

U.C. COOPERATIVE EXTENSION SAMPLE COSTS TO PRODUCE DOUBLE CROPPED CORN SILAGE IN THE SAN JOAQUIN VALLEY

CO-VS-90

by

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The detailed costs for double cropped corn silage production in the San Joaquin Valley are presented in this study. The hypothetical farm used in this report consists of 1200 acres of which 300 acres produce corn silage. 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 1990 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 **Table 1, Costs Per Acre To Produce Double Cropped Corn Silage**. This study consists of **General Assumptions for Producing Double Cropped Corn Silage**, and five tables.

- Table 1. **Costs Per Acre To Produce Double Cropped Corn Silage.**
- Table 2. **Monthly Cash Costs Per Acre to Produce Corn Silage.**
- Table 3. **Annual Equipment, Investment And Business Overhead Costs.**
- Table 4. **Ranging Analysis.**
- Table 5. **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 DOUBLE CROPPED CORN SILAGE

San Joaquin Valley - 1990
U.C. Cooperative Extension

The following is a description of some general assumptions pertaining to sample costs of double cropped corn silage production in the San Joaquin Valley.

1. LAND:

This cost of production study is based on a 1200 acre field and row crop operation of which 300 acres dedicated to growing corn silage. Other crops grown on the same acreage in rotation with corn silage might include wheat, oat hay, alfalfa hay, barley, field corn, cotton, etc.

2. RENT AGREEMENT:

The land used for corn silage production in this study is rented on a cash per acre basis. Under this agreement the landowner receives \$100 per acre from the tenant. Since the land is double cropped only half of the land rent, or \$50 per acre, is charged to the corn silage operation. The landowner maintains the irrigation system on the rented land. Interest cost for land and irrigation system is incurred by the landowner. Land is not depreciated.

3. CULTURAL PRACTICES:

The cultural, pesticide and fertilizer inputs for the production of corn silage are similar to that of field corn. In this study manure is applied before any primary tillage occurs, but no chiseling is done as is in the case of field corn. Beds are listed, fertilized and pre-irrigated with 10 acre-inches of water. The corn is planted on the beds. Two cultivations are done through the growing season and fertilizer is custom applied. 32 acre-inches of water are utilized in six equal irrigations after planting. Two of these irrigations are used to apply nitrogen. Harvest, for non-dairy operators, is done and paid for by the buyer. Variations as to cultural practices and inputs can be significant.

4. YIELDS & RETURNS:

The crop yield used in this study is 25 tons per acre at 70% moisture. An estimated price of a \$20 per ton is used in this study.

5. HARVEST:

It was decided, in this cost study, that the farm is a non-dairy operation and that the buyer would pay for harvesting and hauling of the corn. A grower doing his own harvesting should inventory the equipment for the required operations, and calculate labor, fuel, depreciation, repairs, interest on investment, etc. as a cost of production or show a custom rate.

6. LABOR:

Basic hourly wages for workers are \$6.20 and \$4.75 per hour for skilled and field workers respectively. Adding 34% for SDI, FICA, insurance and other benefits gives the labor rates shown of \$8.31 per hour for skilled labor and \$6.37 per hour for field labor. The labor for operations using machinery are 10% higher than the machine hours to account for the extra labor involved in equipment set-up, moving, maintenance and repair.

7. OVERHEAD:

County taxes are calculated as 1% of the average of the equipment, buildings and improvements. Insurance is charged at 1% of the average value of the equipment over its

useful life. Office and business costs are estimated at \$20 per acre for the ranch. These expenses include office supplies, phone, bookkeeping, accounting, legal fees, road preparation and maintenance, etc. All overhead expenses are charged at half of the per acre cost to corn silage since it is double cropped.

8. INTEREST:

Interest on operating capital is based on cash costs and is calculated monthly, for nine months, until harvest at the rate of 12.5% per year. Interest is also charged on investment at 12% 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 buildings and equipment.

9. EQUIPMENT COSTS:

In allocating the equipment costs per acre, the following calculations were made and shown in **Table 3**: (a) **Original Cost** of equipment is the cost of the new equipment plus sales tax. (b) **Depreciation** is straight line with no salvage value. (c) **Interest** on investment is calculated as one-half of the new cost per acre (the average value of the equipment during its useful life) multiplied by an interest rate of 12%. (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**. Most of this equipment is used on the entire 1200 acre ranch.

10. FUEL & REPAIR:

The fuel and repair cost for each operation is determined by multiplying the total hourly operating cost for each piece of equipment by the number of hours per acre for that operation. On-farm delivery prices for gasoline and diesel fuel are \$0.85 per gallon and \$1.03 per gallon respectively.

Table. 1

U.C. COOPERATIVE EXTENSION
 COST PER ACRE TO PRODUCE DOUBLE CROPPED CORN SILAGE
 SAN JOAQUIN VALLEY - 1990

Labor Rate: \$ 8.31/hr. machine labor Interest Rate: 12.50%
 \$ 6.37/hr. non-machine labor Yield per Acre: 25.00 ton

Operation	Operation Time (Hrs/A)	Cash and Labor Costs per Acre					Total Cost	Your Cost
		Labor Cost	Fuel & Repairs	Material Cost	Custom/ Rent			
Cultural:								
Apply manure	0.00	0.00	0.00	0.00	32.50	32.50		
Disc stubble	0.14	1.43	3.04	0.00	0.00	4.46		
Disc finish 2X	0.12	1.23	2.00	0.00	0.00	3.23		
Land plane field	0.14	1.38	2.04	0.00	0.00	3.42		
List beds & fertilize	0.15	1.55	2.13	11.20	0.00	14.88		
Mulch beds	0.18	1.80	3.36	0.00	0.00	5.16		
Roll beds	0.10	0.95	0.75	0.00	0.00	1.70		
Open ditch	0.02	0.20	0.28	0.00	0.00	0.48		
Irrigate	0.70	4.46	0.00	68.10	0.00	72.56		
Close ditch	0.01	0.10	0.13	0.00	0.00	0.23		
Disc over ditch	0.01	0.10	0.09	0.00	0.00	0.19		
Plant	0.14	1.44	2.83	23.76	0.00	28.02		
Cultivate	0.31	3.09	2.70	0.00	0.00	5.79		
Fertilize, custom	0.00	0.00	0.00	19.50	8.50	28.00		
Irrigate & fertilize(H2O run)	0.28	1.78	0.00	39.74	0.00	41.52		
Apply miticide	0.00	0.00	0.00	17.60	5.00	22.60		
Apply herbicide, custom	0.00	0.00	0.00	3.50	5.00	8.50		
TOTAL CULTURAL COSTS	2.31	19.50	19.35	183.40	51.00	273.24		
Preharvest:								
Close ditch	0.01	0.10	0.13	0.00	0.00	0.23		
Disc over ditch	0.01	0.10	0.09	0.00	0.00	0.19		
TOTAL PREHARVEST COSTS	0.02	0.20	0.22	0.00	0.00	0.42		
Interest on operating capital @ 12.50%						8.85		
TOTAL OPERATING COSTS/ACRE		19.69	19.57	183.40	51.00	282.51		
TOTAL OPERATING COSTS/TON						11.30		
CASH OVERHEAD:								
Land rent						50.00		
Office expense						10.00		
Property Taxes						1.09		
Equipment Insurance						0.54		
Investment Repairs						0.71		
TOTAL CASH OVERHEAD COSTS						62.34		
TOTAL CASH COSTS/ACRE						344.85		
TOTAL CASH COSTS/TON						13.79		

U.C. COOPERATIVE EXTENSION
 Table. 1 continued

NON-CASH OVERHEAD:

Investment	Per producing Acre	Annual Cost		
		Depreciation	Interest @ 12.50%	
Buildings	62.50	2.50	3.75	6.25
Siphon tubes	1.42	0.20	0.09	0.29
Pickup, new	15.00	1.93	0.99	2.92
Pickup, used	3.33	0.60	0.22	0.82
Fuel tanks & equip	5.83	0.39	0.35	0.74
Shop tools	10.00	0.90	0.66	1.56
Equipment	106.38	7.45	7.02	14.47
TOTAL NON-CASH OVERHEAD COSTS	204.47	13.97	13.08	27.05
TOTAL COSTS/ACRE				371.90
TOTAL COSTS/TON				14.88

MONTHLY CASH COST PER ACRE TO PRODUCE DOUBLE CROPPED CORN SILAGE

Beginning JUN 90 Ending MAY 91	JUN 90	JUL 90	AUG 90	SEP 90	OCT 90	NOV 90	DEC 90	JAN 91	FEB 91	MAR 91	APR 91	MAY 91	TOTAL
Cultural:													
Apply manure	32.5												33
Disc stubble	4.5												4
Disc finish 2X	3.2												3
Land plane field	3.4												3
List beds & fertilize	14.9												15
Mulch beds	5.2												5
Roll beds	1.7												2
Open ditch	0.2	0.2											0
Irrigate	14.5	14.5	29.0	14.5									73
Close ditch	0.2												0
Disc over ditch	0.2												0
Plant	28.0												28
Cultivate		5.8											6
Fertilize, custom		28.0											28
Irrigate & fertilize(H2O)		20.8	20.8										42
Apply miticide		22.6											23
Apply herbicide, custom		8.5											9
TOTAL CULTURAL COSTS	108.5	100.4	49.8	14.5									273
Preharvest:													
Close ditch					0.2								0
Disc over ditch					0.2								0
TOTAL PREHARVEST COSTS					0.4								0
Interest on oper. capital	1.1	2.2	2.7	2.8									9
TOTAL OPERATING COSTS/ACRE	109.7	102.6	52.5	17.4	0.4								283
TOTAL OPERATING COSTS/TON	4.4	4.1	2.1	0.7	0.0								11
OVERHEAD:													
Land rent					50.0								50
Office expense					10.0								10
Property Taxes			0.5							0.5			1
Equipment Insurance								0.5					1
Investment Repairs	0.1	0.1	0.1	0.1	0.1								1
TOTAL CASH OVERHEAD COSTS	0.1	0.1	0.7	0.1	60.1			0.5			0.5		62
TOTAL CASH COSTS/ACRE	109.8	102.7	53.2	17.5	60.6			0.5			0.5		345
TOTAL CASH COSTS/TON	4.4	4.1	2.1	0.7	2.4			0.0			0.0		14

Table. 3

ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS
SAN JOAQUIN VALLEY

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	- Non-Cash Over. -		- Cash Overhead -			Total
			Yrs Life	Depre- ciation	Interest	Insur- ance	Taxes	
90	130 hp tractor 2wd	66000	12	4950.00	4356.00	181.50	363.00	9850.50
90	200 hp tractor 4wd	94000	12	7050.00	6204.00	258.50	517.00	14029.50
90	80 hp tractor 2wd	42000	12	3150.00	2772.00	115.50	231.00	6268.50
90	Cultipacker, 6 row	3300	15	198.00	217.80	9.07	18.15	443.02
90	Cultivator, 6 row	6000	15	360.00	396.00	16.50	33.00	805.50
90	Disc, finish, 21'	12500	15	750.00	825.00	34.38	68.75	1678.13
90	Disc, offset 7'	5500	15	330.00	363.00	15.13	30.25	738.38
90	Disc, stubble, 16'	12500	15	750.00	825.00	34.38	68.75	1678.13
90	Ditcher, 5'	5300	15	318.00	349.80	14.58	29.15	711.53
90	Harrow, flex, 21'	750	15	45.00	49.50	2.06	4.13	100.69
90	Lister, 6 row	4500	15	270.00	297.00	12.37	24.75	604.12
90	Mulcher, PTO, 6row	21200	15	1272.00	1399.20	58.30	116.60	2846.10
90	Planter, 6 row	14300	10	1287.00	943.80	39.33	78.65	2348.78
90	Rear blade, 3pt 8'	1900	15	114.00	125.40	5.22	10.45	255.07
90	Triplane, 16'	16000	15	960.00	1056.00	44.00	88.00	2148.00
TOTAL		305750		21804.00	20179.50	840.82	1681.63	44505.95
60% of New Cost *		183450		13082.40	12107.70	504.49	1008.98	26703.57

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

ANNUAL INVESTMENT COSTS

Yr	Description	Price	- Non-Cash Over. -		- Cash Overhead -			Repairs	Total
			Yrs Life	Depre- ciation	Interest	Insur- ance	Taxes		
INVESTMENT									
	Buildings	75000	25	3000.00	4500.00	187.50	375.00	350.00	8412.50
	Fuel tanks & equip	7000	15	466.67	420.00	17.50	35.00	50.00	989.17
	Pickup, new	18000	7	2314.29	1188.00	49.50	99.00	200.00	3850.79
	Pickup, used	4000	5	720.00	264.00	11.00	22.00	100.00	1117.00
	Shop tools	12000	10	1080.00	792.00	33.00	66.00	100.00	2071.00
	Siphon tubes	1700	7	242.86	102.00	4.25	8.50	50.00	407.61
TOTAL INVESTMENT		117700		7823.82	7266.00	302.75	605.50	850.00	16848.07

U.C. COOPERATIVE EXTENSION
Table. 3 continued

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Land rent	300.00	acre	50.00	15000.00
Office expense	1200.00	acre	20.00	24000.00

U.C. COOPERATIVE EXTENSION
RANGING ANALYSIS

Table. 4 COST PER ACRE AT VARYING YIELDS TO PRODUCE CORN SILAGE.

	YIELD (TON/ACRE)						
	22	23	24	25	26	27	28
OPERATING COSTS/ACRE:							
Cultural Cost	273	273	273	273	273	273	273
Preharvest Cost	0	0	0	0	0	0	0
Interest on operating capital	9	9	9	9	9	9	9
TOTAL OPERATING COSTS/ACRE	283	283	283	283	283	283	283
TOTAL OPERATING COSTS/TON	12.84	12.28	11.77	11.30	10.87	10.46	10.09
CASH OVERHEAD COSTS/ACRE	62	62	62	62	62	62	62
TOTAL CASH COSTS/ACRE	345	345	345	345	345	345	345
TOTAL CASH COSTS/TON	15.68	14.99	14.37	13.79	13.26	12.77	12.32
NON-CASH OVERHEAD COSTS/ACRE	27	27	27	27	27	27	27
TOTAL COSTS/ACRE	372	372	372	372	372	372	372
TOTAL COSTS/TON	16.90	16.17	15.50	14.88	14.30	13.77	13.28

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR CORN SILAGE

PRICE (DOLLARS PER TON)	YIELD (TON/ACRE)						
	22	23	24	25	26	27	28
17.00	91	108	125	142	159	176	193
18.00	113	131	149	167	185	203	221
19.00	135	154	173	192	211	230	249
20.00	157	177	197	217	237	257	277
21.00	179	200	221	242	263	284	305
22.00	201	223	245	267	289	311	333
23.00	223	246	269	292	315	338	361

NET RETURNS PER ACRE ABOVE CASH COSTS FOR CORN SILAGE

PRICE (DOLLARS PER TON)	YIELD (TON/ACRE)						
	22	23	24	25	26	27	28
17.00	29	46	63	80	97	114	131
18.00	51	69	87	105	123	141	159
19.00	73	92	111	130	149	168	187
20.00	95	115	135	155	175	195	215
21.00	117	138	159	180	201	222	243
22.00	139	161	183	205	227	249	271
23.00	161	184	207	230	253	276	299

NET RETURNS PER ACRE ABOVE TOTAL COSTS FOR CORN SILAGE

PRICE (DOLLARS PER TON)	YIELD (TON/ACRE)						
	22	23	24	25	26	27	28
17.00	2	19	36	53	70	87	104
18.00	24	42	60	78	96	114	132
19.00	46	65	84	103	122	141	160
20.00	68	88	108	128	148	168	188
21.00	90	111	132	153	174	195	216
22.00	112	134	156	178	200	222	244
23.00	134	157	180	203	226	249	272

U.C. COOPERATIVE EXTENSION
 COST AND RETURNS / BREAKEVEN ANALYSIS
 SAN JOAQUIN VALLEY

Table. 5

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)
Corn Silage	500	283	217	345	155	372	128

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)
Corn Silage	150000	84753	65247	103455	46545	111570	38430
TOTAL	150000	84753	65247	103455	46545	111570	38430

BREAKEVEN PRICES PER YIELD UNIT

CROP	Base Yield (Units/Acre)	Yield Units	Breakeven Price To Cover		
			Operating Costs	Cash Costs	Total Costs
			\$ per Yield Unit		
Corn Silage	25.0	ton	11.30	13.79	14.88

BREAKEVEN YIELDS PER ACRE

CROP	Yield Units	Base Price (\$/Unit)	Breakeven Yield To Cover		
			Operating Costs	Cash Costs	Total Costs
			Yield Units / Acre		
Corn Silage	ton	20.00	14.1	17.2	18.6