

# **U.C. COOPERATIVE EXTENSION**

## **~ CENTRAL COAST CONSERVATION PRACTICES ~**

### **ESTIMATED COSTS AND POTENTIAL BENEFITS FOR AN ANNUALLY PLANTED COVER CROP 2003**

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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 (planting) and maintenance of an annually planted cover crop such as cereal grasses, mustards and/or legumes. Cover crops are grown for their biomass, which is incorporated into the soil without harvest. As such, cover crops are considered a type of conservation practice that is used to provide ground cover during the rainy winter months. Cover crop growth serves to improve water penetration and infiltration, slow surface water runoff, and reduce erosion. Cover crops can also build soil fertility and improve soil structure. In addition, cover crops can capture residual soil nitrogen and reduce nutrient runoff and leaching. In this region, cover crops are commonly planted in the fall, grown during winter, and worked into the soil in spring. However, significant acreage is also grown during the summer. Cover crop types include legumes such as bell beans, peas and vetch, mustards such as white and Indian, and cereals such as barley, oats and rye. Specially formulated mixes that include both cereals and legumes may also be planted.

Costs for the installation (planting) and maintenance of the cover crop 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

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Central Coast of California: San Mateo, Santa Cruz, Santa Clara, San Benito, Monterey and San Luis Obispo.

### PRACTICE COSTS

**Annual Installation (Planting) and Maintenance.** This study assumes that oats, an annually planted cereal, is sown in the fall on gently sloped ground. Prior to planting, land is prepared by chiseling and disking one time each. The cover crop is then drill seeded and irrigated once to improve stand establishment. After this time plant growth is dependent on winter rains. In spring the cover crop is mowed once and then disced twice to incorporate vegetative material into the soil to prepare for planting the subsequent cash crop. Associated costs are located on Tables 1, 2, and 3.

**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 cover crops 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 own operation. This may include risk and any effects on equipment, labor and capital.

**Benefits.** During rainy winter months, both above and below ground growth of a cover crop may help improve water penetration and infiltration, slow surface water runoff and reduce soil erosion. Cover crops can also build soil fertility, cycle nutrients, and improve soil structure over time. In addition, cover crops, especially cereal grasses, can capture residual soil nitrogen to reduce nutrient runoff and leaching. This may ultimately contribute to the maintenance and protection of downstream water quality. Preventing or minimizing downstream impacts and/or property damage may reduce conflicts with neighbors and exposure to legal and regulatory actions.

Growers report some savings in labor and equipment use with a decrease in flood and other erosion control measures associated with cover crop and other conservation practice use. These are considered short-term benefits, which, for this study are estimated at \$28. In addition, when cover crops such as legumes or “green manures” are managed for the contribution to soil nitrogen, growers may be able to reduce some nitrogen fertilizer use thereby reducing costs of production for the subsequent cash crop. Nitrogen savings will vary depending on needs of the cash crop planted and field history. Potential long-term benefits include a reduction in the loss of productive topsoil and improved soil tilth. Because of the difficulty in measuring, thus valuing these losses and improvements, no cash savings is included in this study.

**Drawbacks.** For conservation practice purposes, growers often plant cover crops in areas that would otherwise be left fallow and/or planted in rotation with cash crops. Therefore, no loss in revenue is assumed for this study. However, if land is taken out of production, costs for planting and maintaining the cover crop, and revenue losses from a foregone cash crop must be considered. Farmers may refer to the website <http://coststudies.ucdavis.edu> to view cost of production studies for various crops, and if appropriate, calculate these costs.

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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>.

Resources focused specifically on cover crops or the larger topic "nutrient management" can be found on the UC Agricultural and Natural Resources (UC ANR) publications catalog website at <http://ucanr.org> or on the UC Sustainable Agriculture Research and Education Program (UC SAREP) at <http://www.sarep.ucdavis.edu> under cover crops, or on the USDA Sustainable Agriculture Network website at <http://www.sare.org/handbook/mccp2/index.htm>. ANR publication catalogs and other resource materials are also available at your local UCCE office. You may also call or visit your local NRCS or RCD office.

## PRINT MATERIALS

Cover Cropping in Vineyards. 1998. Technical Editors: Chuck A. Ingels, Robert L. Bugg, Glenn T. McGourty and L. Peter Christensen. University of California Division of Agriculture and Natural Resources. Publication 3338.

Managing Cover Crops Profitably. 1998. Second Edition. Sustainable Agriculture Network. National Agricultural Library. Beltsville, MD.

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Table 1. Annually Planted Cover Crop (Acre) - Partial Budget - Central Coast 2003

<b>COSTS PER UNIT*</b>	ESTIMATED COSTS			<b>ADDITIONAL RETURNS PER UNIT</b>	POTENTIAL BENEFITS		
	LOW	REP**	HIGH		LOW	REP	HIGH
<i>Annual Installation, Oper. &amp; Maint.:</i>				None	\$0	\$0	\$0
Land Prep - Chisel 1X	\$4	\$4	\$4				
Land Prep - Disc 1X	\$5	\$5	\$5				
Drill Cover Crop Seed	\$28	\$43	\$52				
Set Up Sprinklers & Irrigate	\$0	\$75	\$75				
Mow - Flail	\$0	\$8	\$15				
Disc - Incorporate Plant Materials 2X	\$10	\$10	\$10				
<i>Ann. Install., Oper. &amp; Maint. - Subtotal</i>	\$47	\$145	\$161				
<i>Interest on Operating Capital @ 7.4%</i>	\$1	\$2	\$2				
<b><i>(1) Costs - Subtotal</i></b>	<b>\$48</b>	<b>\$147</b>	<b>\$163</b>	<b><i>(4) Additional Returns - Subtotal</i></b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
<b>REDUCED RETURNS PER UNIT</b>	<b>LOW</b>	<b>REP</b>	<b>HIGH</b>	<b>REDUCED COSTS PER UNIT</b>	<b>LOW</b>	<b>REP</b>	<b>HIGH</b>
None	\$0	\$0	\$0	Labor & Equip. Use for Prevention & Repairs (Associated with Flood Control & Storm Events)	\$0	\$28	\$110
<b><i>(2) Reduced Returns - Subtotal</i></b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>	<b><i>(5) Reduced Costs - Subtotal</i></b>	<b>\$0</b>	<b>\$28</b>	<b>\$110</b>
<b>COSTS &amp; REDUCED RETURNS</b>	<b>LOW</b>	<b>REP</b>	<b>HIGH</b>	<b>ADD. RETURNS &amp; REDUCED COST</b>	<b>LOW</b>	<b>REP</b>	<b>HIGH</b>
<b><i>(3) Total Per Unit Per Year (1+2)</i></b>	<b>\$48</b>	<b>\$147</b>	<b>\$163</b>	<b><i>(6) Total Per Unit Per Year (4+5)</i></b>	<b>\$0</b>	<b>\$28</b>	<b>\$110</b>
<b><i>NET CHANGE IN INCOME PER UNIT (Acre) PER YEAR (6-3)</i></b>					<b>-\$48</b>	<b>-\$119</b>	<b>-\$53</b>

\* Unit = Acre.

\*\* Rep = Representative cost.

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Table 2. Detail of Representative Installation, Operation & Maintenance Costs<sup>†</sup>  
Annually Planted Cover Crop (Acre) – Central Coast 2003

Operation	Non-Mach Labor		Machine Labor		Custom Work		Material Cost (\$/Ac) <sup>‡</sup>	Total Cost (\$/Ac) <sup>¶</sup>	Your Cost (\$/Ac)
	Hrs/ Ac	Cost/ Ac	Hrs/ Ac	Cost/ Ac	Hrs/ Ac	Cost/ Ac			
<i>Annual Installation, Operation &amp; Maintenance:</i>									
Land Prep – Chisel 1X			.13	3			1 <sup>§</sup>	4	
Land Prep – Disc 1X			.14	3			2 <sup>§</sup>	5	
Drill Cover Crop Seed			.20	4			39 <sup>§</sup>	43	
Set Up Sprinklers & Irrigate	.6	8	1	21			46 <sup>§</sup>	75	
Mow – Flail 1X			.25	5			3 <sup>§</sup>	8	
Disc – Incorporate Plant Materials 2X			.29	6			4 <sup>§</sup>	10	
<i>Subtotal</i>		8		42			95	145	
<i>Interest on Operating Capital @ 7.4%</i>								2	
<i>Total Costs Per Unit (Acre) Per Year</i>							95	147	

<sup>†</sup> Costs are per acre.

<sup>‡</sup> Detail of material costs located in Table 3. Representative Material Costs.

<sup>¶</sup> May not sum due to rounding.

<sup>§</sup> Includes fuel, lube and repairs.

Table 3. Detail of Representative Material Costs<sup>†</sup>  
Annually Planted Cover Crop (Acre) – Central Coast 2003

Material	Quantity/ Acre	Unit	Cost/ Unit	Material Cost (\$/Ac)	Your Cost (\$/Ac)
<i>Installation, Operation &amp; Maintenance (Year 1):</i>					
Cover Crop Seed – Oats	150	pounds	.24	36	
Water – Irrigation	3	ac inches	13.40	40	
Fuel, Lube, Repairs				19	
<i>Subtotal</i>				95	
<i>Annual Operation &amp; Maintenance (Years 2-5):</i>					
None – Equivalent to Installation					
<i>Subtotal</i>					
<i>Total Material Costs Per Unit (Acre) Per Year</i>				95	

<sup>†</sup> Costs are per acre.