

U.C. COOPERATIVE EXTENSION

~ CENTRAL COAST CONSERVATION PRACTICES ~

ESTIMATED COSTS & POTENTIAL BENEFITS FOR ON-FARM ROW ARRANGEMENT 2003

PREPARED BY

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INTRODUCTION & GENERAL DESCRIPTION

This study is intended as an estimate or guide, which can be helpful in evaluating management decisions related to the installation, operation and maintenance of on-farm row arrangement, also known as furrow alignment. Row arrangement is a type of conservation practice used to slow and direct the flow of water and runoff thus reducing erosion. The process of row arrangement involves surveying and aligning crop rows and furrows across a slope. Farmers practicing row arrangement usually arrange rows so that the furrows are contoured to a slope of 3% or less.

Costs for the installation and annual operation and maintenance of the on-farm row arrangement in this study are estimated for low, representative and high cost scenarios in Table 1. More detailed information for the representative cost scenario is included in Table 2 (installation, operation and maintenance) and Table 3 (materials). In-kind contributions from federal and other local assistance programs may be available to offset direct expenses borne by the farmers and ranchers adopting this conservation practice. Land ownership and rental rates are specific to each operation and therefore are not included in the analysis. Estimated costs given for labor, materials, and custom or contract services are based on current figures. The costs and practices contained in this study may not be applicable to all situations or used every year. Individual farmers and ranchers should therefore use this study as a template and make adjustments to more accurately reflect their own situations. The use of trade names does not constitute an endorsement or a recommendation by the University of California nor is criticism of similar products implied.

The following is a description of general assumptions pertaining to the conservation practice analyzed in this study. The operations are those currently used by farmers and ranchers within six counties on the Central Coast of California: San Mateo, Santa Cruz, Santa Clara, San Benito, Monterey and San Luis Obispo.

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PRACTICE COSTS

Annual Installation, Operation & Maintenance. Arranging rows on-farm involves surveying and laying out fields prior to working beds. For this study, installation, operation and maintenance costs include labor charges for two people, one with special training to survey fields and mark rows specifically to “fit” the slope or contour on a 25 acre parcel. Tools needed to complete the work include devices to measure length and slope of rows, flags, and marking equipment. Additional labor and equipment use costs for land preparation (including land leveling or smoothing), shaping beds and installing the drip irrigation system are also included to account for the extra time necessary to arrange rows on-farm. Costs associated with row arrangement are located on Tables 1, 2, and 3. First year costs are \$125 higher than in subsequent years to account for costs associated with the purchase of measuring devices and flags.

Additional Fees & Expenses. When using conservation practices additional fees and expenses are sometimes incurred for consultants, permits or other charges that are specific to a particular practice. For this study, no specialized fees or costs for row arrangement are assumed.

POTENTIAL BENEFITS & DRAWBACKS OF PRACTICE

Farmers, ranchers and landowners should evaluate each conservation practice for potential benefits and drawbacks with respect to their overall operation. This includes risk and any effects on equipment, labor and capital.

Benefits. Using on-farm row arrangement can help growers mitigate surface water runoff and erosion by slowing the flow of water from fields, thereby allowing more time for water penetration and infiltration. This, in turn, may contribute to the maintenance and protection of downstream water quality. Also, crop damage from beds that are degraded by silt or weakened by water may also be reduced.

Growers report a savings in labor and equipment use with on-farm row arrangements because of a decrease in flood and other erosion control measures. For the representative operation studied here, these savings are estimated at \$900 and shown on Table 1. Growers also report the potential for yield improvement through reduced loss of plants and improved growing conditions when using on-farm row arrangement. Using strawberries as an example, and assuming a yield improvement of 370 trays, with a price of \$7.04 per tray, additional income is estimated at \$2,600 (rounded) and shown on Table 1. Potential long-term benefits include a reduction in the loss of productive topsoil. Because of the difficulty in measuring, thus valuing such losses, no cash savings for long-term benefits are included in this study. In addition, preventing or minimizing downstream impacts and/or property damage may reduce conflicts with neighbors and exposure to legal and regulatory actions.

Drawbacks. For this conservation practice, farmers report some drawbacks associated with on-farm row arrangement. Farmers can have increased labor and equipment costs when laying out rows, especially those with significant contour or hillside curvature. In some cases costs for tractor and other mechanized work that is performed during the growing season will also increase over and above costs when not using row arrangement. This practice may also result in smaller and/or non-contiguous production areas to accommodate the appropriate arrangement of rows. In some situations, particularly those with high slope and sandy soil, this practice may not adequately control surface water runoff and erosion unless used in

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combination with other on-farm conservation practices such as water/sediment control basins, underground outlets, grassed farm roads, and grassed waterways.

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ADDITIONAL INFORMATION

For additional information about the calculations used in this report, call Laura Tourte, UCCE Santa Cruz County (831) 763-8040. Additional information about the practice itself may be accessed via the internet through UCCE at <http://waterquality.ucanr.org> and NRCS at <http://www.nrcs.usda.gov/technical>.

Copies of this study may be requested through local UCCE, NRCS, and Resource Conservation District (RCD) offices in the six counties listed above. Additional publications with estimated costs and potential benefits for various other conservation practices are also available through Central Coast UCCE, NRCS, and RCD offices. They may also be accessed on the Internet at <http://cesantacruz.ucdavis.edu>.

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Table 1. On-Farm Row Arrangement (25 Acre Parcel) - Partial Budget - Central Coast - 2003

ESTIMATED COSTS				POTENTIAL BENEFITS			
COSTS PER UNIT*	LOW	REP**	HIGH	ADDITIONAL RETURNS PER UNIT	LOW	REP	HIGH
<i>Annual Installation, Oper. & Maint.:</i>				Strawberry Yield Improvement	\$0	\$2,600	\$5,200
Land Preparation***	\$10	\$10	\$10	(Reduced Loss of Plants &			
Layout & Mark Rows	\$366	\$768	\$1,652	Improved Growing Conditions)			
Shape Beds***	\$15	\$15	\$15				
Install Drip Irrigation System***	\$80	\$121	\$161				
<i>Ann. Install., Oper. & Maint. - Subtotal</i>	\$471	\$914	\$1,838				
<i>Interest on Operating Capital @ 7.4%</i>	\$3	\$6	\$11				
(1) Costs - Subtotal	\$474	\$920	\$1,849	(4) Additional Returns - Subtotal	\$0	\$2,600	\$5,200
REDUCED RETURNS PER UNIT	LOW	REP	HIGH	REDUCED COSTS PER UNIT	LOW	REP	HIGH
None	\$0	\$0	\$0	Labor & Equip. Use for Prevention &	\$0	\$900	\$1,800
				Repairs (Associated with Flood			
				Control & Storm Events)			
(2) Reduced Returns - Subtotal	\$0	\$0	\$0	(5) Reduced Costs - Subtotal	\$0	\$900	\$1,800
COSTS & REDUCED RETURNS	LOW	REP	HIGH	ADD. RETURNS & REDUCED COST	LOW	REP	HIGH
(3) Total Per Unit Per Year**** (1+2)	\$474	\$920	\$1,849	(6) Total Per Unit Per Year (4+5)	\$0	\$3,500	\$7,000
NET CHANGE IN INCOME PER UNIT (25 Acres) PER YEAR (6-3)					-\$474	\$2,580	\$5,151
NET CHANGE IN INCOME PER ACRE PER YEAR					-\$19	\$103	\$206

* Unit = 25 Acre Parcel.

** Rep = Representative cost.

*** Extra costs associated with arranging rows on-farm.

**** First year costs are \$125 higher than subsequent years to account for costs to purchase measuring devices.

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Table 2. Detail of Representative Installation, Operation & Maintenance Costs[†]
On-Farm Row Arrangement (25 Acre Parcel) – Central Coast 2003

Operation	Non-Mach Labor		Machine Labor		Custom Work		Material Cost (\$/25 Ac) [‡]	Total Cost (\$/25 Ac) [¶]	Your Cost (\$/25 Ac)
	Hrs/ 25 Ac	Cost/ 25 Ac	Hrs/ 25 Ac	Cost/ 25 Ac	Hrs/ 25 Ac	Cost/ 25 Ac			
<i>Annual Installation, Operation & Maintenance:</i>									
Land Preparation [§]			.33	7			3 ^{††}	10	
Layout & Mark Rows	16	214			16	429	125	768	
Shape Beds [§]			.50	10			5 ^{††}	15	
Install Drip Irrigation System [§]	9	121						121	
<i>Subtotal</i>		335		17		429	133	914	
<i>Interest on Operating Capital @ 7.4%</i>								6	
<i>Total Costs Per Unit Per Year^{††}</i>							133	920	
<i>Total Costs Per Acre Per Year</i>							5	37	

[†] Costs are per 25 Acre Parcel.

[‡] Detail of material costs located in Table 3. Representative Material Costs.

[¶] May not sum due to rounding.

[§] Extra costs associated with arranging rows on-farm.

^{††} Fuel, lube and repairs.

^{‡‡} First year costs are \$125 higher than subsequent years to account for costs to purchase measuring devices.

Table 3. Detail of Representative Material Costs[†]
On-Farm Row Arrangement (25 Acre Parcel) – Central Coast 2003

Material	Quantity/ 25 Acres	Unit	Cost/ Unit	Material Cost (\$/25 Ac)	Your Cost (\$/25 Ac)
<i>Installation, Operation & Maintenance (Year 1):</i>					
Measuring Devices & Flags	1	25 acres	125	125	
Fuel, Lube, Repairs	1	25 acres	8.00	8	
<i>Subtotal</i>				133	
<i>Annual Operation & Maintenance (Years 2-5):</i>					
Fuel, Lube, Repairs	1	25 acres	8.00	8	
<i>Subtotal</i>					
<i>Total Material Costs Unit – Year 1</i>				133	
<i>Total Material Costs Per Acre Per Year</i>				5	

[†] Costs are per 25 Acre Parcel.