \$3.82 per gallon, respectively. The cost includes a 2.50% sales tax on diesel fuel and 7.50% sales tax on gasoline. Gasoline also includes federal and state excise tax, which can be refunded for on-farm use when filing your income tax. 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% higher than implement time for a given operation to account for setup, travel and down time.

Interest on Operating Capital. Interest on operating capital is based on cash operating costs and is calculated monthly until harvest at a nominal rate of 5.75% per year. A nominal interest rate is the typical market cost of borrowed funds. The interest rate will vary depending upon various factors. The rate in this study is considered a typical lending rate by a farm lending agency as of January 2012.

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 the profitability and economic viability.

Cash Overhead Costs

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

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

Insurance. Insurance for farm investments varies depending on the assets included and the amount of coverage. Liability insurance covers accidents on the farm and costs \$1,470 for the entire farm.

Office Expense. Office and business expenses are estimated at \$50 per acre. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, shop, and office utilities, and miscellaneous administrative charges.

Investment Repairs. Annual maintenance is calculated as 2% of the purchase price.

Non-Cash Overhead Costs

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

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

Salvage Value. Salvage value is an estimate of the remaining value of an investment at the end of its useful life. For farm machinery (tractors and implements) the remaining value is a percentage of the new cost of the investment (Boehlje and Eidman). The percent remaining value is calculated from equations developed by the American Society of Agricultural Engineers (ASAE) based on equipment type and years of life. The life in years is estimated by dividing the wear out life, as given by ASAE, by the annual hours of use in this operation. For other investments including irrigation systems, buildings, and miscellaneous equipment, the value at the end of its useful life is zero. The salvage value for 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 that corresponds to the interest rate used and the life of the machine.

Interest Rate. An interest rate of 4.75% is used to calculate capital recovery. The rate will vary depending upon loan amount and other lending agency conditions, but is the basic suggested rate by a farm lending agency as of January 2012.

Land. The grower owns 1,500 acres of row-crop land valued at \$8,500 per acre. Values for land with relatively secure irrigation water supplies in the San Joaquin Valley range from \$4,500 per acre to \$11,000, depending upon location, soil condition and water availability.

Building. The buildings are metal buildings erected on a cement slab and cover approximately 2,400 square feet.

Tools. This includes shop tools, hand tools, and miscellaneous field tools. The number is not based upon an actual or average inventory.

Fuel Tanks. Diesel and gasoline fuel tanks with electric pumps are set up in a cement containment pad that meets federal, state, and county regulations.

Equipment. Farm equipment is purchased new or used, but the study shows the current purchase price for new equipment. The new purchase price is adjusted to 60% to indicate a mix of new and used equipment. Annual ownership costs for equipment and other investments are shown in Table 4. 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.

Irrigation. The irrigation system is assumed to be a ditch-based furrow irrigation system, with water delivery from the water source to the individual fields delivered through a pre-existing buried mainline or ditch. Ditches at the field level are pulled in for pre-irrigation, and removed prior to planting. Ditches are removed and replaced during the season to allow for ground equipment operations as defined in the list of field operations. Water is delivered from ditches to furrows using siphon tubes.

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

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UC COOPERATIVE EXTENSION
 SAN JOAQUIN VALLEY - SOUTH 2012
Table 1. COSTS PER ACRE TO PRODUCE PIMA COTTON

Operation	Operation Time (Hrs/A)	Cash and Labor Costs per Acre					Total Cost	Your Cost
		Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/ Rent			
Cultural:								
Rip fields 1X/3Yrs	0.13	2	9	0	0	12		
Disc 2X	0.27	5	14	0	0	19		
Apply herbicide (Roundup)	0.10	2	4	7	0	13		
Spray Triflurex	0.20	3	9	7	0	19		
Incorporate Triflurex	0.13	2	7	0	0	9		
List beds	0.07	1	2	0	0	4		
Make ditch	0.06	1	3	0	0	4		
Irrigate	4.00	47	0	250	0	297		
Close ditch	0.06	1	3	0	0	4		
Cultivate - Preplant	0.10	2	3	0	0	5		
Plant & apply seed treatment (Orthene)	0.12	2	5	57	0	64		
Uncap beds	0.08	1	3	0	0	4		
Cultivate	0.31	5	10	0	0	15		
Fertilize - Sidedress (UN32)	0.14	2	4	126	4	136		
Weed Control - Over -the-top (Staple)	0.20	3	6	28	0	38		
Weed control - Direct/layby (Shark)	0.20	3	6	9	0	19		
Insect control - Lygus (Carbine & Zephyr)	0.00	0	0	77	10	87		
Insect control - Lygus (Leverage)	0.00	0	0	19	10	29		
Apply growth regulator & KNO3	0.00	0	0	1	10	11		
Fertilize - Water run (UN32)	0.00	0	0	25	0	25		
Insect control - Aphid whitefly (Assail)	0.00	0	0	19	10	29		
Defoliate cotton - 2X	0.00	0	0	75	20	95		
PCA	0.00	0	0	0	12	12		
Chop stalks (post-harvest)	0.10	2	5	0	0	6		
Disc residue - 2X (post-harvest)	0.24	4	18	0	0	22		
Pickup truck use	0.44	8	4	0	0	12		
TOTAL CULTURAL COSTS	6.96	98	115	699	76	988		
Harvest:								
Harvest - 2X	0.40	7	77	0	0	84		
Boll buggy - 2X	0.10	2	5	0	0	6		
Build module (tractor #1) - 2X	0.20	3	6	0	0	10		
Build module (machines #1 (2X) and #2)	0.35	10	6	0	0	16		
Build module (tractor #2)	0.15	3	4	0	0	7		
TOTAL HARVEST COSTS	1.20	24	98	0	0	122		
Assessment:								
Assessments	0.00	0	0	24	0	24		
TOTAL ASSESSMENT COSTS	0.00	0	0	24	0	24		
Interest on operating capital at 5.75%						30		
TOTAL OPERATING COSTS/ACRE	8.16	122	213	723	76	1,164		
CASH OVERHEAD:								
Liability insurance						1		
Office expense						50		
Property taxes						89		
Property insurance						3		
Investment repairs						3		
TOTAL CASH OVERHEAD COSTS/ACRE						145		
TOTAL CASH COSTS/ACRE						1,309		

UC COOPERATIVE EXTENSION
SAN JOAQUIN VALLEY - SOUTH 2012

Table 1. Continued

			Total Cost	Your Cost
NON-CASH OVERHEAD:	Per producing Acre	Annual Cost Capital Recovery		
Building - 2,400sqft	40	3	3	
Fuel tanks - 500 gallons (2)	4	0	0	
Service truck - 2 ton	90	10	10	
Shop/field tools	8	1	1	
Siphon pipes 3"x 90"	18	2	2	
Land	8,500	404	404	
Equipment	870	98	98	
TOTAL NON-CASH OVERHEAD COSTS	9,531	517	517	
TOTAL COSTS/ACRE			1,827	

UC COOPERATIVE EXTENSION
 SAN JOAQUIN VALLEY - SOUTH 2012
Table 2. COSTS AND RETURNS PER ACRE TO PRODUCE PIMA COTTON

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Costs
GROSS RETURNS					
Lint (3 bales)	1500.00	lb	1.30	1,950	
Seed	3.00	bale equivalent	35.00	105	
TOTAL GROSS RETURNS	1,500.00			2,055	
OPERATING COSTS					
Insecticide:					118
Orthene	3.25	oz	0.98	3	
Zephyr	8.00	floz	7.46	60	
Carbine 50WG	2.50	oz	6.87	17	
Leverage 2.7	5.00	floz	3.88	19	
Assail 70WP	1.10	oz	16.82	19	
Defoliant:					61
Finish 6 Pro	2.00	pint	13.75	28	
Ginstar	10.00	floz	2.74	27	
Defol 5	1.00	gal	6.37	6	
Herbicide:					64
Roundup	32.00	floz	0.22	7	
Triflurex HFP	1.50	pt	4.52	7	
Staple	0.38	floz	72.88	28	
Shark EW	2.50	floz	9.09	23	
Growth Regulator:					1
Mepex Gin Out	2.00	floz	0.39	1	
Seed:					54
Seed (Pima)	18.00	lb	3.00	54	
Fertilizer:					151
UN 32	180.00	lb N	0.84	151	
Custom:					60
Air application	6.00	acre	10.00	60	
Rent:					4
Fertilizer applicator	1.00	acre	3.50	4	
Irrigation:					250
Water	30.00	acin	8.33	250	
Contract:					12
PCA/consultant fee	1.00	acre	12.00	12	
Assessment:					24
CA Cotton Growers	3.00	bale	0.25	1	
National Cotton Council	3.00	bale	0.55	2	
Pink Bollworm Project	3.00	bale	2.00	6	
USDA Classing Fee	3.00	bale	2.15	6	
Supima Association	3.00	bale	3.00	9	
Labor:					122
Equipment operator labor	4.99	hrs	14.39	72	
Irrigation labor	4.00	hrs	11.65	47	
Non-machine labor	0.30	hrs	11.65	4	
Machinery:					213
Fuel-gas	0.00	gal	3.82	0	
Fuel-diesel	37.63	gal	3.43	129	
Lube				19	
Machinery repair				65	
Interest on operating capital at 5.75%				30	
TOTAL OPERATING COSTS/ACRE				1,164	
NET RETURNS ABOVE OPERATING COSTS				891	

UC COOPERATIVE EXTENSION
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Table 2. Continued

	Value or Cost/Acre	Your Costs
CASH OVERHEAD COSTS		
Liability insurance	1	
Office expense	50	
Property taxes	89	
Property insurance	3	
Investment repairs	3	
TOTAL CASH OVERHEAD COSTS/ACRE	145	
TOTAL CASH COSTS/ACRE	1,309	
NON-CASH OVERHEAD COSTS (Capital Recovery)		
Buildings - 2,400 sqft	3	
Fuel Tanks - 500 gallons (2)	0	
Service Truck - 2 Ton	10	
Shop/field tools	1	
Siphon pipes 3" x 90"	2	
Land	404	
Equipment	98	
TOTAL NON-CASH OVERHEAD COSTS	517	
TOTAL COST/ACRE	1,827	
NET RETURNS ABOVE TOTAL COST	228	

UC COOPERATIVE EXTENSION
SAN JOAQUIN VALLEY - SOUTH 2012

Table 3. MONTHLY CASH COSTS PER ACRE TO PRODUCE PIMA COTTON

Beginning 11-11	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	TOTAL
Ending 11-12	11	11	12	12	12	12	12	12	12	12	12	12	12	
Cultural:														
Rip fields 1X/3 yrs	12													12
Disc 2X	19													19
Apply herbicide (Roundup)				13										13
Spray Triflurex					19									19
Incorporate Triflurex					9									9
List beds					4									4
Make ditch					1		1		1					4
Pre-irrigate					95			78	62	62				297
Close ditch					1			1			1			4
Cultivate - Preplant				5										5
Plant & Orthene treatment						64								64
Uncap beds						4								4
Cultivate						5	5	5						15
Fertilize - Sidedress (UN32)							136							136
Weed Control - Over -the-top (Staple)							38							38
Weed control - Direct/layby (Shark)								19						19
Insect control - Lygus (Carbine & Zephyr)								87						87
Insect control - Lygus (Leverage)									29					29
Apply growth regulator & KNO3									11					11
Fertilize - Water run (UN32)									25					25
Insect Control - Aphid whitefly (Assail)										29				29
Defoliate cotton - 2X												95		95
PCA	1	1	1	1	1	1	1	1	1	1	1	1	1	12
Chop stalks (Post-harvest)													6	6
Disc residue - 2X (post-harvest)													22	22
Pickup truck use	1	1	1	1	1	1	1	1	1	1	1	1	1	13
TOTAL CULTURAL COSTS	32	2	2	20	131	75	182	192	130	92	3	97	30	989
Harvest:														
Harvest - 2X													84	84
Boll buggy - 2X													6	6
Build module (tractor #1) - 2X													10	10
Build module (machines #1 (2X) and #2)													16	16
Build module (tractor #2)													7	7
TOTAL HARVEST COSTS													122	122
Assessment:														
Assessments													24	24
TOTAL ASSESSMENT COSTS	0	24	24											
Interest on operating capital at 5.75%	0	0	0	0	1	1	2	3	4	4	4	5	5	30
TOTAL OPERATING COSTS/ACRE	32	2	2	20	131	77	184	195	134	96	7	101	182	1,165
CASH OVERHEAD														
Liability insurance							1							1
Office expense	4	4	4	4	4	4	4	4	4	4	4	4	4	50
Property taxes		44					44							89
Property insurance			3											3
Investment repairs	0	0	0	0	0	0	0	0	0	0	0	0	0	3
TOTAL CASH OVERHEAD COSTS	4	48	7	4	4	48	5	4	4	4	4	4	4	145
TOTAL CASH COSTS/ACRE	36	50	9	24	135	125	189	200	138	100	11	106	186	1,310
TOTAL CASH COSTS/LB	0.02	0.03	0.01	0.02	0.09	0.08	0.13	0.13	0.09	0.07	0.01	0.07	0.11	0.86

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Table 4. RANGING ANALYSIS

COST PER ACRE AT VARYING YIELDS TO PRODUCE PIMA

	YIELD (lbs. lint/acre)						
	750	1,000	1,250	1,500	1,750	2,000	2,250
OPERATING COSTS:							
Cultural Cost	988	988	988	988	988	988	988
Harvest Cost	66	85	104	122	141	160	179
Assessment Cost	24	24	24	24	24	24	24
Interest on operating capital at 5.75%	30	30	30	30	30	30	30
TOTAL OPERATING COSTS/ACRE	1,108	1,126	1,145	1,164	1,183	1,201	1,220
TOTAL OPERATING COSTS/LB	1.48	1.13	0.92	0.78	0.68	0.60	0.54
CASH OVERHEAD COSTS/ACRE							
CASH OVERHEAD COSTS/ACRE	145	145	145	145	145	145	145
TOTAL CASH COSTS/ACRE	1,253	1,272	1,290	1,309	1,328	1,347	1,365
TOTAL CASH COSTS/LB	1.67	1.27	1.03	0.87	0.76	0.67	0.61
NON-CASH OVERHEAD COSTS/ACRE							
NON-CASH OVERHEAD COSTS/ACRE	517	517	517	517	517	517	517
TOTAL COSTS/ACRE	1,770	1,789	1,808	1,827	1,845	1,864	1,883
TOTAL COSTS/LB	2.36	1.79	1.45	1.22	1.05	0.93	0.84

NET RETURNS PER ACRE ABOVE OPERATING COSTS

		YIELD(lbs. lint/acre)						
		750	1,000	1,250	1,500	1,750	2,000	2,250
PRICE(\$/lb)	PRICE (\$/bale)	YIELD (\$/500 lb. lint bale equivalent)						
Lint	Seed	1.5	2.0	2.5	3.0	3.5	4.0	4.5
0.90	35.00	-380	-156	67	291	515	739	962
1.10	35.00	-230	44	317	591	865	1,139	1,412
1.30	35.00	-80	244	567	891	1,215	1,539	1,862
1.50	35.00	70	444	817	1,191	1,565	1,939	2,312
1.70	35.00	220	644	1,067	1,491	1,915	2,339	2,762
1.90	35.00	370	844	1,317	1,791	2,265	2,739	3,212
2.10	35.00	520	1,044	1,567	2,091	2,615	3,139	3,662

NET RETURNS PER ACRE ABOVE CASH COSTS

		YIELD(lbs. lint/acre)						
		750	1,000	1,250	1,500	1,750	2,000	2,250
PRICE(\$/lb)	PRICE (\$/bale)	YIELD (\$/500 lb. lint bale equivalent)						
Lint	Seed	1.5	2.0	2.5	3.0	3.5	4.0	4.5
0.90	35.00	-525	-302	-78	146	370	593	817
1.10	35.00	-375	-102	172	446	720	993	1,267
1.30	35.00	-225	98	422	746	1,070	1,393	1,717
1.50	35.00	-75	298	672	1,046	1,420	1,793	2,167
1.70	35.00	75	498	922	1,346	1,770	2,193	2,617
1.90	35.00	225	698	1,172	1,646	2,120	2,593	3,067
2.10	35.00	375	898	1,422	1,946	2,470	2,993	3,517

NET RETURNS PER ACRE ABOVE TOTAL COSTS

		YIELD(lbs. lint/acre)						
		750	1,000	1,250	1,500	1,750	2,000	2,250
PRICE(\$/lb)	PRICE (\$/bale)	YIELD (\$/500 lb. lint bale equivalent)						
Lint	Seed	1.5	2.0	2.5	3.0	3.5	4.0	4.5
0.90	35.00	-1,043	-819	-595	-372	-148	76	300
1.10	35.00	-893	-619	-345	-72	202	476	750
1.30	35.00	-743	-419	-95	228	552	876	1,200
1.50	35.00	-593	-219	155	528	902	1,276	1,650
1.70	35.00	-443	-19	405	828	1,252	1,676	2,100
1.90	35.00	-293	181	655	1,128	1,602	2,076	2,550
2.10	35.00	-143	381	905	1,428	1,952	2,476	3,000

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Table 5. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead		Total
						Insurance	Taxes	
12	105 hp 2WD tractor	94,159	10	27,813	9,809	490	610	10,909
12	105 hp 4WD tractor	107,347	10	31,709	11,183	558	695	12,437
12	150 hp 4WD tractor	153,548	10	45,356	15,996	799	995	17,789
12	230 hp track-type	287,000	10	84,775	29,899	1,493	1,859	33,250
12	Boll buggy	23,000	10	4,067	2,615	109	135	2,859
12	Cultivator Roll 20'	16,000	5	5,212	2,722	85	106	2,913
12	Disc - Offset 21'	43,877	12	6,077	4,494	201	250	4,944
12	Disc - Stubble 18' #1	59,000	10	10,434	6,709	279	347	7,335
12	Disc - Stubble 18' #2	42,000	10	7,427	4,776	198	247	5,222
12	Ditcher - 8'	7,800	15	749	703	34	43	781
12	Harvester - 6-Row #1	557,253	10	105,115	62,838	2,659	3,312	68,809
12	Harvester - 6-Row #2	557,253	10	105,115	62,838	2,659	3,312	68,809
12	Lister - 6-Row 20'	22,000	12	3,047	2,253	101	125	2,479
12	Module builder #1	40,000	10	0	5,117	161	200	5,478
12	Module builder #2	40,000	10	0	5,117	161	200	5,478
12	Mower - Flail 20'	29,558	15	2,838	2,666	130	162	2,958
12	Pickup - 1/2 ton	24,000	5	10,756	3,549	140	174	3,862
12	Pickup - 3/4 ton	28,000	5	12,549	4,140	163	203	4,506
12	Planter - 6-Row 20'	41,784	15	4,012	3,768	184	229	4,181
12	Rear Blade - 10'	4,500	18	299	367	19	24	410
12	Saddle Tank 300 gal	3,218	5	1,048	548	17	21	586
12	Spray Boom 20'	3,630	3	1,510	847	21	26	893
12	Subsoiler - 10'	26,534	10	4,692	3,017	125	156	3,299
12	Uncapper - 6-row 20'	10,500	10	1,857	1,194	50	62	1,305
TOTAL		2,221,961		476,457	247,166	10,834	13,492	271,493
60% of new cost*		1,333,177		285,874	148,300	6,500	8,095	162,896

*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	
Buildings - 2,400 sqft	60,000	30	0	3,793	241	300	1,200	5,533
Fuel tanks 2-500 gallons	6,514	20	651	491	29	36	130	686
Service truck 2-ton	135,500	10	25,000	15,325	644	803	2,510	19,281
Shop/field tools	12,000	15	1,200	1,080	53	66	240	1,439
Siphon pipes 3"x90"	13,496	10	0	1,727	54	67	160	2,008
Land	12,750,000	25	12,750,000	605,625	0	127,500	0	733,125
TOTAL INVESTMENT	12,977,510		12,776,851	628,040	1,021	128,772	4,240	762,073

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability insurance	1,500	acre	0.98	1,470
Office expense	1,500	acre	50.00	75,000

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Table 6. HOURLY EQUIPMENT COSTS

Yr	Description	COSTS PER HOUR							
		Actual Hours Used	Capital Recovery	Cash Overhead		Operating		Total Oper.	Total Costs/Hr.
				Insurance	Taxes	Lube & Repairs	Fuel		
12	105 hp 2WD tractor	1203	4.83	0.24	0.30	7.45	20.90	28.35	33.72
12	105 hp 4WD tractor	182	4.05	0.20	0.25	5.89	20.90	26.79	31.30
12	150 hp 4WD tractor	758	4.68	0.23	0.29	7.67	29.86	37.53	42.73
12	230 hp track-type	305	14.01	0.70	0.87	16.41	45.78	62.19	77.77
12	Boll buggy	75	7.85	0.33	0.41	3.17	0.00	3.17	11.75
12	Cultivator Roll 20'	309	4.61	0.14	0.18	0.88	0.00	0.88	5.81
12	Disc - Offset 21'	99	12.87	0.57	0.72	5.30	0.00	5.30	19.46
12	Disc - Stubble 18' #1	202	19.91	0.83	1.03	9.63	0.00	9.63	31.40
12	Disc - Stubble 18' #2	180	14.33	0.60	0.74	6.93	0.00	6.93	22.59
12	Ditcher - 8'	45	3.25	0.16	0.20	1.22	0.00	1.22	4.83
12	Harvester - 6-Row #1	165	110.75	4.69	5.84	84.87	79.63	164.50	285.77
12	Harvester - 6-Row #2	165	110.75	4.69	5.84	84.87	79.63	164.50	285.77
12	Lister - 6-Row 20'	52	8.14	0.36	0.45	4.48	0.00	4.48	13.44
12	Module builder #1	150	12.97	0.41	0.51	6.20	10.29	16.49	30.37
12	Module builder #2	113	15.35	0.48	0.60	7.05	10.29	17.34	33.78
12	Mower - Flail 20'	77	12.27	0.60	0.75	13.44	0.00	13.44	27.06
12	Pickup - 1/2 ton	167	5.33	0.21	0.26	2.82	6.86	9.68	15.48
12	Pickup - 3/4 ton	167	6.22	0.24	0.30	3.12	6.86	9.98	16.74
12	Planter - 6-Row 20'	91	17.00	0.83	1.03	8.40	0.00	8.40	27.26
12	Rear Blade - 10'	45	1.37	0.07	0.09	0.67	0.00	0.67	2.20
12	Saddle Tank 300 gal	576	0.51	0.02	0.02	0.00	0.00	0.00	0.54
12	Spray Boom 20'	523	0.70	0.02	0.02	0.69	0.00	0.69	1.43
12	Subsoiler - 10'	97	9.19	0.38	0.48	6.15	0.00	6.15	16.21
12	Uncapper - 6-row 20'	61	3.58	0.15	0.19	2.16	0.00	2.16	6.07

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Table 7. OPERATIONS WITH EQUIPMENT

Operation	Operation Month	Tractor	Implement	Field Labor Hrs/Acre	Material	Rate/acre	Unit
Rip fields 1X/3 yrs	Nov	230 hp track-type	Subsoiler - 10'	0.16			
Disc 2X	Nov	150 hp 4WD tractor	Disc - stubble 18'	0.32			
Apply herbicide	Feb	150 hp 4WD tractor	Saddle tank 300 gal	0.12	Roundup	32	floz
Spray Triflurex	Mar	150 hp 4WD tractor	Spray boom 20'	0.24	Triflurex HFP	1.5	pt
Incorporate Triflurex	Mar	150 hp 4WD tractor	Disc - offset 21'	0.16			
List beds	Mar	150 hp 4WD tractor	Lister 6-row 20'	0.08			
Make ditch	Mar	150 hp 4WD tractor	Ditcher - 8'	0.02			
	July	150 hp 4WD tractor	Ditcher - 8'	0.02			
Irrigate	Mar			1.00	Water	10.00	acin
	June			1.00	Water	8.00	acin
	July			1.00	Water	6.00	acin
	Aug			1.00	Water	6.00	acin
Close ditch	Mar	150 hp 4WD tractor	Rear blade - 10'	0.02			
	June	150 hp 4WD tractor	Rear blade - 10'	0.02			
	Sept	150 hp 4WD tractor	Rear blade - 10'	0.02			
Cultivate - Preplant	Feb	150 hp 2WD tractor	Cultivator roll 20'	0.12			
Plant & Orthene treatment	Apr	150 hp 2WD tractor	Planter - 6-Row 20'	0.15	Seed (Pima)	18.00	lb
					Orthene	3.25	oz
Uncap beds	Apr	105 hp 2WD tractor	Uncapper - 6-row 20'	0.10			
Cultivate	Apr	105 hp 2WD tractor	Cultivator Roll 20'	0.12			
	May	105 hp 2WD tractor	Cultivator Roll 20'	0.12			
	June	105 hp 2WD tractor	Cultivator Roll 20'	0.12			
Fertilize - Sidedress (UN32)	May	105 hp 2WD tractor		0.17	UN32 lbN	150.00	lb N
					Fertilizer rental	1.00	acre
Weed Control - Over-the-top (Staple)	May	105 hp 2WD tractor	Saddle Tank 300 gal Spray Boom 20'	0.24	Staple	0.38	floz
Weed control - Direct/layby (Shark)	June	105 hp 2WD tractor	Saddle Tank 300 gal Spray Boom 20'	0.24	Shark EW	1.00	floz
Insect control - Lygus (Carbine Zephyr)	June				Carbine 50WG Zephyr	2.50 8.00	oz floz
					Air application	1.00	acre
Insect control - Lygus (Leverage)	July				Leverage 2.7 Air application	5.00 1.00	floz acre
Apply growth regulator & KNO3	July				Mepex Gin Out Air application	2.00 1.00	floz acre
Fertilize - Water run (UN32)	July				UN32 lbN	30.00	lb N
Insect control - Aphid whitefly (Assail)	Aug				Assail 70WP Air application	1.10 1.00	oz acre
Defoliate cotton - 2X	Oct				Finish 6 Pro Ginstar	2.00 10.00	pint floz
	Oct				Air application Defol 5	1.00 1.00	acre gal
					Shark EW Air application	1.50 1.00	floz acre
PCA	Oct				PCA/consultant fee	1.00	acre
Harvest - 2X	Nov		Harvester 6-Row #1	0.24			
	Nov		Harvester 6-Row #2	0.24			

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Table 7. CONTINUED

Operation	Operation Month	Tractor	Implement	Field Labor Hrs/Acre	Material	Rate/ acre	Unit
Boll buggy - 2X	Nov	150 hp 4WD tractor	Boll buggy	0.12			
Build module (tractor #1) - 2X	Nov	105 hp 2WD tractor		0.24			
Build module	Nov		Module builder #1	0.15			
	Nov		Module builder #2	0.15			
Build module (tractor #2)	Nov	105 hp 4WD Tractor		0.18			
Assessments	Nov				CA Cotton Growers	3.00	bale
					Nat'l Cot. Council	3.00	bale
					Pink Bollworm Proj	3.00	bale
					USDA Classing Fee	3.00	bale
					Supima Association	3.00	bale
Chop stalks (post-harvest)	Nov	105 hp 2WD tractor	Mower - Flail 20'	0.12			
Disc residue - 2X (post-harvest)	Nov	230 hp track-type	Disc - Stubble 18'	0.29			
Pickup truck use	Nov		Pickup - 3/4 ton	0.27			
	Nov		Pickup - 1/2 ton	0.27			