1999

U.C. COOPERATIVE EXTENSION

SAMPLE COSTS TO PRODUCE

~ COTTON~

TRANSGENIC, HERBICIDE-RESISTANT VARIETIES
SAN JOAQUIN VALLEY

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INTRODUCTION

The detailed costs for transgenic, herbicide-resistant cotton production in the San Joaquin Valley are presented in this study. The hypothetical farm used in this report consists of 1,200 acres with 160 acres planted to transgenic cotton.

This study is intended as a guide only. It can be used to make production decisions, determine potential returns, prepare budgets and evaluate production loans. Sample costs given for labor, materials, equipment and contract services are based on current figures. Costs and practices detailed in this study will not be applicable to every situation. A blank, *Your Cost*, column is provided to enter your actual costs on.

Tables include:

For an explanation of calculations used for the study refer to the General Assumptions section, call the Department of Agricultural and Resource Economics, Cooperative Extension, University of California, Davis, California, (530) 752-3563 or call the farm advisor in your county.

Companion cost of production studies for cotton in the San Joaquin Valley are available and titled, "1999 Sample Costs To Produce Cotton, 40-Inch Row Acala Variety, San Joaquin Valley", 1999 Sample Costs To Produce Cotton, 30-Inch Row Acala Variety, San Joaquin Valley", and "1999 Sample Costs To Produce Cotton, Pima Variety, San Joaquin Valley".

Other cost studies are available for commodities grown in California. If you are interested in obtaining this or other studies please call the Department of Agricultural and Resource Economics, U.C. Davis, (530) 752-1515, or your county Cooperative Extension office.

ASSUMPTIONS

The following is the assumptions pertaining to sample costs of 38 and 40-inch row full season, transgenic, herbicide-resistant cotton production in the San Joaquin Valley. Practices described are not recommendations by the University of California, but represent production procedures and materials considered typical of a well managed field and row crop farm in this area. Some costs, practices, and materials may not be applicable to your situation nor used during every year. Additional ones not indicated may be needed. Establishment and cultural practices vary by grower and region; variations can be significant. These costs are on an annual, per acre basis. *The use of trade names 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.*

Land. The farm consists of 1,200 acres of land. Of the total acreage, 160 acres are rented and planted to transgenic cotton. The remaining 1,040 acres is planted to acala cotton and other field and row crops. Land is rented for $110 per acre on a cash basis. Other crops grown in rotation with cotton includes processing tomatoes, corn, wheat, alfalfa, and barley.

The 800 rented acres contains an irrigation system adequate to irrigate the total acreage. Therefore, the irrigations system cost is included as part of the land rental cost and is found in the Cash Overhead Costs sections of Tables 1, 2, and 3, and Annual Business Overhead section in Table 3.

Labor. Basic hourly wages for workers are $8.16 per hour for machine operators and $5.87 per hour for non-machine workers. Adding 34% for SDI, FICA, insurance and other benefits raises the total labor costs to $10.93 per hour for machine operators and $7.86 per hour non-machine labor. The labor for operations involving machinery is 20% higher than the operation time to account for the additional time involved in equipment set up, moving, maintenance and repair.

Row Spacing. In this study cotton is planted on 38 or 40-inch beds. Thirty-eight and forty-inch row spacing still constitutes the majority of the cotton acreage in the San Joaquin Valley. However, 30-inch, narrow row cotton is increasingly being grown in the San Joaquin Valley and can represent an alternative to standard, 38/40-inch row cotton. Please see the study titled, *1999 Sample Costs To Produce Cotton, 30-Inch Row, San Joaquin Valley*, for cost and cultural practices information.

Growers wishing to change row spacing need to be aware that changes in production costs and initial capital cost outlays due to differing material rates, operation time, and acquisition of new equipment, will occur. Previous studies indicate that cash production costs for 30-inch cotton will increase about 1% above total cash production costs for 40-inch cotton.

Earlier research suggest that yields for narrow row Acala cotton are also higher than 40-inch cotton. Based on trials, lint yields for 30-inch row cotton should increase about 7% without any increase in applied water or fertilizer. In most research, this potential 7% yield increase with 30 inch cotton has been consistently demonstrated in the northern San Joaquin Valley. Carefully consider local experience with 30 inch cotton yields in using yield estimates and production values. Growers should carefully examine both options to determine the best system for their farm.

PRODUCTION CULTURAL PRACTICES AND MATERIAL INPUTS

Tables 1-3 show the costs associated with ground preparation, planting, growing, and harvesting cotton. Land preparations begin in fall or spring and the crop is harvested in September of the following year.

Land Preparation. Land preparation begins with subsoiling the soil profile to 2 to 3 feet in order to break up any underlying hardpan which would affect root and water penetration. The ground is then disced twice to break up large clods of soil and smooth the ground.

The discing and subsoiling operations are done with a 215 hp, crawler. All other operations involving tractors are performed with 130 or 110 hp tractors.

Planting. A transgenic, herbicide-resistant cotton variety is seeded at a rate of 15.0 pounds per acre during April. Cotton is planted into 38 or 40-inch beds. Seed costs for transgenic, herbicide-resistant cotton includes a technology fee in addition to the actual price of the seed. Currently, technology fees vary from $35 to $54 per 50 pounds of seed. In this study the technology fee is included in the cost of the seed. Primary varieties available in 1999 are non-Acala California uplands. Starting in 2000 seed of some Acala versions of herbicide resistant varieties will be widely available.

Weed Control. A mix of materials and cultural practices are used to manage weeds in cotton. Genetically engineered herbicide tolerant cotton varieties with tolerance to glyphosate (Roundup Ready®) and bromoxynil (BXN®) provide the grower with an additional management option for weed control. The value in use of an herbicide tolerant variety will depend upon a number of factors including weed species present (annuals vs. perennials; broadleaf vs. grass), density and extent of weed population and cost of alternative herbicides.

A pre-emergent herbicide is applied and incorporated by discing in either late fall or spring before planting. This application controls many early season (February) annual broadleaf weeds and grasses. For early season weed escapes or weeds tolerant to the pre-plant herbicide application an over the top application of an herbicide (Roundup® [up to the fourth leaf stage] or Buctril® depending upon the variety) is sprayed from May to June. If necessary, a second application may be applied. The two cultivations in this study are done in May and June using rolling cultivators to eradicate weeds. Hand hoeing is also eliminated with this system.

With the availability of herbicide tolerant varieties growers must be cautioned, as is the case with any weed management system, the need to implement resistance management strategies to prevent weed resistance or weed species shifts to harder-to-control weeds. Strategies include crop rotation, herbicide rotation (within a cropping season and between crops), and control of weed escapes by tillage and or hand removal.

Irrigation. Water cost for irrigation represents a combination of district water and pumped water. Price per acre-foot for water will vary by grower depending on the particular irrigation district or various well characteristics and other irrigation factors. In this study a water cost of $50 per acre-foot is used. Based on current information it is estimated that 2.5 acre-feet of water would be applied during the growing season for cotton in this region, though this amount is dependent upon soil and climactic factors.

Successful water management and irrigation scheduling requires careful observation of water conditions of the soil and plant. Proper irrigation management can not only strike the correct balance between vegetative growth and fruit development, but it can also influence insect and disease pests.

Fertilization. Nitrogen is the primary nutrient applied to cotton throughout the growing season. 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. When cotton requires N-P-K during early growth a mixed fertilizer, such as 4-10-10, is applied at planting, but is not used in this study. UN-32 (32-0-0) is sidedressed at a rate of 150 pounds of N per acre during the month of May. A foliar application of KNO_3 (13-0-45) is mixed with the growth regulator and sprayed in July.

Insect And Mite Management. In this study, pest management is for mites, aphids, and lygus. All pest management decisions begin with careful monitoring to determine whether insect populations have reached economically damaging populations. All insect and mite sprays are aerial applications.

Insects. Damage by lygus consists of feeding on squares and small bolls. Damaged squares will usually drop off while damaged bolls may produce stained lint and injured seeds. In this study, it is assumed that the lygus population reaches an economic threshold in June and control consists of an insecticide application.

Cost estimates do not include applications of insect growth regulators and insecticides for silverleaf whitefly control which can be a major late-season pest in the southern San Joaquin Valley. Materials are available to aid in control, but costs are highly variable by location and timing of infestations.

Aphids cause physical damage to cotton leaves by their feeding and/or contamination of the lint by honeydew produced by aphids. Aphid feeding will also reduce the carbohydrates needed for boll maturation resulting in yield loss. In this study, an application of insecticides is made in July.

Mites. Feeding by mites on leaves reduces plant vigor and can lead to extensive defoliation. Loss of energy by the plant may cause a reduction in yield. A miticide treatment in May provides control.

Growth Regulator & Defoliation. A growth regulator is applied with foliar nutrients in July. Plant growth regulators control excessive vegetative growth and promote a balance between vegetative and reproductive growth. This results in a more uniform boll set leading to a once over opening mature green bolls and mechanical harvest.

Defoliants are applied prior to picking to aid harvest by causing the leaves to drop off. Defoliation is essential for efficient mechanical picking and diminishes staining of lint by leaves while reducing the amount of trash collected with the cotton. Proper timing and rates of defoliants are essential for good yields, lint quality, and efficient harvesting. A combination of defoliants are applied once in September and again in October.

Pesticides, rates, and cultural practices mentioned in this cost study and shown in Table 2 are some of those listed in the *Integrated Pest Management For Cotton In The Western Region Of The United States, UC Pest Management Guidelines,* and *Insecticide Resistance Management in San Joaquin Valley Cotton.* All pest management strategies need to be tailored to meet specific requirements and should be discussed with a pest control advisor or local farm advisor. Written recommendations are required for many pesticides and are made by licensed pest control advisors. For information concerning pesticide use permits, contact the local county Agricultural Commissioner's office.

Equipment Cash Costs. Equipment costs fall into three categories; capital recovery, cash overhead, and operating costs. The cash overhead and capital recovery costs will be discussed in later sections. The operating costs consist of fuel, lubrication, and repairs.

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 hp, and type of fuel used. The fuel and repair cost per acre for each operation in Table 2 is determined by multiplying the total hourly operating cost in Table 6 for each piece of equipment used for the cultural practice by the number of hours per acre for that operation. Tractor time is 10% higher than implement time (Operation Time) for a given operation to account for fueling, moving equipment, and setup time. Prices for on-farm delivery of diesel and gasoline are $0.62 and $1.02 per gallon, respectively.

Harvest. It is assumed that the farm in this cost study owns two cotton harvesters and a module builder which perform harvest operations. The cotton is dumped from the harvester directly into the module builder which presses loose seed cotton into a dense and economical unit for transportation to the gin.

Harvesting is a crucial operation in a cotton cropping system. 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.

Equipment for harvest operations are inventoried in investment costs on Table 3, and labor, fuel, repairs, depreciation, and operating interest, are calculated as harvest costs in Table 1. If a grower contracts his harvest operation all harvesting equipment should be removed from investment costs in Table 3, its appropriate cost should be subtracted from harvest costs in Table 1 and a custom charge would then be added.

Transportation. Transportation costs are based on roundtrip distance from the field to the gin and module weight. This can add significant costs to producing cotton. Fields closer to the gin have lower hauling costs than those further away. For example a round-trip of 1 to 10 miles might cost $0.30 per hundredweight (cwt) while one of 111 to 120 miles, round-trip may cost $1.30 per cwt. Hauling companies may also have a surcharge for modules less than a minimum weight. Hauling cost are included as part of the ginning cost.

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. Currently, ginning costs are approximately $3.35 per cwt. With a lint yield of 12.5 cwt per acre ginning (and transportation) costs in this study are $58 per acre. In this study, ginning fees are covered by the seed credit and is not included as a line-item cost.

Cotton gins charge growers for compressing lint into bales. This is separate from ginning costs and for this study a charge of $7.50 per bale is included in Tables 1, 2, 3, and 4.

Assessments. Cotton is assessed several fees for different organizations and purposes. Both mandatory and voluntary assessments are discussed below.

USDA-HVI. The USDA levies a fee for High Volume Instrumentation (HVI) classing. This determines the classification cotton is graded for marketing purposes. Growers are mandated with a $1.55 per bale fee.

Cotton Incorporated. Cotton Incorporated was created by a federal marketing order and is overseen by the Cotton Board. Cotton Inc. provides funds for industry research and promotion and currently requires growers pay $1.00 per bale plus 0.5% of the lint sale price.

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 to fund the project.

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 $0.45 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 and charges $0.12 per bale. Participation in this organization is voluntary.

Yields. The crop in this study is assumed to yield 1,250 pounds of lint and 2,222 pounds of seed per acre. Returns for various lint yields, government support program, and prices are shown in Table 6.

Returns. An estimated price of a $0.72 per pound of lint is used to calculate returns above several levels of cost. Cotton gins pay growers $25 per bale for seed credit above grower ginning costs, if any. Table 6 indicates the effects on grower returns based on varying yields and returns. Breakeven points based on estimated costs are calculated for both yields and return prices in Table 7.

This study also includes income received from the Production Flexibility Contract (PFC) program administered by the USDA Farm Service Agency. The PFC income is calculated by taking 85% of the program payment yield and multiplying it times the payment rate. In this study the California program payment yield is 1,074 pounds of lint per acre and the payment rate is $0.076 per pound of lint. Program support is calculated as

1,074 pounds/acre ? 0.85 ? $0.076/pound = $69.38/acre .

In this study, every cotton acre is assumed to be covered by program payments. In reality, however, maximum payment limitations may leave some acres uncovered effectively reducing the per cwt income. Maximum contract payments are limited to $40,000 per person. However, in 1998 congress allocated additional funds for contract payments. These extra funds increase payments to individual growers by almost 50% of their 1998 PFC payment. This was a one time allocations and is not expected to be available for future years.

The PFC payment rate is set by a number of factors at harvest time. Because the actual rate is not determined until the end of each growing season the USDA sets future PFC payment rates in a range. PFC payment rates change annually. Contact the local Farm Service Agency office for further information about the support program.

Risk. The risks associated with producing and marketing field cotton 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 of cotton production. A market channel should be determined before cotton is planted and brought into production. Though, not used in this study, crop insurance is a risk management tool available to growers.

OVERHEAD COSTS

Cash Overhead. Cash overhead consists of various cash expenses paid out during the year that are assigned to the whole farm and not to a particular operation. These costs include property taxes, interest on operating capital, office expense, liability and property insurance, and investment repairs. Cash overhead costs are included in Tables 1, 2, 3, and 4.

Property Taxes. Counties charge a base property tax at the rate of 1% on the assessed value of the property including land, equipment, buildings, and improvements. In some counties special assessment districts exist and charge additional taxes on property. 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. Land value is assumed to remain unchanged.

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 9.69% per year. This interest rate is the going market cost of borrowed funds. The cost of postharvest operations are discounted back to the harvest month using a negative interest charge.

Insurance. Insurance for farm investments varies depending on the assets included and the amount of coverage. Property insurance provides coverage for property loss and is charged at 0.713% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs $1,044 for the entire farm or $0.87 per acre.

Office Expense: Office and business expenses are estimated at $25 per acre. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, road maintenance, etc.

Non-cash Overhead. Non-cash overhead is calculated as the capital recovery cost for equipment and other farm investments. This study shows the current purchase price for new equipment and then adjusts the price to 60% of new cost to indicate a mix of new and used equipment. Annual ownership costs for equipment and investments are shown in Tables 1, 2, and 4 as the capital recovery cost on an annual per acre basis.

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). Put another way, it is equivalent to the annual payment on a loan for the investment with the downpayment 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 calculation for annual capital recovery costs is as follows.

$$\left(\text{Purchase Price} - \text{Salvage Value}\right) \times \text{Capital Recovery Factor} + \text{Salvage Value} \times \text{Interest Rate}$$

Salvage Value. Salvage value is an estimate of the remaining market value of an investment at the end of its useful life. It is calculated differently for different investments. For farm machinery (e.g., tractors and implements) the remaining value is a percentage of the new cost of the investment. Salvage value is calculated as

$$\text{New Price} \times \%\,\text{Remaining Value}$$

Salvage value for other investments including buildings and miscellaneous equipment is zero. The salvage value for land is equal to the purchase price because land does not depreciate. Salvage value for investments can vary. The purchase price and salvage value for certain equipment and investments are shown in Table 4.

Capital Recovery Factor. Capital recovery factor is the amortization factor or annual payment whose present value at compound interest is 1. It is the function of the interest rate and years of life of the equipment.

Interest Rate. The interest rate of 7.40% used to calculate capital recovery cost is the United States Department of Agriculture-Economic Reporting Service's (USDA-ERS) ten year average of California's agricultural sector long-run real rate of return to production assets from current income. It is used to reflect the long-term realized rate of return to these specialized resources that can only be used effectively in the agricultural sector, not including inflation. In
other words, the next best alternative use for these resources is in another agricultural enterprise.

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Table 1.

U.C. COOPERATIVE EXTENSION
COSTS PER ACRE TO PRODUCE COTTON
SAN JOAQUIN VALLEY – 1999
Transgenic, Herbicide-Resistant Varieties, 40-Inch Row

Labor Rate: $10.93/hr. machine labor
$7.86/hr. non-machine labor

Interest Rate: 9.69%
Yield per Acre: 1,250 Lb of Lint

Operation	Operation Time (Hrs/A)	Cash and Labor Costs per Acre: Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/ Rent	Total Cost	Your Cost
Cultural:							
Rip Fields	0.48	6	9	0	0	15	
Primary Discing 2X	0.29	4	6	0	0	10	
Spray & Incorporate Herbicide	0.20	3	3	8	0	14	
List Beds	0.15	2	2	0	0	4	
Make Ditch	0.06	1	1	0	0	1	
Irrigate	5.00	39	0	125	0	164	
Close Ditch	0.06	1	1	0	0	1	
Cultivate - Preplant	0.13	2	1	0	0	3	
Plant	0.25	3	3	53	0	59	
Uncap Beds	0.14	2	1	0	0	3	
Weed Control - Over-The-Top Spray	0.29	4	3	11	0	18	
Cultivate - 2X	0.26	3	2	0	0	6	
Insect Control - Mites	0.00	0	0	30	8	38	
Weed Control - Post Directed Herbicide Spray	0.29	4	3	11	0	18	
Insect Control - Lygus	0.00	0	0	30	8	38	
Insect Control - Aphids	0.00	0	0	16	8	25	
Apply Growth Regulator & KNO^3	0.00	0	0	13	8	21	
Fertilizer - Sidedress UN-32	0.25	3	2	33	2	40	
Defoliate Cotton 2X	0.00	0	0	46	16	62	
Advising Services	0.00	0	0	0	10	10	
Pickup Truck Use	0.24	6	1	0	0	7	
TOTAL CULTURAL COSTS	8.09	83	38	376	60	557	
Harvest:							
Harvest	0.65	9	14	0	0	22	
Build Module & Tarp	0.17	4	2	4	0	10	
Haul & Gin Cotton	0.00	0	0	0	0	0	
Compress Cotton	0.00	0	0	0	19	19	
TOTAL HARVEST COSTS	0.82	13	16	4	19	51	
Assessments:							
USDA - HVI	0.00	0	0	3	0	3	
Cotton Incorporated	0.00	0	0	7	0	7	
Cotton Pest Control Project	0.00	0	0	5	0	5	
National Cotton Council	0.00	0	0	1	0	1	
California Cotton Growers & Ginners Assc.	0.00	0	0	0	0	0	
TOTAL HARVEST COSTS	0.00	0	0	16	0	16	
Land Rent						110	
Property Taxes						4	
Property Insurance						3	
Investment Repairs						1	
TOTAL CASH OVERHEAD COSTS						148	
TOTAL CASH COSTS/ACRE						813	
TOTAL CASH COSTS/LB						0.65	

CAPITAL RECOVERY COSTS (7.4% Interest Rate):

Investment	Per producing Acre	-- Annual Cost -- Capital Recovery	Total
Shop Buildings	67	6	6
Fuel Tanks & Pumps	2	0	0
Shop Tools	11	1	1
Fuel Wagon	15	2	2
Tool Carrier	13	1	1
Siphon Tubes	2	0	0
Equipment	594	93	93
TOTAL CAPITAL RECOVERY COSTS	705	104	104
TOTAL COSTS/ACRE			917
TOTAL COSTS/LB			0.73

Table 2.

U.C. COOPERATIVE EXTENSION
COSTS AND RETURNS PER ACRE TO PRODUCE COTTON
SAN JOAQUIN VALLEY - 1999
Transgenic, Herbicide-Resistant Varieties, 40-Inch Row

Labor Rate: $10.93/hr. machine labor
$7.86/hr. non-machine labor

Interest Rate: 9.69%

	Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Lint	1,250	Lb	0.72	900	
Production Flexibility Contract (PFC)	913	Lb	0.076	69	
Cottonseed	Seed credit used to pay ginning fees.			0	
TOTAL GROSS RETURNS FOR COTTON				969	
OPERATING COSTS					
Herbicide:					
Treflan Pro 5	1.50	Pint	5.36	8	
Roundup Ultra	4.00	Pint	5.55	22	
Irrigation:					
Water	2.50	AcFt	50.00	125	
Seed:					
Transgenic Cotton Seed	15.00	Lb	3.52	53	
Miticide:					
Zephyr	6.00	Oz	5.08	30	
Custom:					
Air Application	6.00	Acre	8.00	48	
Ginning	1.00	Acre	0.01	0	
Compression Fee	2.50	Bale	7.50	19	
Insecticide:					
Capture	6.00	Oz	5.08	30	
Provado	3.75	Oz	4.40	16	
Growth Regulator:					
Pix	0.50	Pint	15.42	8	
Fertilizer:					
13-0-46	10.00	Lb	0.566	6	
UN-32	150.00	Lb N	0.22	33	
Rent:					
Fertilizer Applicator	1.00	Acre	1.50	2	
Defoliant:					
Prep	2.00	Pint	12.87	26	
Def	2.00	Pint	6.70	13	
Sodium Chloride	1.00	Gal	0.987	1	
Starfire	16.00	Oz	0.34	5	
Harvest Aid:					
Tarps - Module	0.06	Tarp	62.00	4	
Assessment:					
HVI Classing Fee	2.50	Bale	1.25	3	
Cotton Inc.	2.50	Bale	2.80	7	
Pink Bollworm Project	2.50	Bale	2.00	5	
National Cotton Council	2.50	Bale	0.45	1	
California Cotton Growers & Ginners Assc.	2.50	Bale	0.12	0	
Contract:					
PCA/Consultant Fee	1.00	Acre	10.00	10	
Labor (machine)	5.35	Hrs	10.93	58	
Labor (non-machine)	5.26	Hrs	7.86	41	
Fuel - Gas	0.48	Gal	1.02	0	
Fuel - Diesel	39.25	Gal	0.62	24	
Lube				4	
Machinery repair				31	
Interest on operating capital @ 9.69%				29	
TOTAL OPERATING COSTS/ACRE				662	
TOTAL OPERATING COSTS/LB				0.53	
NET RETURNS ABOVE OPERATING COSTS				304	

Table 2. continued

CASH OVERHEAD COSTS:	
Office Expense	25
Liability Insurance	1
Sanitation Facilities	3
Land Rent	110
Property Taxes	4
Property Insurance	3
Investment Repairs	1
TOTAL CASH OVERHEAD COSTS/ACRE	147
TOTAL CASH COSTS/ACRE	813
TOTAL CASH COSTS/LB	0.65
CAPITAL RECOVERY COSTS (7.4% Interest Rate):	
Shop Buildings	6
Fuel Tanks & Pumps	0
Shop Tools	1
Fuel Wagon	2
Tool Carrier	1
Siphon Tubes	0
Equipment	93
TOTAL CAPITAL RECOVERY COSTS/ACRE	103
TOTAL COSTS/ACRE	917
TOTAL COSTS/LB	0.73
NET RETURNS ABOVE TOTAL COSTS	53

Table 3. U.C. COOPERATIVE EXTENSION
MONTHLY CASH COSTS PER ACRE TO PRODUCE COTTON
SAN JOAQUIN VALLEY – 1999
Transgenic, Herbicide-Resistant Varieties, 40-Inch Row

Beginning NOV 98 Ending NOV 99	NOV 98	DEC 98	JAN 99	FEB 99	MAR 99	APR 99	MAY 99	JUN 99	JUL 99	AUG 99	SEP 99	OCT 99	NOV 99	TOTAL
Cultural:														
Rip Fields	15													15
Primary Discing 2X	10													10
Spray & Incorporate Herbicide	14													14
List Beds	4													4
Make Ditch				0				0	0					1
Irrigate				41				30	62	31				164
Close Ditch				0				0			0			1
Cultivate - Preplant					3									3
Plant						59								59
Uncap Beds						3								3
Weed Control - Over-The-Top Spray							18							18
Cultivate - 2X							3	3						6
Insect Control - Mites							38							38
Weed Control - Post Directed Spray								18						18
Insect Control - Lygus								38						38
Insect Control - Aphids									25					25
Apply Growth Regulator & KNO[3]									21					21
Fertilizer - Sidedress UN-32									40					40
Defoliate Cotton 2X												62		62
Advising Services	1	1	1	1	1	1	1	1	1	1	1	1	1	10
Pickup Truck Use	1	1	1	1	1	1	1	1	1	1	1	1		7
TOTAL CULTURAL COSTS	44	1	1	44	4	64	60	92	149	32	2	63	1	558
Harvest:														
Harvest													22	22
Build Module & Tarp													10	10
Haul & Gin Cotton													0	0
Compress Cotton													19	19
TOTAL HARVEST COSTS													68	68
Assessment:														
USDA - HVI													3	3
Cotton Incorporated													7	7
Cotton Pest Control Project													5	5
National Cotton Council													1	1
California Cotton Growers & Ginners Assc.													0	0
TOTAL ASSESSMENT COSTS													68	68
Postharvest:														
Chop Stalks													4	4
Disc Residue - 2X													6	6
TOTAL POSTHARVEST COSTS													10	10
Interest on operating capital	0	0	0	1	1	1	2	3	4	4	4	4	5	29
TOTAL OPERATING COSTS/ACRE	44	2	2	44	5	65	62	94	153	36	6	67	84	665
TOTAL OPERATING COSTS/LB	0.04	0.00	0.00	0.04	0.00	0.05	0.05	0.08	0.12	0.03	0.00	0.05	0.07	0.53
CAPITAL RECOVERY COSTS:														
Office Expense	2	2	2	2	2	2	2	2	2	2	2	2		25
Liability Insurance			1											1
Sanitation Facilities	0	0	0	0	0	0	0	0	0	0	0	0	0	3
Land Rent													110	110
Property Taxes			2						2					4
Property Insurance						2						2		3
Investment Repairs	0	0	0	0	0	0	0	0	0	0	0	0		1
TOTAL CAPITAL RECOVERY COSTS	2	2	5	2	2	4	2	2	5	2	2	4	110	148
TOTAL CASH COSTS/ACRE	47	4	7	47	7	69	65	97	158	39	8	71	194	813
TOTAL CASH COSTS/LB	0.04	0.00	0.01	0.04	0.01	0.06	0.05	0.08	0.13	0.03	0.01	0.06	0.16	0.65

U.C. COOPERATIVE EXTENSION

Table 4. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS
SAN JOAQUIN VALLEY - 1999
Transgenic, Herbicide-Resistant Varieties, 40-Inch Row

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	-- Cash Overhead -- Insur-ance	Taxes	Total
99	110 HP 2WD Tractor	70,050	10	20,692	8,689	324	454	9,466
99	130 HP 2WD Tractor	90,841	10	26,833	11,268	420	588	12,276
99	250 HP Crawler	176,963	10	52,272	21,951	817	1,146	23,914
99	Cultivator Rolling - 6 Row	4,676	12	648	566	19	27	612
99	Cultivator Rolling - 6 Row	4,676	12	648	566	19	27	612
99	Cultivator Rolling - 6 Row	4,676	12	648	566	19	27	612
99	Disc - Finish 21'	19,595	12	2,714	2,372	80	112	2,563
99	Disc - Stubble 18'	38,610	10	6,828	5,114	162	227	5,504
99	Disc - Tandem 24'	19,057	10	3,370	2,524	80	112	2,716
99	Ditcher	4,070	12	564	493	17	23	532
99	Flail Chopper	14,593	10	2,581	1,933	61	86	2,080
99	Harvester - 2 Row	117,700	5	40,895	21,959	565	793	23,318
99	Harvester - 2 Row	117,700	5	40,895	21,959	565	793	23,318
99	Hooded Sprayer	6,700	10	1,185	887	28	39	955
99	Lister - 6 Row	1,565	12	217	189	6	9	205
99	Module Builder	24,303	10	4,011	3,240	101	142	3,482
99	Pickup - 1/2 Ton	16,000	7	6,069	2,318	79	110	2,507
99	Pickup - 3/4 Ton	16,000	7	6,069	2,318	79	110	2,507
99	Planter - 6 Row	15,015	10	2,655	1,989	63	88	2,140
99	Rear Blade - 10'	2,418	10	428	320	10	14	345
99	Saddle Tank - 300 Gal	3,218	10	569	426	14	19	459
99	Spray Boom - 20'	482	10	85	64	2	3	69
99	Subsoiler - 8'	8,022	10	1,419	1,063	34	47	1,143
99	Subsoiler - 8'	8,022	10	1,419	1,063	34	47	1,143
99	Uncapper - 6 Row	5,814	10	1,028	770	24	34	829
TOTAL		790,766		224,742	114,607	3,620	5,078	123,305
60% of New Cost *		474,460		134,845	68,764	2,172	3,047	73,983

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

ANNUAL INVESTMENT COSTS

Description	Price	Yrs Life	Salvage Value	Capital Recovery	-------Cash Overhead ------- Insur-ance	Taxes	Repairs	Total
INVESTMENT								
Fuel Tanks & Pumps	1,838	20	184	175	7	10	22	214
Fuel Wagon	18,105	10	1,811	2,497	71	100	362	3,030
Shop Buildings	80,991	20	8,099	7,695	318	445	891	9,349
Shop Tools	13,568	20	1,357	1,289	53	75	149	1,566
Siphon Tubes	2,181	20	218	207	9	12	24	252
Tool Carrier	15,592	20	1,559	1,481	61	86	171	1,799
TOTAL INVESTMENT	132,275		13,228	13,345	519	728	1,619	16,210

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Land Rent	500	Acre	110.00	55,000
Liability Insurance	1,200	Acre	0.80	960
Office Expense	1,200	Acre	25.00	30,000
Sanitation Facilities	1,200	Acre	3.15	3,780

Table 5.

U.C. COOPERATIVE EXTENSION
HOURLY EQUIPMENT COSTS
SAN JOAQUIN VALLEY – 1999
Transgenic, Herbicide-Resistant Varieties, 40-Inch Row

		COSTS PER HOUR						
	Actual		-- Cash Overhead --		---------- Operating ----------			
Description	Hours Used	Capital Recovery	Insur-ance	Taxes	Repairs	Fuel & Lube	Total Oper.	Total Costs/Hr.
110 HP 2WD Tractor	1,371.3	3.80	0.14	0.20	3.12	4.55	7.67	11.81
130 HP 2WD Tractor	1,199.2	5.64	0.21	0.29	4.04	5.38	9.42	15.57
250 HP Crawler	1,599.2	8.24	0.31	0.43	4.50	10.34	14.84	23.81
Cultivator Rolling - 6 Row	101.5	3.35	0.11	0.16	0.92	0.00	0.92	4.53
Cultivator Rolling - 6 Row	165.5	2.05	0.07	0.10	0.92	0.00	0.92	3.14
Cultivator Rolling - 6 Row	101.5	3.35	0.11	0.16	0.92	0.00	0.92	4.53
Disc - Finish 21'	166.0	8.57	0.29	0.40	3.05	0.00	3.05	12.31
Disc - Stubble 18'	199.8	15.36	0.49	0.68	6.16	0.00	6.16	22.68
Disc - Tandem 24'	200.0	7.57	0.24	0.34	3.04	0.00	3.04	11.19
Ditcher	166.0	1.78	0.06	0.08	1.08	0.00	1.08	3.00
Flail Chopper	199.5	5.81	0.18	0.26	5.95	0.00	5.95	12.20
Harvester - 2 Row	178.8	73.71	1.90	2.66	12.86	6.62	19.48	97.75
Harvester - 2 Row	178.8	73.71	1.90	2.66	12.86	6.62	19.48	97.75
Hooded Sprayer	142.8	3.73	0.12	0.17	1.15	0.00	1.15	5.16
Lister - 6 Row	165.5	0.69	0.02	0.03	0.31	0.00	0.31	1.05
Module Builder	83.3	23.33	0.73	1.02	6.28	0.00	6.28	31.35
Pickup - 1/2 Ton	285.0	4.88	0.17	0.23	1.16	1.17	2.33	7.61
Pickup - 3/4 Ton	285.0	4.88	0.17	0.23	1.16	1.17	2.33	7.61
Planter - 6 Row	150.0	7.96	0.25	0.35	3.94	0.00	3.94	12.50
Rear Blade - 10'	200.0	0.96	0.03	0.04	0.66	0.00	0.66	1.69
Saddle Tank - 300 Gal	292.8	0.87	0.03	0.04	0.85	0.00	0.85	1.79
Spray Boom - 20'	142.8	0.27	0.01	0.01	0.13	0.00	0.13	0.41
Subsoiler - 8'	199.2	3.20	0.10	0.14	1.79	0.00	1.79	5.24
Subsoiler - 8'	199.2	3.20	0.10	0.14	1.79	0.00	1.79	5.24
Uncapper - 6 Row	199.5	2.32	0.07	0.10	1.17	0.00	1.17	3.66

Table 6.

U.C. COOPERATIVE EXTENSION
RANGING ANALYSIS
SAN JOAQUIN VALLEY - 1999
Transgenic, Herbicide-Resistant Varieties, 40-Inch Row

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE COTTON

	YIELD (LB/ACRE)						
	900	1,000	1,100	1,250	1,300	1,400	1,500
OPERATING COSTS/ACRE:							
Cultural Cost	558	558	558	558	558	558	558
Harvest & Assessment Costs	49	55	60	68	71	76	82
Postharvest Cost	10	10	10	10	10	10	10
Interest on operating capital	29	29	29	29	29	30	30
TOTAL OPERATING COSTS/ACRE	646	651	657	665	668	673	679
TOTAL OPERATING COSTS/LB	0.72	0.65	0.6	0.53	0.51	0.48	0.45
CASH OVERHEAD COSTS/ACRE	148	148	148	148	148	148	148
TOTAL CASH COSTS/ACRE	794	799	805	813	816	821	827
TOTAL CASH COSTS/LB	0.88	0.8	0.73	0.65	0.63	0.59	0.55
CAPITAL RECOVERY COSTS/ACRE	104	104	104	104	104	104	104
TOTAL COSTS/ACRE	897	903	908	917	919	925	930
TOTAL COSTS/LB	1.00	0.90	0.83	0.73	0.71	0.66	0.62

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR COTTON

PRICE (DOLLARS/LB)		YIELD (LB/ACRE)						
Lint		900	1,000	1,100	1,250	1,300	1,400	1,500
	PFC*	913	913	913	913	913	913	913
0.5	0.076	-81	-32	18	92	117	166	216
0.58	0.076	-36	18	73	154	182	236	291
0.65	0.076	9	68	128	217	247	306	366
0.72	0.076	54	118	183	279	312	376	441
0.79	0.076	99	168	238	342	377	446	516
0.86	0.076	144	218	293	404	442	516	591
0.94	0.076	189	268	348	467	507	586	666

*Production Flexibility Contract

NET RETURNS PER ACRE ABOVE CASH COSTS FOR COTTON

PRICE (DOLLARS/LB)		YIELD (LB/ACRE)						
Lint		900	1,000	1,100	1,250	1,300	1,400	1,500
	PFC*	913	913	913	913	913	913	913
0.5	0.076	-229	-180	-130	-56	-31	18	68
0.58	0.076	-184	-130	-75	7	34	88	143
0.65	0.076	-139	-80	-20	69	99	158	218
0.72	0.076	-94	-30	35	132	164	228	293
0.79	0.076	-49	20	90	194	229	298	368
0.86	0.076	-4	70	145	257	294	368	443
0.94	0.076	41	120	200	319	359	438	518

*Production Flexibility Contract

NET RETURNS PER ACRE ABOVE TOTAL COSTS FOR COTTON

PRICE (DOLLARS/LB)		YIELD (LB/ACRE)						
Lint		900	1,000	1,100	1,250	1,300	1,400	1,500
	PFC*	913	913	913	913	913	913	913
0.5	0.076	-333	-284	-234	-160	-135	-86	-36
0.58	0.076	-288	-234	-179	-97	-70	-16	39
0.65	0.076	-243	-184	-124	-35	-5	54	114
0.72	0.076	-198	-134	-69	28	60	124	189
0.79	0.076	-153	-84	-14	90	125	194	264
0.86	0.076	-108	-34	41	153	190	264	339
0.94	0.076	-63	16	96	215	255	334	414

*Production Flexibility Contract

Table 7.

U.C. COOPERATIVE EXTENSION
COSTS AND RETURNS / BREAKEVEN ANALYSIS
SAN JOAQUIN VALLEY - 1999
Transgenic, Herbicide-Resistant Varieties, 40-Inch Row

COSTS AND RETURNS - PER ACRE BASIS

Crop	1. Gross Returns	2. Operating Costs	3. Net Returns Above Oper. Costs (1-2)	4. Cash Costs	5. Net Returns Above Cash Costs (1-4)	6. Total Costs	7. Net Returns Above Total Costs (1-6)
Cotton	969	665	304	813	157	917	53

COSTS AND RETURNS - TOTAL ACREAGE

Crop	1. Gross Returns	2. Operating Costs	3. Net Returns Above Oper. Costs (1-2)	4. Cash Costs	5. Net Returns Above Cash Costs (1-4)	6. Total Costs	7. Net Returns Above Total Costs (1-6)
Cotton	484,694	332,478	152,216	406,434	78,260	458,341	26,353

BREAKEVEN PRICES PER YIELD UNIT

			---------- Breakeven Price To Cover ----------		
CROP	Base Yield (Units/Acre)	Yield Units	Operating Costs	Cash Costs	Total Costs
			--------- $ per Yield Unit ---------		
Cotton	1,250	Lb	0.49	0.60	0.68

BREAKEVEN YIELDS PER ACRE

			---------- Breakeven Yield To Cover ----------		
CROP	Yield Units	Base Price ($/Unit)	Operating Costs	Cash Costs	Total Costs
			--------- Yield Units /Acre ---------		
Cotton	Lb	0.72	857.40	1,048.20	1,182.00