

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Sustainable Food Systems

- Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	16%		4%	
111	Conservation and Efficient Use of Water	3%		3%	
201	Plant Genome, Genetics, and Genetic Mechanisms	2%		15%	
202	Plant Genetic Resources	3%		4%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	4%		8%	
204	Plant Product Quality and Utility (Preharvest)	7%		5%	
205	Plant Management Systems	28%		4%	
206	Basic Plant Biology	1%		16%	
211	Insects, Mites, and Other Arthropods Affecting Plants	2%		4%	
212	Pathogens and Nematodes Affecting Plants	1%		5%	
302	Nutrient Utilization in Animals	4%		4%	
307	Animal Management Systems	9%		1%	
501	New and Improved Food Processing Technologies	1%		3%	
502	New and Improved Food Products	2%		5%	
503	Quality Maintenance in Storing and Marketing Food Products	2%		2%	
601	Economics of Agricultural Production and Farm Management	8%		3%	
603	Market Economics	1%		3%	
702	Requirements and Function of Nutrients and Other Food Components	0%		6%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	4%		3%	
723	Hazards to Human Health and Safety	2%		2%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2013	Extension		Research	
	1862	1890	1862	1890
Plan	96.2	0.0	131.2	0.0

Actual Paid Professional	98.9	0.0	142.8	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
2005411	0	2460427	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
2005411	0	2460427	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
107769408	0	107769408	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

UC ANR's integrated research and extension activities conducted research projects, workshops, education classes and demonstrations, as well as one-on-one interventions. In addition, the programs use PSAs, newsletters, mass media, web sites and collaborations with other agencies and organizations to create and deliver programs.

2. Brief description of the target audience

- Food producers (e.g. farmers/ranchers and rangeland owners/operators/managers, including conventional, organic, small and large producers)
- Agricultural advising professionals (e.g. Pest Control Advisors, crop advisors, landscape professionals)
- Allied industry companies including seed and supply companies
- Food processors, handlers, retailers and suppliers
- Public regulatory agencies and private non-profit advocacy groups
- Food consumers, members of the general public

3. How was eXtension used?

UC ANR academics used eXtension to participate in and contribute to Communities fo Practice, to answer "Ask an Expert" questions, and for other networking purposes. The Division looks forward to the re-invention into a system of greater value to California Extension.

V(E). Planned Program (Outputs)

1. Standard output measures

2013	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	324690	0	1694	0

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2013
 Actual: 5

Patents listed

1. BIFIDOBACTERIAL GENE SEQUENCES REQUIRED FOR CATABOLISM OF MILK OLIGOSACCHARIDES
2. THE REDUCTION OF HYDROGEN SULFIDE (H₂S) FORMATION IN WINE YEAST STRAINS VIA ALLELE REPLACEMENT, EXCHANGING NATIVE ALLELES IN THE TARGET STRAIN
3. SELECT GALACTO-OLIGOSACCHARIDES ARE PREFERENTIALLY CONSUMED BY DIFFERENT SPECIES OF BIFIDOBACTERIA ENABLING TARGETED ENRICHMENT
4. A HYBRID BUSH BABY LIMA BEAN VARIETY (BBL302) RESISTANT TO THE TARNISHED PLANT BUG LYGUS HESPERUS
5. 'KinnowLS' MANDARIN

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2013	Extension	Research	Total
Actual	89	457	546

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Classes/Short Courses Conducted

Year	Actual
2013	298

Output #2

Output Measure

- Workshops Conducted

Year	Actual
2013	101

Output #3

Output Measure

- Demonstrations and Field Days Conducted

Year	Actual
2013	139

Output #4

Output Measure

- Newsletters Produced

Year	Actual
2013	29

Output #5

Output Measure

- Web Sites Created or Updated

Year	Actual
2013	27

Output #6

Output Measure

- Research Projects Conducted

Year	Actual
2013	316

Output #7

Output Measure

- Videos, Slide Sets and other A/V or Digital Media Educational Products Created
- Not reporting on this Output for this Annual Report

Output #8

Output Measure

- Manuals and Other Printed Instructional Materials Produced

Year	Actual
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2013

25

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Farm and ranch owners/managers and allied industry professionals, participating in the programs, will gain knowledge of crop and varietal selection factors and research-based performance data.
2	Farm, ranch, and landscaping owners/managers and allied industry professionals, participating in the programs, will adopt improvements in aspects of comprehensive management systems for plant and animal production.
3	Farm, ranch and landscaping owners/managers and allied industry professionals, participating in the programs, will adopt superior varieties of crops.
4	Farm, ranch, landscaping owners/managers and allied industry professionals, participating in the programs, will gain knowledge of aspects of comprehensive management systems for plant and animal production.
5	Farm and ranch owners/managers, participating in the programs, will gain knowledge of business management practices and marketing strategies, including the costs and risks associated with producing specialty crops.
6	Members of public, participating in the programs, including the Master Gardener Program, will gain knowledge of sustainable gardening practices.
7	Tree fruit and nut owners/managers and allied industry professionals, participating in the programs, will adopt recommended pruning techniques or other orchard management practices.
8	Farm and ranch owners/managers and allied industry professionals, participating in the programs, will be more likely to try out or adopt recommended cultural practices, pest and disease management, or other aspects of comprehensive management systems for animal and plant production.
9	Farm and ranch owners/managers, participating in the programs, will gain skills in business management practices.
10	Farm and ranch owners/managers, participating in the programs, will realize increased profitability due to lower production costs or diversification of income.
11	Farm, ranch and landscaping owners/managers and allied industry professionals, participating in the programs, will gain knowledge of pest and disease management for plant and animal production.
12	Farm, ranch and landscaping owners/ managers and allied industry professionals, participating in the programs, will gain knowledge of cultural practices.
13	Farm, ranch and landscaping owners/ managers and allied industry professionals, participating in the programs, will gain knowledge of irrigation management and drainage.
14	Farm, ranch and landscaping owners/managers and allied industry professionals, participating in the programs, will adopt improvements in cultural practices.
15	Producers increase sales as consumers become more aware of local, specialty crops.
16	Farm owner/operators and allied industry professionals, participating in agriculture education programs, gained knowledge of crop and varietal selection factors for plant production.

17	Small farm and ranch owner/operators and managers, participating in agriculture education programs, utilized alternative marketing of their crops to local consumers, including farmers markets, schools, restaurants, community supported agriculture boxes.
18	Small farmers on the Central Coast of California are successfully growing new or promising profitable specialty crops.
19	New knowledge on conservation tillage systems for California tomatoes indicates cost savings and resource conservation benefits.
20	New knowledge on conservation tillage systems for California cotton indicates cost savings and resource conservation benefits.
21	New knowledge about cover cropping shows a number of potential benefits for Central Valley annual-cropping systems.
22	Innovative mechanical trunk shaker is implemented commercially for California table olives, and offers hope for long-term industry sustainability.
23	Beginning farmers, participating in farm management education, grow their businesses.
24	California rice farmers cultivate new varieties to increase yields and milling quality.
25	Orchard owner/operators and managers adopt superior varieties of nut crops to improve profitability.

Outcome #1

1. Outcome Measures

Farm and ranch owners/managers and allied industry professionals, participating in the programs, will gain knowledge of crop and varietal selection factors and research-based performance data.

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Farm, ranch, and landscaping owners/managers and allied industry professionals, participating in the programs, will adopt improvements in aspects of comprehensive management systems for plant and animal production.

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Farm, ranch and landscaping owners/managers and allied industry professionals, participating in the programs, will adopt superior varieties of crops.

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Farm, ranch, landscaping owners/managers and allied industry professionals, participating in the programs, will gain knowledge of aspects of comprehensive management systems for plant and animal production.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	340

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
206	Basic Plant Biology
302	Nutrient Utilization in Animals

307	Animal Management Systems
601	Economics of Agricultural Production and Farm Management

Outcome #5

1. Outcome Measures

Farm and ranch owners/managers, participating in the programs, will gain knowledge of business management practices and marketing strategies, including the costs and risks associated with producing specialty crops.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	240

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management

Outcome #6

1. Outcome Measures

Members of public, participating in the programs, including the Master Gardener Program, will gain knowledge of sustainable gardening practices.

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Tree fruit and nut owners/managers and allied industry professionals, participating in the programs, will adopt recommended pruning techniques or other orchard management practices.

Not Reporting on this Outcome Measure

Outcome #8

1. Outcome Measures

Farm and ranch owners/managers and allied industry professionals, participating in the programs, will be more likely to try out or adopt recommended cultural practices, pest and disease management, or other aspects of comprehensive management systems for animal and plant production.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	2003

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems

- 211 Insects, Mites, and Other Arthropods Affecting Plants
- 212 Pathogens and Nematodes Affecting Plants
- 307 Animal Management Systems

Outcome #9

1. Outcome Measures

Farm and ranch owners/managers, participating in the programs, will gain skills in business management practices.

Not Reporting on this Outcome Measure

Outcome #10

1. Outcome Measures

Farm and ranch owners/managers, participating in the programs, will realize increased profitability due to lower production costs or diversification of income.

Not Reporting on this Outcome Measure

Outcome #11

1. Outcome Measures

Farm, ranch and landscaping owners/managers and allied industry professionals, participating in the programs, will gain knowledge of pest and disease management for plant and animal production.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	80

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants

Outcome #12

1. Outcome Measures

Farm, ranch and landscaping owners/ managers and allied industry professionals, participating in the programs, will gain knowledge of cultural practices.

Not Reporting on this Outcome Measure

Outcome #13

1. Outcome Measures

Farm, ranch and landscaping owners/ managers and allied industry professionals, participating in the programs, will gain knowledge of irrigation management and drainage.

Not Reporting on this Outcome Measure

Outcome #14

1. Outcome Measures

Farm, ranch and landscaping owners/managers and allied industry professionals, participating in the programs, will adopt improvements in cultural practices.

Not Reporting on this Outcome Measure

Outcome #15

1. Outcome Measures

Producers increase sales as consumers become more aware of local, specialty crops.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Although Placer and Nevada Counties have a vibrant local food movement, less than two percent of the population buys local specialty crops regularly. A wide range of specialty crops is grown locally, and increasing sales would lead to more economically viable specialty crop sectors in local agriculture. In addition, increasing consumption of fresh fruits and vegetables is critical to combating the growing health crisis of obesity, diabetes and other diseases.

What has been done

UCCE Placer/Nevada led a collaborative effort that includes internal and external stakeholders. The program Consumer Outreach to Enhance Awareness and Marketing of Specialty Crops in the Sierra Foothill conducted an outreach campaign to reach 50,000 consumers, through the "Eat Local" website, Facebook pages, and point-of-sale materials. 27 promotional tastings of local produce were offered at farmers' markets, health centers, senior centers, and food pantries. In addition, a community dinner was held to help connect consumers and local farmers, and to encourage consumers to buy local produce; 81 consumers and 19 farmers attended.

Results

The farmers market and other event tastings, community dinners and promotional activities helped 150 local producers increase sales. In addition, consumers were educated about seasonal availability, nutritional value, preparation, and purchase points for local specialty crops to encourage consumers to try and buy local produce.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management

Outcome #16

1. Outcome Measures

Farm owner/operators and allied industry professionals, participating in agriculture education programs, gained knowledge of crop and varietal selection factors for plant production.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	1250

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms

Outcome #17

1. Outcome Measures

Small farm and ranch owner/operators and managers, participating in agriculture education programs, utilized alternative marketing of their crops to local consumers, including farmers markets, schools, restaurants, community supported agriculture boxes.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	200

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management

Outcome #18

1. Outcome Measures

Small farmers on the Central Coast of California are successfully growing new or promising profitable specialty crops.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The south Central Coast of California with its diverse climatic niches and soil types provides opportunity for the year-round production of a variety of unique crops. These crops and the proximity to diverse markets attract and support a large group of small acreage specialty crop entrepreneurs. Agriculture is extremely competitive for small farms in California. This agricultural community needs assistance and consultation in the production and marketing of alternative new crops, in order to offer valuable support to small scale and limited resource farmers in Santa Barbara and San Luis Obispo counties.

What has been done

UCCE continues to conduct research, outreach, and education on alternative new crops, expanding efforts with specific crops that have demonstrated high potential such as blueberries. UCCE evaluates new or promising specialty crops as alternatives for small farms on the Central

Coast. In 2013 presentations in English and Spanish were extended. A Spanish speaking webinar series on small farm management in collaboration with eXtension was held.

Results

Alternative new specialty crops are successfully being grown along the Central Coast of California. There is new and growing small farm acreage of crops such as blueberries, raspberries, blackberries, sweet onions, and vegetable soybean. There is a dramatic increase in new acreage of blackberries in Ventura, Santa Barbara, and San Luis Obispo. In addition, there is an increase in harvested acreage of coffee in Santa Barbara County, intercropping with avocados in established avocado orchards. These growers are successfully growing and selling coffee as an alternative new crop.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management

Outcome #19

1. Outcome Measures

New knowledge on conservation tillage systems for California tomatoes indicates cost savings and resource conservation benefits.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Rising fuel and labor costs oblige growers to carefully cut production costs. Reducing intercrop tillage typically associated with bed preparation operations is a promising means to cut costs in tomato production systems. A variety of "conservation tillage" (CT) crop production systems have been developed in other regions for crops such as corn, wheat, soybean, and cotton. To what extent, though, might CT principles and practices be adapted to tomato production in California?

What has been done

Since 1999, UC researchers have been evaluating CT practices for tomato production in

California. This work compares standard till (ST) and CT systems in terms of economics, profitability, soil properties, and dust emissions through a tomato-cotton rotation. The CT system reduced the total number of passes over the field by an average of nine per year, eliminating disking, chiseling, landplaning, and listing and shaping beds. CT system yields were comparable to those achieved by the ST approach, increasing profitability with CT because costs decreased and revenue remained unchanged.

Results

Although conservation tillage reduced the number of tillage passes by 50 percent. The total cultural cost of tomato production was reduced by about 10 percent: 41 percent for harvest, 14 percent for seed, only 20 percent for preplant tillage operations. The value of the savings from reducing labor and fuel prices will increase as labor rates and fuel costs per gallon increase. For example, CT reduced fuel use by 16 gallons per acre. At a price of \$1 per gallon, the savings is \$16; at a price of \$3 per gallon, the savings is \$39. Reducing the number of ground preparation operations by adopting CT always will reduce resource use and cut costs; however, overall profit may not improve if CT leads to a decrease in income due to a crop yield reduction that is greater than cost savings. Even if yields are lower under CT, profit can increase if the reduction in costs is greater than the income loss due to yield reduction. Other environmental or ecosystem services result from reducing tillage. Dust generation in the CT systems was reduced by more than 60 percent and greenhouse gas emissions were lower, particularly when coupled with the use of cover crops. Elements of these systems are now being adapted and pursued by some processing and fresh-market tomato growers on the west side of the San Joaquin Valley.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems
601	Economics of Agricultural Production and Farm Management

Outcome #20

1. Outcome Measures

New knowledge on conservation tillage systems for California cotton indicates cost savings and resource conservation benefits.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Cotton production in California's San Joaquin Valley relies on soil tillage for seedbed preparation, weed control, and postharvest pest management. Intensive tillage practices throughout the production season contribute to the crop's yield and help producers manage risk. But these practices are costly, requiring considerable labor, specialized tillage implements, and adequate tractor horsepower. Despite incentives programs through the Farm Bill and USDA encouraging tillage reduction, along with rising costs of tillage, most cotton in the San Joaquin Valley continues to be produced using traditional, heavy tillage practices. Cotton is one of the most tillage-intensive agronomic crops produced in California; tillage systems for cotton have changed little over the past 50 years.

What has been done

UC ANR researchers have evaluated a number of reduced-input Conservation Tillage systems (CT) in the San Joaquin Valley. These studies address "learning curve" issues for cotton producers such as the need for well-timed seeding techniques, adequate soil moisture for crop establishment and postharvest crop management practices that comply with state-mandated pink bollworm regulations. Once successful seeding techniques are worked out and adequate crop stands are established, yields of CT cotton are comparable to cotton produced through conventional tillage practices.

Results

Recent UC ANR studies show that CT cotton systems can reduce fuel use by more than 70 percent, increase soil carbon by more than 20 percent, and reduce dust emissions by more than 60 percent, relative to conventional till approaches. The cost savings and resource conservation benefits provided by CT production systems in cotton warrant further evaluation. Provided yield and profitability are maintained, various conservation tillage systems are becoming attractive to producers and more common in the San Joaquin Valley cotton-growing areas.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems
601	Economics of Agricultural Production and Farm Management

Outcome #21

1. Outcome Measures

New knowledge about cover cropping shows a number of potential benefits for Central Valley annual-cropping systems.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Diversifying crop rotations may be a means for reducing disease pressures and improving long-term productivity in California's annual crop production valleys. Using "off-season" or intercrop cover crops might be a useful crop diversification strategy that also could add organic matter to the soil and improve soil function and quality. In general, farmers have little experience with cover-cropping practices and have been reluctant to use them.

What has been done

UC ANR scientists evaluated the impacts of adding winter cover crops to annual crop rotations in California's San Joaquin and Sacramento Valley production regions. In a study initiated in 1999 at the UC West Side Research and Extension Center, the use of triticale/rye/vetch cover crops increased soil carbon by an average of 4,000 pounds per acre after four years under standard tillage and by 4,456 pounds per acre in a conservation or reduced tillage system. When projecting these results into the future to take into account the storage and emissions of various greenhouse gases such as CO₂, CH₄, and N₂O, the cover-crop systems -- particularly when coupled with reduced tillage -- can reduce emissions significantly relative to today's standard systems in which cover cropping and conservation tillage are not used. In addition, the use of subsurface drip systems may enhance the effects of cover crops and conservation tillage in reducing greenhouse gases.

Results

This initial research shows a number of potential benefits to using cover crops in Central Valley annual-cropping systems, including the improvement of soil properties and the mitigation of greenhouse gas emissions. Researchers and farm advisors are busy developing more grower-friendly practices and systems. They are studying the use of subsurface drip or overhead low-pressure irrigation systems in cover-crop systems, the evaluations of various new cover crops

and mixes, the timing of cover-crop establishment and termination, how to efficiently manage irrigation water resources in cover-crop systems, and more efficient means for cover-crop incorporation or management systems.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems

Outcome #22

1. Outcome Measures

Innovative mechanical trunk shaker is implemented commercially for California table olives, and offers hope for long-term industry sustainability.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The economic sustainability and consequent longevity of California's historic black ripe table olive industry is challenged by the cost of hand-harvest, which is often 50 to 75 percent of gross return. Hand-harvest costs are volatile due to dynamics in annual and regional crop load and labor supply, and are influenced by competition between growers and producers of other commodities. Reliance on hand-harvest in concert with weather-related crop failures has led to Tulare County olive acreage shrinking by 20 percent over the past decade. Multi-generational families of olive growers either left agriculture or diversified to other crops, forcing processors to import olives, often of a lower quality, to maintain inventory. Development of a mechanical harvesting method offers hope for long-term industry sustainability.

What has been done

The California Olive Committee funded efforts between UC ANR researchers and University of Cordoba, Spain researchers and industry stakeholders to develop mechanical harvesters. A UCCE specialist estimates that 80 percent fruit removal is necessary for economic feasibility of mechanical harvest. In 2006, another UCCE specialist formed a team of engineers, horticulturists

and farm advisors to develop and test mechanical harvesters. A trunk shaker originally used for pistachio and a prototype canopy-contact harvester developed for jatropha were modified for use on olive. Trunk shaker technology may be more applicable to olive trees with a smooth trunk, upright growth habit, and short scaffolds, whereas canopy-contact harvesters may be better suited for hedgerow plantings managed with mechanical pruning.

Results

The research team found that the mechanical harvesters achieved near 80 percent fruit removal efficiency, and panels of sensory and consumer analysts are unable to detect a difference between mechanically harvested and hand-harvested olives. This UC research that showed trunk shaking technology is feasible for table olive harvest inspired fabricators to continue improving upon the technology. In the 2012 season, the trunk shaking technology was first implemented commercially for table olives in Sacramento Valley.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #23

1. Outcome Measures

Beginning farmers, participating in farm management education, grow their businesses.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Beginning farmers often struggle to gain access to equipment, land, credit and markets. They often need to learn sound business practices and accumulate years of experience to move forward. The UCCE Farmer Individual Development Account program is helping beginning farmers develop a learning network, write business plans, and have successful experiences so they can grow their farm businesses.

What has been done

Humboldt County UCCE coordinated the Farmers Individual Development Account program with several other local agencies. This business development model has been used before with homebuyers and other small businesses; this program was the first in the county for farmers. The non-profit California FarmLink spearheaded the movement to use this program with farmers. A UCCE advisor worked with other agencies to open the way for farmers to participate, by developing workshops specifically for farm business planning and by fostering a learning community with new and experienced farmers. Participants put \$100 per month in savings accounts and attended workshops for 18 months (with a break for the growing season). At the end of the program their savings were matched 2:1 for a capital improvement for their farm.

Results

As a result of this project, all eight farmers developed a strong network among themselves and with a farmer-mentor in a non-competitive mode. The participants wrote business plans and attended financial planning workshops, met personnel from many agencies available to help them, and created a savings plan towards a major purchase. Three farmers met the savings program and were awarded a matching grant (funds are from private foundations supporting the program). One built a mist system for starting plants, another bought a rototiller, and the third bought materials for planting beds and a cold frame. The new farmers now benefit from a strong support network and are growing a variety of crops and selling both on the internet and at farmers markets.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management

Outcome #24

1. Outcome Measures

California rice farmers cultivate new varieties to increase yields and milling quality.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Over 90% of the rice acreage in California is planted to public varieties. Producers and processors need reliable data on varietal performance under commercial production practices in order to make management decisions on the selection of appropriate varieties for different locations and planting times.

What has been done

The UCCE statewide uniform variety-testing program is an ongoing research project initiated over 30 years ago. It is conducted throughout the California rice producing regions. The breeding staff at the California Rice Experiment Station in Biggs, CA, develops these varieties, then the UCCE trials evaluate the adaptability of public varieties and advanced lines to different climatic zones and soil types. UCCE extends this information on rice variety adaptation and cultural practices to rice growers.

Results

California rice farmers cultivate the newly released, UCCE evaluated, public rice varieties. Over 70% of the approximately 550,000 acres of rice in California are planted to these varieties (M-104, M-205, M-206, M-208, and M-105) released over the last 10 years.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms

Outcome #25

1. Outcome Measures

Orchard owner/operators and managers adopt superior varieties of nut crops to improve profitability.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2013	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Fruit and nut tree crop agriculture is a large and highly valued component of the California economy. However, farm profitability is under pressure from steadily rising production costs, depressed value of some commodities, and increased competition from imports. Tree crop producers and the allied industry constantly need new information to adapt to changing conditions and to remain competitive.

What has been done

UCCE trials in California's Central Valley evaluate selections for possible new cultivar release. Information was extended through a Statewide Pistachio Day, Almond Institute, field days, short courses, and educational presentations. This UCCE research and extension focusses on improving the culture and management of these nut crops, addressing both the ecological sustainability and economic viability of the production system.

Results

Orchard owner/operators and managers gained knowledge of pistachio and almond cultivars suitable for planting in commercial orchards. As of early 2013, orchard owner/operators and managers planted approximately 10,000 acres of the new UC pistachio cultivars, which harvest earlier than the major existing cultivar allowing for more efficient allocation of trained personal, harvesting equipment and hulling facilities. In addition, orchard owner/operators and managers are planting the newly released Winters variety, which is an early pollinator, more productive, and the nuts have higher value than previously available choices.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

UC ANR's notable, qualitative impact statements, as well as the quantitative outcomes

recorded from the evaluation studies, are reported under the State Defined Outcomes section.

Key Items of Evaluation

The Report Overview's federal Planned Program summary of accomplishments highlights UC ANR's most significant work during FY 2013, especially the research developments. In addition, the State Defined Outcomes section captures UC ANR's clientele behavior change outcomes, which demonstrate important program successes resulting from the research and extension network.