

# U.C. COOPERATIVE EXTENSION

## SAMPLE COSTS TO PRODUCE BARLEY Irrigated, Double Cropped IN THE SAN JOAQUIN VALLEY - 1990

by

Marsha Campbell, Stanislaus Co.  
Lee Jackson, Extension Agronomist, U.C. Davis  
Alan Fulton, Kern Co.  
Bruce Roberts, Kings Co.  
Ron Vargas, Madera Co.  
Bill Weir, Merced & Fresno Co.  
Steve Wright, Tulare Co.  
Karen Klonsky, Extension Economist, U.C. Davis  
and  
Pete Livingston, Staff Research Associate, U.C. Davis

The detailed costs for irrigated, double cropped barley production in the San Joaquin Valley are presented in this study. The hypothetical farm used in this report consists of 1,200 acres of which 300 acres are in barley production. The remainder of the farm is planted to different field crops.

Practices described are based on those production procedures considered typical for this crop and area. Sample costs given for labor, materials, equipment and contract services are based on current figures. Some costs and practices detailed in this study may not be applicable to your situation. This study is only intended as a guide and can be used in making production decisions, determining potential returns, preparing budgets and evaluating production loans. A blank **Your Costs** column is provided to enter your actual costs on **Tables 1 and 2, Costs Per Acre To Produce Barley, Irrigated, Double Cropped** and **Costs And Returns Per Acre To Produce Barley, Irrigated, Double Cropped**, respectively.

This study consists of **General Assumptions for Producing Barley, Irrigated, Double Cropped** and seven tables.

- Table 1. Costs Per Acre To Produce Barley**
- Table 2. Costs And Returns Per Acre To Produce Barley**
- Table 3. Monthly Cash Costs Per Acre to Produce Barley**
- Table 4. Whole Farm Annual Equipment, Investment And Business Overhead Costs**
- Table 5. Hourly Equipment Costs**
- Table 6. Ranging Analysis**
- Table 7. Costs And Returns/Breakeven Analysis**

For an explanation of calculations used for the study refer to the attached General Assumptions or call the Department of Agricultural Economics, Cooperative Extension, University of California, Davis, California, (916) 752-3589 or call the farm advisor in the county of interest.

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**GENERAL ASSUMPTIONS FOR PRODUCING  
BARLEY  
Irrigated, Double Cropped  
San Joaquin Valley - 1990  
U.C. Cooperative Extension**

The following is a description of some general assumptions pertaining to sample costs of double cropped barley production in the San Joaquin Valley. The costs are based on cultural practices used by growers in this region, some of which may not be used during every production year. Costs are represented 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.

**1. LAND:**

This cost of production study is based on a 1,200 acre field and row crop farm of which 300 acres is dedicated to growing double cropped barley. Other crops grown on the same acreage in rotation with barley might include oat hay, field corn, alfalfa hay, wheat, corn silage, cotton, etc.

**2. RENT AGREEMENT:**

The land used for barley production in this study is rented on a cash rent basis. Under this agreement the landowner receives \$100 per acre from the tenant. Since the rented land is double cropped only half of the land rent, or \$50, is allocated to the barley crop. The landowner maintains the irrigation system on the rented land. Interest cost for land and irrigation system is incurred by the landowner. Rent is shown as a cash overhead cost in **Tables 1, 2, 3 and 4.**

**3. CULTURAL PRACTICES:**

The cultural, pesticide and fertilizer inputs for the production of double cropped barley vary considerably from grower to grower and field to field. Land preparation operations such as disking, land planing and chiselling, are done with a 200 hp (horsepower) four wheel drive (4wd) tractor during the months of November and December. After the final disking, successive operations are performed with a 130 hp wheel tractor.

Fertilization begins with 100 pounds of nitrogen in the form of  $\text{NH}_3$  spread by custom operator. The fertilizer is spread on the field in December just prior to planting. The remaining 25 pounds of nitrogen is injected into the water once irrigation starts. A total of 125 pounds of nitrogen per acre is used by the crop during the year.

Barley is planted on flat ground with a grain drill. A seeding rate of 100 pounds per acre is used.

Pest control starts in February with applications of both an herbicide and an insecticide. Di-syston is used to control several species of aphids, while 2,4-D manages many different broadleaf plants. All pesticides in this study are custom applied by air.

Water costs in the San Joaquin Valley range widely depending on whether it is pumped from a well, if it is supplied by a water district and even which water district supplies the water. In this study, a cost of \$27.24 per acre foot is assumed. Barley requires 18 acre

inches of water during the growing season and is applied in five irrigations with nitrogen fertilizer injected into the water during the March irrigation.

The pesticides and rates mentioned in this cost study are a few of those that are listed in the UC IPM Small Grains Pest Management Guidelines and the Integrated Pest Management For Small Grains manual. Cultural practices for the production of double cropped barley vary from grower to grower and region to region. The practices and inputs used in this cost study serve only as a sample or guide. Variations can be significant. Contact your local farm advisor for advice on production practices.

#### **4. HARVEST:**

In this cost study the barley is custom harvested. Custom harvest rates are different with each custom harvester. Some charge on a straight per acre basis, some use a per ton rate, while others use a smaller per acre charge plus a smaller per ton charge. In this study a fee of \$27 per acre for harvesting is paid by the grower. A grower that harvests their own barley would subtract the custom charge from harvest costs in **Table 1** and all equipment for harvest operations should be inventoried in investment costs in **Table 4**, and labor, fuel, repairs, depreciation, and interest on investment costs would then be added to harvest costs in **Table 1**.

#### **5. YIELDS & RETURNS:**

The crop yield used in this study is 2.5 tons per acre. An estimated price of a \$120 per ton is used in this study.

#### **6. LABOR:**

Basic hourly wages for workers are \$6.20 and \$4.75 per hour for machine and non-machine labor, respectively. Adding 34% for SDI, FICA, insurance and other benefits gives the labor rates shown of \$8.31 per hour for machine labor and \$6.37 per hour for non-machine labor. The labor for operations using machinery are 20% higher than the operation time to account for the extra labor involved in equipment set-up, moving, maintenance and repair. Wages for managers are not included as a cash cost. Any returns above total costs are considered a return to management and risk.

#### **7. INVESTMENT:**

The investments shown in **Table 4** are those that can be partially or completely allocated to the double cropped barley enterprise. All of the investments used in this study can be allocated to all of the enterprises of the 1,200 acre farm. Annual investments shown in **Table 1** represents depreciation and opportunity cost for each investment on an annual per acre basis.

#### **8. OVERHEAD:**

County taxes are calculated as 1% of the average of the equipment, buildings and improvements. Insurance on assets is charged at 0.5% of the average value of the asset over its useful life. Liability insurance covers accidents on the farm and costs \$850 for the entire farm or \$0.71 per acre. Office and business costs are estimated at \$30 per acre for the ranch. These expenses include office supplies, phone, bookkeeping, accounting, legal fees, road preparation and maintenance, etc. All of the overhead is charged at half of the per acre

cost shown in **Table 4** since the acreage is double cropped.

#### **9. INTEREST:**

Interest on operating capital is based on cash costs and is calculated monthly for eleven months until harvest at a nominal rate of 9.00% per year. Interest is also charged on investment at 4% per year to account for income foregone that could be received from an alternative investment (opportunity cost) and is based on the average value of the land, orchard, buildings and equipment. Real interest rates are used on investments, so no adjustment for inflation have been included. Nominal interest rates would contain a factor for inflation which might run 1% to 4% higher than real interest rates, to account for inflation.

#### **10. EQUIPMENT COSTS:**

In allocating the equipment costs per acre, the following calculations were made and shown in **Table 4**: (a) Original Cost of equipment is the cost of the new equipment plus sales tax. (b) Depreciation is straight line with a 10% salvage value. (c) Interest on investment is calculated as the average value per acre of the equipment during its useful life, multiplied by an interest rate of 4.00%. Average value equals new cost plus salvage value divided by 2 on a per acre basis. (d) The total investment costs are also calculated as 60% of the depreciation and the interest costs for all new equipment to reflect a mix of the new and used equipment. These values are also used in **Table 1**. Hourly equipment costs are shown in **Table 5**. The equipment listed in **Tables 4** and **5** indicate only that equipment which is used in barley enterprise and does not necessarily include all of the equipment that would be found on a typical farm growing barley. Most of this equipment is used on the entire 1,200 acre ranch.

#### **11. FUEL & REPAIR:**

The fuel and repair cost for each operation in **Table 1** is determined by multiplying the total hourly operating cost for each piece of equipment by the number of hours per acre for that operation. Prices for on-farm delivery of gasoline and diesel are \$0.71 and \$0.98 per gallon respectively.





Table 3.

U.C. COOPERATIVE EXTENSION  
MONTHLY CASH COSTS PER ACRE TO PRODUCE BARLEY  
Irrigated, Double Cropped  
SAN JOAQUIN VALLEY - 1990

Beginning NOV 90 Ending OCT 93	NOV 90	DEC 90	JAN 93	FEB 93	MAR 93	APR 93	MAY 93	JUN 93	JUL 93	AUG 93	SEP 93	OCT 93	TOTAL
Cultural:													
Disc Stubble	4.54												4.54
Chisel - Light	7.52												7.52
Land Plane Field	3.37												3.37
Finish Seedbed With Disc		6.38											6.38
Put Up Borders		0.44											0.44
Apply Fertilizer - Preplant		16.75											16.75
Plant		25.79											25.79
Apply Herbicide - Custom				10.66									10.66
Open Ditch					0.26								0.26
Irrigate & Fertilize					15.70								15.70
Irrigate						19.02	19.02						38.04
Close Ditches										0.22			0.22
Pickup Truck Use	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25					10.04
<b>TOTAL CULTURAL COSTS</b>	<b>16.69</b>	<b>50.62</b>	<b>1.25</b>	<b>11.90</b>	<b>17.21</b>	<b>20.27</b>	<b>20.27</b>	<b>1.48</b>					<b>139.72</b>
Harvest:													
Harvest - Custom													27.00
<b>TOTAL HARVEST COSTS</b>													<b>27.00</b>
Interest on oper. capital	0.13	0.50	0.51	0.60	0.73	0.88	1.04	1.25					5.65
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>16.81</b>	<b>51.13</b>	<b>1.77</b>	<b>12.52</b>	<b>17.95</b>	<b>21.16</b>	<b>21.31</b>	<b>29.73</b>					<b>172.37</b>
<b>TOTAL OPERATING COSTS/TON</b>	<b>6.72</b>	<b>20.45</b>	<b>0.71</b>	<b>5.01</b>	<b>7.18</b>	<b>8.46</b>	<b>8.52</b>	<b>11.89</b>					<b>68.95</b>
OVERHEAD:													
Land Rent			50.00										50.00
Office Expense	1.88	1.88	1.88	1.88	1.88	1.88	1.88	1.88					15.00
Liability Insurance	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04					0.35
Property Taxes			0.57							0.57			1.15
Property Insurance			0.29							0.29			0.57
Investment Repairs	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05					0.40
<b>TOTAL CASH OVERHEAD COSTS</b>	<b>1.97</b>	<b>1.97</b>	<b>52.83</b>	<b>1.97</b>	<b>1.97</b>	<b>1.97</b>	<b>1.97</b>	<b>1.97</b>	<b>0.86</b>				<b>67.47</b>
<b>TOTAL CASH COSTS/ACRE</b>	<b>18.78</b>	<b>53.09</b>	<b>54.60</b>	<b>14.49</b>	<b>19.90</b>	<b>23.13</b>	<b>23.28</b>	<b>31.70</b>	<b>0.86</b>				<b>239.84</b>
<b>TOTAL CASH COSTS/TON</b>	<b>7.51</b>	<b>21.24</b>	<b>21.84</b>	<b>5.80</b>	<b>7.97</b>	<b>9.25</b>	<b>9.31</b>	<b>12.68</b>	<b>0.34</b>				<b>95.94</b>

Table 4. U.C. COOPERATIVE EXTENSION  
WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS  
SAN JOAQUIN VALLEY - 1990

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	- Non-Cash Over. Depre- ciation	Interest	- Cash Overhead Insur- ance	Taxes	Total
90	130 hp 2wd Tractor	77359	12	5801.90	1701.90	212.74	425.48	8142.04
90	200 hp 4wd Tractor	109503	12	8212.75	2409.06	301.13	602.26	11525.20
90	Border Disc	1210	15	72.60	26.62	3.33	6.65	109.20
90	Chisel - Heavy 11'	5683	15	341.00	125.02	15.63	31.25	512.90
90	Disc - Finish 21'	14245	15	854.67	313.40	39.17	78.35	1285.59
90	Disc - Stubble 16'	18622	15	1117.33	409.68	51.21	102.42	1680.64
90	Ditcher - V	12706	15	762.33	279.54	34.94	69.88	1146.69
90	Grain Drill - 12'	9100	7	1170.00	200.20	25.02	50.05	1445.27
90	Pickup - Used	8300	4	1867.50	182.60	22.83	45.65	2118.58
90	Pickup Truck - 1/2 Ton	17655	7	2269.86	388.42	48.55	97.11	2803.94
90	Rear Blade - 8'	1976	15	118.53	43.48	5.43	10.87	178.31
90	Triplane - 16'	17527	15	1051.60	385.60	48.20	96.40	1581.80
TOTAL		293886		23640.09	6465.52	808.18	1616.37	32530.16
60% of New Cost *		176332		14184.05	3879.31	484.91	969.82	19518.10

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

ANNUAL INVESTMENT COSTS

Yr	Description	Price	Yrs Life	- Non-Cash Over. Depre- ciation	Interest	- Cash Overhead Insur- ance	Taxes	Repairs	Total
INVESTMENT									
	Fuel Tanks & Pumps	8050	20	402.50	161.00	20.13	40.25	125.00	748.88
	Fuel Wagon	1500	10	150.00	30.00	3.75	7.50	50.00	241.25
	Shop Building	85137	20	4256.85	1702.74	212.84	425.68	100.00	6698.11
	Shop Tools	12000	20	600.00	240.00	30.00	60.00	100.00	1030.00
	Siphon Tubes	1930	20	96.50	38.60	4.83	9.65	100.00	249.58
TOTAL INVESTMENT		108617		5505.85	2172.34	271.55	543.08	475.00	8967.82

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Land Rent	300.00	acre	100.00	30000.00
Liability Insurance	1200.00	acre	0.71	852.00
Office Expense	1200.00	acre	30.00	36000.00

Table 5. U.C. COOPERATIVE EXTENSION  
HOURLY EQUIPMENT COSTS  
SAN JOAQUIN VALLEY - 1990

Yr	Description	Actual Hours Used	COSTS PER HOUR						Total Oper.	Total Costs/Hr.
			-Non-Cash Over. Depre- ciation	Interest	- Cash Overhead Insur- ance	Taxes	Repairs	Operating Fuel & Lube		
90	130 hp 2wd Tractor	999.7	3.48	1.02	0.13	0.26	4.64	6.16	10.80	15.69
90	200 hp 4wd Tractor	952.6	5.17	1.52	0.19	0.38	5.48	9.48	14.96	22.22
90	Border Disc	166.0	0.26	0.10	0.01	0.02	0.35	0.00	0.35	0.74
90	Chisel - Heavy 11'	165.4	1.24	0.45	0.06	0.11	1.63	0.00	1.63	3.49
90	Disc - Finish 21'	165.8	3.09	1.13	0.14	0.28	4.09	0.00	4.09	8.74
90	Disc - Stubble 16'	122.9	5.45	2.00	0.25	0.50	5.35	0.00	5.35	13.56
90	Ditcher - V	166.0	2.76	1.01	0.13	0.25	3.65	0.00	3.65	7.79
90	Grain Drill - 12'	174.1	4.03	0.69	0.09	0.17	4.56	0.00	4.56	9.54
90	Pickup - Used	500.0	2.24	0.22	0.03	0.05	1.51	2.82	4.33	6.87
90	Pickup Truck - 1/2 Ton	191.0	7.13	1.22	0.15	0.31	3.12	5.17	8.29	17.10
90	Rear Blade - 8'	166.0	0.43	0.16	0.02	0.04	0.57	0.00	0.57	1.21
90	Triplane - 16'	165.4	3.81	1.40	0.17	0.35	2.54	0.00	2.54	8.28



Table 6.

U.C. COOPERATIVE EXTENSION  
RANGING ANALYSIS  
SAN JOAQUIN VALLEY - 1990

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COSTS PER ACRE AT VARYING YIELDS TO PRODUCE BARLEY  
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	YIELD (TON/ACRE)						
	1.0	1.5	2.0	2.5	3.0	3.5	4.0
OPERATING COSTS/ACRE:							
Cultural Cost	133	133	133	133	133	133	133
Harvest Cost	27	27	27	27	27	27	27
Interest on operating capital	5	5	5	5	5	5	5
TOTAL OPERATING COSTS/ACRE	166	166	166	166	166	166	166
TOTAL OPERATING COSTS/TON	165.77	110.52	82.89	66.31	55.26	47.36	41.44
CASH OVERHEAD COSTS/ACRE	67	67	67	67	67	67	67
TOTAL CASH COSTS/ACRE	233	233	233	233	233	233	233
TOTAL CASH COSTS/TON	233.25	155.50	116.62	93.30	77.75	66.64	58.31
NON-CASH OVERHEAD COSTS/ACRE	20	20	20	20	20	20	20
TOTAL COSTS/ACRE	253	253	253	253	253	253	253
TOTAL COSTS/TON	252.99	168.66	126.50	101.20	84.33	72.28	63.25

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NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR BARLEY  
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PRICE (DOLLARS PER TON)	YIELD (TON/ACRE)						
	1.0	1.5	2.0	2.5	3.0	3.5	4.0
80.00	-86	-46	-6	34	74	114	154
90.00	-76	-31	14	59	104	149	194
100.00	-66	-16	34	84	134	184	234
110.00	-56	-1	54	109	164	219	274
120.00	-46	14	74	134	194	254	314
130.00	-36	29	94	159	224	289	354
140.00	-26	44	114	184	254	324	394

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NET RETURNS PER ACRE ABOVE CASH COSTS FOR BARLEY  
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PRICE (DOLLARS PER TON)	YIELD (TON/ACRE)						
	1.0	1.5	2.0	2.5	3.0	3.5	4.0
80.00	-153	-113	-73	-33	7	47	87
90.00	-143	-98	-53	-8	37	82	127
100.00	-133	-83	-33	17	67	117	167
110.00	-123	-68	-13	42	97	152	207
120.00	-113	-53	7	67	127	187	247
130.00	-103	-38	27	90	157	222	287
140.00	-93	-23	47	117	187	257	327

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NET RETURNS PER ACRE ABOVE TOTAL COSTS FOR BARLEY  
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PRICE (DOLLARS PER TON)	YIELD (TON/ACRE)						
	1.0	1.5	2.0	2.5	3.0	3.5	4.0
80.00	-173	-133	-93	-53	-13	27	67
90.00	-163	-118	-73	-28	17	62	107
100.00	-153	-103	-53	-3	47	97	147
110.00	-143	-88	-33	22	77	132	187
120.00	-133	-73	-13	47	107	167	227
130.00	-123	-58	7	72	137	202	267
140.00	-113	-43	27	97	167	237	307

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Table 7.

U.C. COOPERATIVE EXTENSION  
 COSTS AND RETURNS / BREAKEVEN ANALYSIS  
 SAN JOAQUIN VALLEY - 1990

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)
Barley	275	172	103	240	35	260	15

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)
Barley	82500	51712	30788	71953	10547	77877	4623

BREAKEVEN PRICES PER YIELD UNIT

CROP	Base Yield (Units/Acre)	Yield Units	Breakeven Price To Cover		
			Operating Costs	Cash Costs	Total Costs
Barley	2.5	ton	68.95	95.94	103.84

BREAKEVEN YIELDS PER ACRE

CROP	Yield Units	Base Price (\$/Unit)	Breakeven Yield To Cover		
			Operating Costs	Cash Costs	Total Costs
Barley	ton	110.00	1.6	2.2	2.4