

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Plant Production Systems

2. Brief summary about Planned Program

Plant biology linking basic science with applied science is important to bring the results of basic plant science toward a usable form for applied agricultural sciences. Molecular biology and genomics are opening many new pathways for crop plant improvement and pest management, which will enhance the economic development of agricultural regions, enhance human health through more nutritious and safer food products, and find fundamental solutions to societal issues through renewable and sustainable crop production and pest management. Successful applied crop science, environmental science, and pest management only occur through collaboration with scientists actively involved in fundamental plant and pest sciences.

Cropping systems research and extension activities contribute significantly to the profitability and sustainability of field crop (including hayed or ensiled forages) production in Colorado. This is a key component of the state's rural economy. The goal of this program is to support sustainable and profitable field crop production systems in Colorado.

Three Extension Work Teams plan and will report in this Program Area: Wheat and Other Cropping Systems; Small Farms and Specialty Crops; and Pest Management.

The Small Farms and Specialty Crops Work Team strives to increase the sustainability and profitability of small and mid-sized farms whose operators report farming as their major occupation and report sales of less than \$250,000, or between \$250,000 and \$1,000,000 in less commodity oriented, diverse channels using a broad array of methodologies to provide education to producers and Team members.

There is a long-term need for a comprehensive, high quality integrated pest management system encompassing the disciplines of entomology, plant pathology and weed science. Pest activity and severity are dynamic and thus demand for pest diagnostics, management education and a systems approach will be ongoing. There is no other agency or organization that can assume the core applied research and outreach IPM program of Bioagricultural Sciences & Pest Management and IPM-disciplinary based extension and research personnel throughout the Colorado State University

•Pest Management, with a sub-team on Diagnostics and Pest Management •Plant Introduction and Invasive Species •Wheat-Based Dryland Cropping Systems

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

6. Expending other than formula funds or state-matching funds : Yes

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	10%		0%	
111	Conservation and Efficient Use of Water	10%		0%	
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		10%	
202	Plant Genetic Resources	0%		5%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		10%	
204	Plant Product Quality and Utility (Preharvest)	10%		0%	
205	Plant Management Systems	10%		20%	
206	Basic Plant Biology	0%		5%	
211	Insects, Mites, and Other Arthropods Affecting Plants	0%		10%	
212	Pathogens and Nematodes Affecting Plants	0%		10%	
213	Weeds Affecting Plants	0%		10%	
215	Biological Control of Pests Affecting Plants	0%		10%	
216	Integrated Pest Management Systems	10%		10%	
307	Animal Management Systems	10%		0%	
308	Improved Animal Products (Before Harvest)	10%		0%	
601	Economics of Agricultural Production and Farm Management	10%		0%	
602	Business Management, Finance, and Taxation	10%		0%	
604	Marketing and Distribution Practices	10%		0%	
	Total	100%		100%	

V(C). Planned Program (Situation and Scope)**1. Situation and priorities**

Colorado State has a history of providing crop selection and testing in other agronomic crops and fruits and vegetables to support the development of these agricultural industries in Colorado. In 2007, wheat generated \$608 million in commodity sales, dry beans \$21 million, potatoes \$181 million, and other agronomic crops and vegetable and fruit crops generated \$1,216 million, in Colorado. The value of these industries to the Colorado economy through other related economic activity is at least double these combined amounts.

Fundamental plant biology linking basic science with applied science is important to bring the results of basic plant science toward a usable form for applied agricultural sciences. Molecular biology and genomics are opening many new pathways for crop plant improvement and pest management, which will enhance the economic development of agricultural regions, enhance human health through more nutritious and safer food products, and find fundamental solutions to societal issues through renewable and sustainable crop production and pest management. Non-hybrid crop plants require public investment in genetic improvement to provide varieties of cultivars which improve yield, resist environmental and pest stresses, and serve the consuming public. Colorado State has a history of providing cultivar breeding for wheat, dry beans, and potatoes to serve the industries in climatic zones represented in Colorado.

Wheat

Wheat is the most widely grown crop in Colorado with an average of 2.1 million acres harvested in 2001 - 2010. Crop value over the same period has averaged \$313 million. This compares favorably to grain corn, which has averaged 980,000 acres and \$460 million in crop value over the same period. The difference in crop value per acre is explained by the fact that roughly 90% of Colorado's wheat is grown under dryland conditions, while about 75% of corn grown for grain is irrigated. Approximately 8% of Colorado wheat production comes from limited and fully irrigated conditions. Wheat for limited irrigation conditions is attracting more and more interest because the timing and amount of its water use minimizes competition with summer crops (alfalfa, corn, sunflower, sugarbeet and soybean).

There are approximately 9,000 wheat producers in Colorado, and their crop is an important part of the state's agricultural exports. Approximately 80% of the state's wheat production is exported, with the top 10 purchasers in 2009-2010 being Nigeria, Japan, Mexico, Philippines, Korean Republic, Taiwan, Venezuela, Colombia, Peru, and Indonesia.

The two most important negative pressures on agriculture are competition for water and urban development. Dryland production is not affected by the former and is less affected than irrigated cropland by the latter because the majority of non-irrigated cropland is located well out of the path of development, as evidenced by the list of ag-dependent counties above.

Efficient production practices continue to be an essential component of profitable wheat cultivation. Growers need up-to-date, research-based information on variety selection, seed quality, seeding rates, fertilization, carbon sequestration, management for wheat quality, weed management, the role of biofuels in wheat production systems, and crop rotations that optimize water use efficiency. Similar management information is required for traditional and emerging pests and diseases. While this situation statement emphasizes wheat and its importance to Colorado, this team also addresses issues with many other crops important to Colorado agriculture. These include corn, alfalfa, bean, sunflower, sorghum, millet and several others.

Small Farms

Direct market, value added, and/or entrepreneurial agriculture pertains to those Colorado farms and ranches with a particular focus on values-driven consumers who seek to make purchases from producers who share their values related to the principles of environmental health, economic profitability, and enhancing local communities. Sustainable agricultural business practices must also include enhancing soil productivity and the surrounding natural and social environment, while at the same time increasing biodiversity on the farm. Typically, these farms are considered "sustainable", as they focus on the triple bottom line (environmental, economic and social sustainability).

However, farms must also be profitable enough to provide an adequate return on the management, labor, and investment inputs. They must also provide investment capital for adapting to changing trends in markets and societal values. For the full-time farm, its economic base should be able to foster an adequate retirement for elderly managers and workers as well as a functional transition to subsequent generations.

2. Scope of the Program

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension
- Integrated Research and Extension
- Multistate Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Successful applied crop science, environmental science, and pest management do not occur in the absence of scientists actively involved in fundamental plant and pest sciences. Colorado State has created the Cancer Prevention Laboratory (CPL) embedded among strong programs of plant breeding and crop production research to address the interactions between crop composition and human health.

Wheat

Colorado farmers are economically challenged compared to the State's non-farm counterparts. Their ability to compete for land and water for irrigation is hampered by this disparity in net income. The average age of Colorado farmers in 2007 was 57 compared to 53.5 in 1997. The percentage of Colorado farmers with farm gate sales of over \$100,000 was 15.7% in 1997 vs. 13.8% in 2007. Of all Colorado farmers in 2007 less than 2.6% accounted for 75% of all agricultural products sold. These are primarily livestock, field crops (grains, oilseeds, and drybeans), and forage producers but probably include a very few specialty marketers for the nursery, produce, and greenhouse markets.

Extension integrated crop (and crop & livestock) and pest management based programs that work with producers, their advisors, and agricultural industry partners significantly impact many farm operators' economic and environmental vitality and sustainability. Farm operators are keenly interested in transferring vibrant farms for successful generations. These collaborative Extension programs provide the basis for successful farm transfers.

Small Farms

Approximately 78 percent of the farms and ranches in Colorado have annual agricultural sales of less than \$50,000, according to a 2006 survey conducted by Tranel, et.al. The impact of direct market, value added, and/or entrepreneurial agricultural strategies is even greater when one considers those farms classified by the USDA as small (less than \$250,000 in annual agricultural sales) and those farms using direct marketing strategies.

The team will continue to seek out opportunities to provide technical assistance and education to all facets of the agricultural community, but this team will focus on assistance that supports the triple bottom line of sustainability.

CSU researchers and Extension personnel excel in the technical assistance areas of integrated cropping systems, no-till and reduced tillage farming, site-specific/precision agriculture, manure and biosolid applications, biointensive crop integrated pest management, market farm production and marketing and alternative Ag business development.

Pest Management

continued staffing of pest management extension and research positions; continued increase in population

of Colorado

2. Ultimate goal(s) of this Program

- Molecular biology and genomics of crop plants and their pests, mechanisms of biological resistance to pests, mechanisms of invasion of weed species, and understand the molecular and cellular foundations for crop improvement and crop pest management.

- Combine the knowledge of human nutrition and plant genetics to extend crop selection, germplasm screening, and crop improvement with the objective to build greater amounts of compounds relevant to improved human health and disease prevention into these crops.
- Research in plant selection and improvement, limited-irrigation landscape plant cultivation, and landscape policies, and outreach in landscape industry plant selection, cultivation management, and Master Gardener education and volunteer development.
- Research in genetic determinants of host plant resistance, fundamental mechanisms of biological invasions, and ecology, bio-informatics, genomics, and population genetics of pests. Extension will include applied research and education relevant to emerging issues of Colorado's agricultural industries, including bio-security, safe and effective pesticide use, and implementation of effective pest management strategies that do not rely on pesticides.
- Evaluate new crop, range, and livestock systems in semi-arid environments including disciplinary and interdisciplinary work in crop and soil sciences, animal sciences, pest sciences, range science, wildlife biology and ecology, forest science, water sciences, economics, and landscape design and policy applicable to the state and region.
- Disseminate findings through extension educational programs aimed at changing practices to control pests.
- Proper diagnosis of plant problems, entomology related to plants and structures, weed control and recommendations of integrated pest management strategies.

- PM 1: Environment - reduced health complications that may result from exposure to pesticides and other negative outcomes of IPM practices.
- SFSC 1: Agricultural land owners and managers are wisely using natural resources
- SFSC 2: Colorado farmers and ranchers have formal succession/legacy plans so that land and water will remain in agriculture and pathways are created for beginning farmers and ranchers in production agriculture
- SFSC 3: Commercial agriculture producers of all sizes are increasing their opportunities for economic sustainability
- SFSC 4: Commercial producers are attaining their business goals and improving their business management and practices.
- SFSC 5: Colorado farmers and ranchers have increased access to resources, information and networks to improve their production enterprises.
- WOCS 1: Enhanced capacity of a sustainable global food system including new/improved plans, animals, technologies and management systems
- WOCS 2: Enhance adaptive capacity of production and natural systems to reduce exposure and vulnerability to climate variability and change.

V(E). Planned Program (Inputs)

1. Estimated Number of professional FTE/SYs to be budgeted for this Program

Year	Extension		Research	
	1862	1890	1862	1890
2013	18.1	0.0	26.0	0.0
2014	15.0	0.0	26.0	0.0
2015	15.0	0.0	26.0	0.0
2016	0.0	0.0	26.0	0.0
2017	0.0	0.0	26.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

- Conduct basic and applied research in plant productions systems.
- Workshops and educational classes for producers.
- Utilize demonstration plots and field days to communicate program results.
- Use individual counseling with producers and clientele on specific plant production problems

2. Type(s) of methods to be used to reach direct and indirect contacts

Extension

Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • Workshop • Group Discussion • One-on-One Intervention • Demonstrations • Other 1 (Field Days) 	<ul style="list-style-type: none"> • Public Service Announcement • Newsletters • Web sites other than eXtension • Other 1 (Radio reports)

3. Description of targeted audience

Individual agricultural producers, homeowners, agribusinesses, and commodity organizations.

V(G). Planned Program (Outputs)

NIFA no longer requires you to report target numbers for standard output measures in the Plan of Work. However, all institutions will report actual numbers for standard output measures in the Annual Report of Accomplishments and Results. The standard outputs for which you must continue to collect data are:

- Number of contacts
 - Direct Adult Contacts
 - Indirect Adult Contacts
 - Direct Youth Contacts
 - Indirect Youth Contact
 - Number of patents submitted
 - Number of peer reviewed publications
- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(H). State Defined Outputs

1. Output Measure

- PM 14) New Technologies Expected to be Adopted by Producers
- PM 2) Pest diagnostics in field, urban, office, individual settings
- PM 3) Trainings/Classes/Workshops, Field Days, Activity Days
- PM 4) Trainings for Volunteers
- PM 5) Trainings for Extension Staff
- PM 6) Community Meetings Convened [examples: Advisory Groups, Councils, Coalition Meetings, Boards]
- PM 7) Direct Communication/Education by field call, telephone and/or e-mail
- PM 8) Newsletters (This is number of newsletters, not number mailed or number of Coloradans who received them.)
- PM 9) Websites (number of Websites, not number of hits)
- PM 10) Websites hits (number of hits, not number of sites)
- PM 11) Press/News Release or Column (number submitted)
- PM 12) Volunteers (total) in Planned Program
- PM 13) Certified Master Volunteers (of those in #12)
- PM 15) External Grant Dollars
- PM 16) User Fees
- SFSC 1) Trainings/Classes/Workshops, Field Days, Activity Days
- SFSC 2) Direct Communication/Education by telephone and/or e-mail
- SFSC 3) New Technologies Expected to be Adopted by Producers
- SFSC 4) External Grant Dollars
- WOCS 1) Trainings/Classes/Workshops, Field Days, Activity Days
- WOCS 10) Press/News Release or Column (number submitted)

- WOCS 11) Volunteers (total) in Planned Program
- WOCS 12) New Technologies Expected to be Adopted by Producers
- WOCS 13) External Grant Dollars
- WOCS 14) User Fees
- WOCS 3) Trainings for Extension Staff
- WOCS 4) Community Meetings Convened [examples: Advisory Groups, Councils, Coalition Meetings, Boards]
- WOCS 5) Community Coalitions, Collaborations, Alliances Formed to Address a Specific Issue
Groups: USDA-ARS at Akron & Ft Collins Units
CSU Experiment Station
Colorado Sunflower Association,
Colorado Conservation Tillage Association
Colorado Wheat Research Foundation
Colorado Wheat Administrative Committee
Colorado Association of Wheat Growers
BASF Bayer CropScience
DuPont Syngenta
Issue: Providing Cropping Systems Education for Producers and their Advisors
- WOCS 6) Direct Communication/Education by telephone and/or e-mail
- WOCS 7) Newsletters (This is number of newsletters, not number mailed or number of Coloradans who received them.)
- WOCS 8) Websites (number of Websites, not number of hits)
- WOCS 9) Websites hits (number of hits, not number of sites)
- Amount of grant dollars garnered to support crop production systems research
- Clicking this box affirms you will continue to collect data on these items and report the data in the Annual Report of Accomplishments and Results.

V(I). State Defined Outcome

O. No	Outcome Name
1	Economic impact of the change in behavior reported.
2	Adoption of improved wheat cultivars.
3	PM 1.1 a: Participants will improve or intend to improve their practices, decisions and skills in action through timely access to pest management resources and/or pest identification and IPM implementation.
4	SFSC 1.1: Participants intend to adopt or have adopted and/or increase usage of production practices which will reduce greenhouse gas emissions, increase carbon sequestration, reduce carbon footprint and/or reduce ground water pollutants
5	SFSC 2.1: Participants intend to develop or have developed formal plans regarding succession
6	SFSC 3.1: Participants intend to further investigate alternative marketing strategies for their crop and/or livestock products
7	SFSC 3.2: Participants develop and use business, marketing and production plans
8	SFSC 3.3: Participants have implemented strategies for increasing the profitability of their crop and/or livestock enterprises (Action)
9	SFSC 3.4: Participants have implemented strategies for improving crop yield and quality
10	SFSC 3.5: Participants project they will have increased revenues and/or decreased costs
11	SFSC 4.1: Participants use a record-keeping system for financial and production records
12	SFSC 5.1: Participants have accessed resources, information and networks to improve their production enterprises
13	WOCS 1.1: % wheat (or other crop) acres planted to CSU and other recently released improved varieties.
14	WOCS 1.2: % of field crop acreage under crop and soil management systems that result in an enhancement of soil health and crop productivity (includes but is not limited to no-till or conservation tillage practices)
15	WOCS 1.3: % of producers using new marketing and/or management techniques for enhancing enterprise efficiency and optimizing net profits
16	WOCS 1.4: % of producers using research based nutrient management practices for cropping systems
17	WOCS 1.5: % of producers using research based integrated pest management practices for field crops
18	WOCS 2.1: % of farmed acreage planted to diversified cropping systems.
19	WOCS 2.2: % of farmed acreage managed with research based best management practices for water use crop efficiency
20	Adoption of crop production technology as measured by agricultural statistics

Outcome # 1

1. Outcome Target

Economic impact of the change in behavior reported.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems
- 206 - Basic Plant Biology
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 213 - Weeds Affecting Plants
- 215 - Biological Control of Pests Affecting Plants
- 216 - Integrated Pest Management Systems

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 2

1. Outcome Target

Adoption of improved wheat cultivars.

2. Outcome Type : Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 202 - Plant Genetic Resources
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems
- 206 - Basic Plant Biology
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 213 - Weeds Affecting Plants

4. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

Outcome # 3

1. Outcome Target

PM 1.1 a: Participants will improve or intend to improve their practices, decisions and skills in action through timely access to pest management resources and/or pest identification and IPM implementation.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 211 - Insects, Mites, and Other Arthropods Affecting Plants

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 4

1. Outcome Target

SFSC 1.1: Participants intend to adopt or have adopted and/or increase usage of production practices which will reduce greenhouse gas emissions, increase carbon sequestration, reduce carbon footprint and/or reduce ground water pollutants

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 205 - Plant Management Systems

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 5

1. Outcome Target

SFSC 2.1: Participants intend to develop or have developed formal plans regarding succession

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 602 - Business Management, Finance, and Taxation

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 6

1. Outcome Target

SFSC 3.1: Participants intend to further investigate alternative marketing strategies for their crop and/or livestock products

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 604 - Marketing and Distribution Practices

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 7

1. Outcome Target

SFSC 3.2: Participants develop and use business, marketing and production plans

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 602 - Business Management, Finance, and Taxation
- 604 - Marketing and Distribution Practices

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 8

1. Outcome Target

SFSC 3.3: Participants have implemented strategies for increasing the profitability of their crop and/or livestock enterprises (Action)

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 604 - Marketing and Distribution Practices

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 9

1. Outcome Target

SFSC 3.4: Participants have implemented strategies for improving crop yield and quality

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 10

1. Outcome Target

SFSC 3.5: Participants project they will have increased revenues and/or decreased costs

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 602 - Business Management, Finance, and Taxation
- 604 - Marketing and Distribution Practices

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 11

1. Outcome Target

SFSC 4.1: Participants use a record-keeping system for financial and production records

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 602 - Business Management, Finance, and Taxation

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 12

1. Outcome Target

SFSC 5.1: Participants have accessed resources, information and networks to improve their production enterprises

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 602 - Business Management, Finance, and Taxation

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 13

1. Outcome Target

WOCS 1.1: % wheat (or other crop) acres planted to CSU and other recently released improved varieties.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 202 - Plant Genetic Resources

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 14

1. Outcome Target

WOCS 1.2: % of field crop acreage under crop and soil management systems that result in an enhancement of soil health and crop productivity (includes but is not limited to no-till or conservation tillage practices)

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 601 - Economics of Agricultural Production and Farm Management

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 15

1. Outcome Target

WOCS 1.3: % of producers using new marketing and/or management techniques for enhancing enterprise efficiency and optimizing net profits

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 602 - Business Management, Finance, and Taxation
- 604 - Marketing and Distribution Practices

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 16

1. Outcome Target

WOCS 1.4: % of producers using research based nutrient management practices for cropping systems

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 17

1. Outcome Target

WOCS 1.5: % of producers using research based integrated pest management practices for field crops

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 216 - Integrated Pest Management Systems

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 18

1. Outcome Target

WOCS 2.1: % of farmed acreage planted to diversified cropping systems.

2. Outcome Type : Change in Action Outcome Measure

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 19

1. Outcome Target

WOCS 2.2: % of farmed acreage managed with research based best management practices for water use crop efficiency

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water

4. Associated Institute Type(s)

- 1862 Extension

Outcome # 20

1. Outcome Target

Adoption of crop production technology as measured by agricultural statistics

2. Outcome Type : Change in Knowledge Outcome Measure

3. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water
- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems
- 601 - Economics of Agricultural Production and Farm Management
- 604 - Marketing and Distribution Practices

4. Associated Institute Type(s)

- 1862 Research

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Programmatic Challenges

Description

Public policies and weather and other natural diseases will affect the adoption of new crop production technologies. Most of the advances are multi-year activities and cumulative rather than episodic in nature.

- weather conditions such as drought, flooding, hail, moisture/temperature trends influencing pathogen and pest life cycles, which will require short/medium/long term redirection of effort to accommodate program needs for pest diagnostics and management strategies
- economic issues that may lead more individuals to acquire and/or redirect their IPM strategies according to resource limitations or opportunities
- continued funding through federal, state and county agencies
- changes by governmental and non-governmental agencies to irrigation and pest management requirements

Drought: affects productive capacity and is a business risk

Economy: affects direct market purchasing power and is a business risk

Appropriations changes: ABM Small Farm Specialist is a great asset and loss of that position would negatively impact outcomes

Public Policy changes: food safety policies in local markets can be a business risk, immigration policy is currently a risk for ag labor

Competing public priorities: loss of traditional farming systems via public interest in market farms (dismissive of traditional farming) can cause systemic damage to the ag input supply sector as demand for these inputs wanes, loss of input providers, and make administration and management of ditch systems problematic for irrigation

Competing programmatic challenges: Extension covering several important programs can deplete time and effort toward these POW outcomes

Population changes: market demand may vary with population changes, requiring new marketing strategies and products, also a business risk

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Wheat: For this Planned Program, evaluation will be performed by [for example, distributing written surveys to all program participants.]

- The surveys will be done pre and post program
- The surveys will ask questions focused primarily on knowledge and skills gained and intention to change behaviors or use knowledge & skills gained. Follow-up surveys will ask for actual changes made and practices used as well as their economic or welfare benefits.
- The surveys will help us measure the percentage of program participants who increased people's knowledge and skills as well as the profitability and sustainability of people's business enterprises

(primarily farms & ranches).

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The results of the surveys will be distributed to or will be used for developing further program plans for the work team as well as developing impact reports for stakeholders.

Small Farms

- Evaluating impacts pre and post with written and online instruments based on stated learning and action outcomes in this POW
- using surveys and questionnaires with participants to elicit immediate, and in some cases, longer term changes in behavior, attitudes and practices because they participated in this team's programs.

Pest:

- For this Planned Program, evaluation criteria will be adapted from the National Roadmap for IPM and will be performed by distributing written surveys to all program participants.
- The surveys will be done pre and post program.
- The surveys will ask questions focused primarily on pest biology, education and management.
- The surveys will help us measure the percentage of program participants who increased their knowledge on pest biology, education, and management.