

# 2013 University of Arizona Combined Research and Extension Plan of Work

Status: Accepted

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## I. Plan Overview

### 1. Brief Summary about Plan Of Work

Many challenges will help to shape the future of Arizona agriculture in the year 2013 and beyond. Over the next decade Arizona agriculture will be challenged by international competition, environmental regulation, changes in technologies and the food and fiber production chain, and increased risk; this changing landscape offers new research and extension opportunities. We expect these challenges to be met through both individual management decisions and the actions by government, land grant colleges, and grass roots groups of agricultural producers. National, state and county budgets are a challenge which impacts the ability of the College of Agriculture and Life Science to meet stakeholders needs, and limited funding and diminishing grant opportunities are problematic but not impossible to overcome. In spite of the problems, it is important to note that the direct, induced and ripple effects of Arizona Agriculture provide overall impact of near 9 billion dollars into our rapidly growing state.

Arizona farmers have been and continue to be early adopters of new technologies, including laser leveling, drip irrigation, transgenic cottons, insect growth regulators (IGRs), and others. Informed, innovative farm managers, as well as price and yield incentives, helped spur this early, widespread adoption. Thus progressive farm management attitude and practices already in place will help assure the use and diffusion of new technologies in the next decade.

Technology is currently available to address many natural resource problems. To minimize adverse impacts on soil and water resources, ranchers will continue to conduct rangeland monitoring and adjust their livestock grazing systems. Specific methods are being developed to demonstrate effectively the benefits of instituting environmentally sound natural resource management programs. The College of Agriculture and Life Sciences is becoming a leader in this arena. The social, environmental and economic benefits from these new practices need to be quantified and compared to the costs of not implementing these programs.

New developments in precision implements, communication, and computer technology promise to change some farming and ranching activities. For example, data from precision implements will be analyzed and shared through on-line tools, permitting improved interaction between farmers and various other players in the food and fiber production system. GPS and GIS will be an important part of precision farming. A new relationship with NASA will build on the GPS and GIS activities and its practical application at the local level. Agribusinesses will be more closely linked by these technologies and provide inputs tailored to individual field and feedlot needs.

Farms will continue to use more biotechnology, especially for managing pests. Bt and Roundup Ready cotton provide good examples of ways that biotechnology will help meet the challenge of long-run price declines and environmental challenges. For the last few years, the UA cotton management team has worked closely with growers in implementing the use of insect growth regulators and Bt cotton in their fields. Because of this program, there has been a 60% decline in pesticide spraying, resulting in a reduction of 1.6 million pounds of pesticides used. This has saved 142 million dollars and reduced damage by 11%.

Collective actions will also affect farming in the next decade, perhaps even more so than in the past. At the federal level, economic policies seem on track to foster low interest rates, a crucial factor for capital-intensive agriculture, and a growing economy. Higher incomes will encourage demand for value-added and specialty agricultural products. Research and extension activities at the federal and state levels will provide information to reduce producer risk. At off-campus locations, the College of Agriculture and Life Sciences will use new computer and communications-based technologies to increase and make scientific

information more accessible to farm and agribusiness managers and employees.

Although it shows ups and downs, most of Arizona agriculture has prospered over the last ten to fifteen years by successfully meeting the challenges of declining real commodity prices, increasing input prices, serious pest problems, drought, and increasing government regulations. This capacity to meet challenges bodes well for the future.

We speculate that ten years from now Arizona agriculture will have about the same number of very large farms producing most of the state's agricultural production, the dairy sector will continue to expand, ranching may decline somewhat, and cropped acreage will be at about its present level, although the acreage of individual crops may change over the years. Native American agriculture will likely increase with the availability of affordable water. More noticeable changes will occur in production technologies, the degree of vertical integration, and increased interaction with the international market.

Our family and youth programs will also experience change. In this era of federal deregulation and block grants to states, Arizonans have both the opportunity and the responsibility to cope with the gap in children's health care coverage, the tragedies of child abuse and neglect, the struggles of parents without job skills, and chronic diseases such as obesity and diabetes. There is clear evidence that community effort can help prevent teenagers from having babies, committing crimes, and dropping out of school. Healthier people are better able to contribute to a robust economy.

Fortunately, we have the tools we need to face these challenges. The risk indicators confirm that focused attention, money, and uninterrupted effort over time will produce good results. As a result of increased federal and state investment, more children now have access to quality preschool, and more parents are getting help in paying for child care.

Health issues remain a challenge. We have a long way to go to reach the point where every Arizona child has the opportunity to succeed. The rate of reports of child abuse and neglect needing investigation grew about 30% in the past 10 years. The rate of child deaths due to abuse or neglect nearly doubled during that time. And perhaps the most alarming statistic is the 25% jump in the percentage of Arizona children living in foster care. These are the most vulnerable children in our communities, growing up without the security of a stable family. The challenge of our program is to provide unique research-based university outreach efforts in partnership with local and state government as well as non-governmental organizations to address these crises conditions.

**Estimated Number of Professional FTEs/SYs total in the State.**

Year	Extension		Research	
	1862	1890	1862	1890
2013	46.0	0.0	100.0	0.0
2014	46.0	0.0	100.0	0.0
2015	44.0	0.0	100.0	0.0
2016	44.0	0.0	95.0	0.0
2017	44.0	0.0	95.0	0.0

**II. Merit Review Process**

**1. The Merit Review Process that will be Employed during the 5-Year POW Cycle**

- Internal University Panel
- Combined External and Internal University Panel

## 2. Brief Explanation

Merit review for Extension covers all programs conducted by CES.

## III. Evaluation of Multis & Joint Activities

### 1. How will the planned programs address the critical issues of strategic importance, including those identified by the stakeholders?

The following list outlines our priorities, as identified by stakeholders( over 300 participants in a statewide survey conducted in 2008) (496 stakeholders surveyed in spring 2006) and faculty (from state initiatives and working groups, 2003 - 2005).

#### **ENSURE A SUSTAINABLE, PROFITABLE AND COMPETITIVE FOOD AND FIBER SYSTEM IN ARIZONA**

##### ***Livestock production-Help livestock producers:***

- Prevent potential threats by developing an early warning system to detect 1) new emerging diseases, 2) the resurgence of well-known diseases, and 3) the introduction of foreign animal diseases into the United States.
- Design management systems that fit an extensive range environment, including livestock production; genetics; nutrition; reproduction; economics; and grazing management.

##### ***Crop production-Help growers:***

- Increase water use efficiency in irrigated crops.
- Use best management practices to enhance sustainable production of plants used for food, fiber, livestock feed, industrial products, and for environmental, aesthetic, recreational, conservation and ornamental purposes.

##### ***Urban horticulture-Help homeowners and landscape managers:***

- Increase water use efficiency in home and commercial landscapes.
- Employ best management practices in the selection, installation, care and production of plants used for food, conservation, recreational and ornamental purposes.

#### **ENHANCE NATURAL RESOURCE CONSERVATION AND MANAGEMENT**

- Increase public awareness and understanding of water quality and quantity, watershed values, riparian areas, climate science and geospatial tools.
- Work with natural resource managers to improve management of rangeland and forest resources on a sustainable basis using best management practices.

#### **IMPROVE THE HEALTH, SAFETY AND ECONOMIC SECURITY OF ARIZONA INDIVIDUALS, FAMILIES AND COMMUNITIES**

- Provide training to help Arizona residents acquire the knowledge, skills, attitudes and behaviors necessary for self-sufficient, healthy lifestyles.
- Equip youth and adults with work and life skills to help them acquire and keep jobs in today's workforce.

**PREPARE ARIZONA YOUTH TO BE PRODUCTIVE CITIZENS, EQUIPPED WITH THE KNOWLEDGE, SKILLS AND ATTITUDES NEEDED FOR LIFE-LONG LEARNING AND A POSITIVE FUTURE**

•Engage youth as participants and decision-makers in programs, organizations, and communities of 4-H and beyond.

• Promote the Arizona 4-H Youth Development program among diverse communities in Arizona.

**2. How will the planned programs address the needs of under-served and under-represented populations of the State(s)?**

The University of Arizona is an equal opportunity,affirmative action institution.The University does not discriminate on the basis or race, color, religion, sex, national origin, age, disability, veteran status or sexual orientation in its programs and activities.The University has special and specific initiatives to work with Hispanic and Native American populations.

**3. How will the planned programs describe the expected outcomes and impacts?**

Each program utilized a logic model in planning expected outcomes and evaluation.All faculty report yearly in APROL (Annual performance report on-line) results of planned programs.Many of these reports are used to develop impact statement for a variety of clientele and for CSREES.The College 5 year plan describes the expected outcome and impacts of the six programs outlined in this Plan of Work. Within each program mutli-state and multi-institution issues are also addressed and encouraged. All state specialists have joint Extension and Research funding and expectations.

Being a border state with Mexico, California, New Mexico, Nevada, Utah, and Colorado, numerous multi-state programs exist through the collaborative efforts of faculty from each state.This type of collaboration improves effectiveness and responsiveness.

**4. How will the planned programs result in improved program effectiveness and/or**

This plan will continue the long standing integration between research and extension with appropriate input from stakeholders.

**IV. Stakeholder Input**

**1. Actions taken to seek stakeholder input that encourages their participation**

- Use of media to announce public meetings and listening sessions
- Targeted invitation to traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to selected individuals from general public
- Survey of traditional stakeholder groups
- Survey of traditional stakeholder individuals

**Brief explanation.**

Public input is extremely important to the College of Agriculture and Life Sciences. Because we are a Land Grant College committed to serving the needs of the State of Arizona, the College regularly seeks stakeholder input, programmatic feedback, and advice on future directions from citizens.

**2(A). A brief statement of the process that will be used by the recipient institution to identify individuals and groups stakeholders and to collect input from them**

**1. Method to identify individuals and groups**

- Use Advisory Committees
- Use Internal Focus Groups
- Use External Focus Groups
- Open Listening Sessions
- Needs Assessments

**Brief explanation.**

1) Advisory Boards

a) *Cooperative Extension.*

The Legislature of the State of Arizona accepted the provisions of the Smith-Lever Act in 1915. It authorized the Board of Regents of the University of Arizona, the Land Grant University in Arizona, to "organize and conduct agricultural Extension work which shall be carried on in connection with the College of Agriculture and Life Sciences of the UA in accordance with the terms and conditions expressed in the Act of Congress aforesaid". This State legislation also empowered county governments to appropriate funds for the county Extension program.

Currently, according to Arizona State Law *ARS 3-124-127*, each County Extension Board consists of seven persons, who are residents of the county, four of whom have as their principal business the production of agricultural commodities, and the other three of whom are representative of organizations or persons who utilize the county Cooperative Extension offices. Extension faculty are sensitive to including membership representative of their county regardless of racial or ethnic background. Names of Advisory Boards for each Arizona county are available at the Cooperative Extension web site (<http://ag.arizona.edu/extension/>).

The County Extension Boards have three responsibilities. First, in order to build educational program priorities that are based on needs of local people, the Extension Board must approve the Annual County Plan of Work. The county Extension faculty present a prioritized list of potential programs and the Board may suggest others. In setting priorities, Cooperative Extension is interested in involving a broad-based, representative county group that may include commodity groups, 4-H councils, family consumer groups and community development groups.

Another role of the County Extension Board is to annually approve the county Extension budget, submitted to the Extension Board by the County Director. This budget covers all funds expended for Extension work in the county. According to the legislation, the Board of Supervisors of each county must provide reasonable rent-free office space for the conduct of extension work in that county.

Finally, the Extension Board approves the Annual Report of Extension work in the county. County reports are available at the Cooperative Extension web site.

b) *Experiment Station*

Individual advisory boards have been established for each of the following Agricultural Centers: Maricopa, Safford, Yuma, Santa Rita Experimental Range and the V-V Ranch. The boards have representatives from the agricultural community, the agri-business community and include consumer representatives who are appointed on a rotational basis. These boards meet from two to four times per year to review ongoing programs and make recommendations for change. In addition, the State 4-H Youth Development program, the

Departments of Agricultural and Biosystems Engineering and Animal Science and the Schools of Renewable Natural Resources and Family and Consumer Studies have separate advisory committees that provide input to the programs of these units.

2) State Program Evaluation

Accountability is increasingly important to secure new resources, maintain visibility, and market effectiveness. Every faculty member in the College of Agriculture and Life Sciences provides an Annual Performance Report (APR) of accomplishments and impacts for the previous year, and a plan of major commitments for the coming year. The faculty prepare their APRs on-line, in a system called APROL.

Since the year 2004, the College of Agriculture and Life Sciences has a searchable database of programs and their impacts. Key components of the database are: (1) college-wide reporting, linking extension, research and teaching; (2) agricultural experiment station reporting of federal project data; (3) Cooperative Extension reporting of federal clientele contact data and outreach activities.

Statewide program priorities for the next three to five years were identified during the exercises of several program reviews for the V-V Ranch (Agricultural Center), Family and Consumer Sciences, Horticulture, Natural Resources and Integrated Pest Management as well as several county reviews for 4-H Youth Development. Extension faculty are committed to an on-going process of self-improvement in outreach programs.

**2(B). A brief statement of the process that will be used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them**

**1. Methods for collecting Stakeholder Input**

- Meeting with traditional Stakeholder groups
- Survey of traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Survey of traditional Stakeholder individuals
- Meeting with the general public (open meeting advertised to all)
- Meeting with invited selected individuals from the general public
- Survey of selected individuals from the general public

**Brief explanation.**

See prior statements

**3. A statement of how the input will be considered**

- In the Budget Process
- To Identify Emerging Issues
- Redirect Extension Programs
- Redirect Research Programs
- In the Action Plans
- To Set Priorities

**Brief explanation.**

Stakeholder input is used by both CES and AES for determination of priorities and establishment of programs.

## V. Planned Program Table of Content

S. No.	PROGRAM NAME
1	Climate Change
2	FAMILY, YOUTH, AND COMMUNITY
3	Global Food Security and Hunger
4	Food Safety
5	Childhood Obesity



**V(A). Planned Program (Summary)**

**Program # 1**

**1. Name of the Planned Program**

Climate Change

**2. Brief summary about Planned Program**

The consequences of broader land use activities that are known to contribute to water quality and degradation challenge decision makers in the arid Southwest. Energy and water efficient landscaping (Xeriscape) demonstrates how to create beautiful and efficient environments compatible with the desert communities. Science and data management provide inputs, such as the AZMET automated weather stations in Arizona where collected data is made available to turf grass managers, cotton and vegetable farmers, park managers and specialized agricultural producers. Programs are planned around xeriscaping, nonpoint pollution, drought related strategies, climate science, rangeland monitoring, watershed management, the consequences of pathogen detection, and related outreach educational programs. Growers in the arid Southwest manage water, fertilizer applications and nutrient relationships. With over one million acres of irrigated cropland in Arizona, with crops ranging from citrus, and lettuce, to pecans and apples, measuring water and nutrient relationships is a critical part of any management system. Programs are planned for irrigation studies, wastewater management, contamination, nutrient management, hydroponics, sustainability and environmental impacts.

**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	37%		37%	
111	Conservation and Efficient Use of Water	16%		16%	
112	Watershed Protection and Management	16%		16%	
121	Management of Range Resources	31%		31%	
	<b>Total</b>	100%		100%	

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

**1. Situation and priorities**

The demand for water, especially from the municipal and industrial sectors, continues to increase. Agriculture remains as a significant economic contributor to the state. Sustainability entails management challenges for the efficient and effective use of scarce water resources including the use of

The amount of water going into agriculture will be reduced slightly each decade. The consequences of a prolonged drought will effect farms, ranches, tribes, metropolitan areas and wildlife. Arizona is growing and developing in leaps and bounds with major building projects appearing in every community. Farmers are planting more houses than pecans. Water professionals in the state continue to discuss the challenges of watershed issues, assuring long-term water supplies and meeting water management objectives, whether statutory or otherwise. The competition for water supplies could be fierce among different regions of the state, between agriculture and the metropolitan areas, between tribes and other entities in the state. Both demand and supply side solutions need study. Programs are planned around the use of tribal water, water brokering, conservation, onsite wastewater demonstrations, installation and maintenance of septic systems, water audits, water education for teachers, and master watershed programs.

**2. Scope of the Program**

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

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

**1. Assumptions made for the Program**

Demand for water use will increase with population growth and tribal needs. Everyone wants others to use less water and enhance their water usage. Tribal water rights are changing access to water. The State of Arizona water law continues to drive policy decisions. Population growth is transforming the landscape. Controlled environment agriculture (greenhouse production) will continue to expand.

**2. Ultimate goal(s) of this Program**

Develop programs that reduce usage, conserve, and maximize the use of water. Create better management systems, improve early detection of contaminants, use precision technology to reduce water usage and improve water quality. Provide the best science, environmental data, and legal precedent to find compromise in water policy and management.

**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	11.0	0.0	21.0	0.0
2014	11.0	0.0	21.0	0.0
2015	11.0	0.0	21.0	0.0
2016	11.0	0.0	20.0	0.0
2017	11.0	0.0	20.0	0.0

**V(F). Planned Program (Activity)**

**1. Activity for the Program**

Extension specialists and their clients need expanded knowledge about water quality and quantity to help protect the environment and safeguard our food supply.

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

<b>Extension</b>	
<b>Direct Methods</b>	<b>Indirect Methods</b>
<ul style="list-style-type: none"> <li>● Education Class</li> <li>● Workshop</li> <li>● Group Discussion</li> <li>● One-on-One Intervention</li> <li>● Demonstrations</li> </ul>	<ul style="list-style-type: none"> <li>● Public Service Announcement</li> <li>● Newsletters</li> <li>● TV Media Programs</li> <li>● Web sites other than eXtension</li> </ul>

**3. Description of targeted audience**

Natural resource managers, Governor's Office and state agencies, municipal organizations and leaders, households, consumers, youth, master gardening and master watershed programs

**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**

- Effectiveness of the research program will be used to reach direct and indirect contacts
- Number of individuals participating in educational programs
- Number of individuals adopting new technology
- 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	Effectiveness of research programs will be based on publications, external grant support, and integration into existing extension programs
2	Number of individuals gaining knowledge by participating in educational programs
3	Volunteers completing Master Gardening training
4	Create awareness and increase knowledge

**Outcome # 1**

**1. Outcome Target**

Effectiveness of research programs will be based on publications, external grant support, and integration into existing extension programs

**2. Outcome Type** : Change in Knowledge Outcome Measure

**3. Associated Knowledge Area(s)**

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 121 - Management of Range Resources

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 2**

**1. Outcome Target**

Number of individuals gaining knowledge by participating in educational programs

**2. Outcome Type** : Change in Knowledge Outcome Measure

**3. Associated Knowledge Area(s)**

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 121 - Management of Range Resources

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 3**

**1. Outcome Target**

Volunteers completing Master Gardening training

**2. Outcome Type : Change in Knowledge Outcome Measure**

**3. Associated Knowledge Area(s)**

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 121 - Management of Range Resources

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 4**

**1. Outcome Target**

Create awareness and increase knowledge

**2. Outcome Type : Change in Action Outcome Measure**

**3. Associated Knowledge Area(s)**

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 121 - Management of Range Resources

**4. Associated Institute Type(s)**

- 1862 Extension
- 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 Public priorities

**Description**

Available resources will be the largest factor affecting outcomes followed by climate.

**V(K). Planned Program - Planned Evaluation Studies**

**Description of Planned Evaluation Studies**

All programs are currently in the process of being evaluated internally for existing areas to preserve, protect, or enhance, as well as areas to discontinue or modify. We will seek further input from stakeholders, advisory committees, and focus groups utilizing needs assessments with the assistance and expertise of an Evaluation Specialist. See State Defined Outcomes.



**V(A). Planned Program (Summary)**

**Program # 2**

**1. Name of the Planned Program**

FAMILY, YOUTH, AND COMMUNITY

**2. Brief summary about Planned Program**

Our outreach efforts build on the research base from our School of Family and Consumer Sciences and related departments, to address family and human development, cognitive (early brain) development, child care, dependent care, parenting and after school programs. The plan of work addresses the economic, social, psychological and biological factors affecting individuals, families and groups over their lifespan. 4-H youth development is the prime youth program with direct access to technological advances in agriculture, life sciences, human development, social sciences and related areas which result from land-grant university research. Youth development is helping young people become mature, competent adults capable of participation and leadership in their communities with valuable skills on entry into the workforce.

**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
802	Human Development and Family Well-Being	40%		40%	
806	Youth Development	60%		60%	
	<b>Total</b>	100%		100%	

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

**1. Situation and priorities**

Arizona's population is both aging (the first baby boomers will turn 65 in 2011) and growing in numbers of youth. The fastest growing segment is the Hispanic population and the ages of most people moving into Arizona are the 20's and 30's (and their children). Events and trends in California greatly influence the population of Arizona. In addition, the influx of population from and through the Mexican border influence family, community and individual needs. High School drop out rates (among the highest in the US), new immigrants, low income families, and limited after school literacy programs challenge traditional approaches. Programs are designed to link educational and community resources to improve family well-being.

**2. Scope of the Program**

- In-State Extension
- In-State Research
- Multistate Research
- Multistate Extension

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

**1. Assumptions made for the Program**

Increased rapid growth of a diverse population with diverse needs will continue. In addition, the rapid growth of disadvantaged populations both existing (especially certain Native American Tribes) and recent immigrants will challenge our research capacities to deliver relevant programs sensitive to population needs.

**2. Ultimate goal(s) of this Program**

To develop and provide research-based programs that address the evolving social challenges in our communities. These include educational programs such as financial literacy, training child care providers on early brain development, and helping youth learn problem-solving skills. This will result in life skills and leadership for individuals, families and the community

**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	22.0	0.0	5.0	0.0
2014	22.0	0.0	5.0	0.0
2015	22.0	0.0	5.0	0.0
2016	20.0	0.0	4.0	0.0
2017	21.0	0.0	5.0	0.0

**V(F). Planned Program (Activity)**

**1. Activity for the Program**

Conduct research and deliver services, products and information.

**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"><li>● Education Class</li><li>● Workshop</li><li>● Group Discussion</li><li>● One-on-One Intervention</li></ul> | <ul style="list-style-type: none"><li>● Public Service Announcement</li><li>● Newsletters</li><li>● Web sites other than eXtension</li></ul> |
|---------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|

### 3. Description of targeted audience

Parents, educators, youth, community groups.

### 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

- Number of individuals participating in educational programs
- Number of educational events, training workshops and clinics

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	Adoption of essential life skills by Arizona's youth that leads to a responsible, productive, and healthy life-style
2	Adoption of life building skills including self-discipline, responsibility and leadership

**Outcome # 1**

**1. Outcome Target**

Adoption of essential life skills by Arizona's youth that leads to a responsible, productive, and healthy life-style

**2. Outcome Type :** Change in Knowledge Outcome Measure

**3. Associated Knowledge Area(s)**

- 802 - Human Development and Family Well-Being
- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 2**

**1. Outcome Target**

Adoption of life building skills including self-discipline, responsibility and leadership

**2. Outcome Type :** Change in Knowledge Outcome Measure

**3. Associated Knowledge Area(s)**

- 802 - Human Development and Family Well-Being
- 806 - Youth Development

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**V(J). Planned Program (External Factors)**

**1. External Factors which may affect Outcomes**

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations

**Description**

Changing economy and loss of support for school systems.

**V(K). Planned Program - Planned Evaluation Studies**

**Description of Planned Evaluation Studies**

All programs are currently in the process of being evaluated internally for existing areas to preserve, protect, or enhance, as well as areas to discontinue or modify. We will seek further input from stakeholders, advisory committees, and focus groups utilizing needs assessments with the assistance and expertise of an Evaluation Specialist. See State Defined Outcomes.

## **V(A). Planned Program (Summary)**

### **Program # 3**

#### **1. Name of the Planned Program**

Global Food Security and Hunger

#### **2. Brief summary about Planned Program**

Arizona has farm gate sales of nearly \$4 billion, and approximately 55% of the total comes from the sales of crops and crop products and 45% from animal and animal products which contribute to overall food security and hunger. Agriculture is diverse in Arizona because of its wide spectrum of climate and terrain. Temperatures range from very cold in the higher mountain areas to searing heat in the desert. Cropping in Arizona requires plants that are resistant to extremes in temperature and also tolerant to high salt situations which are prevalent throughout much of the state. Virtually all crops in Arizona are irrigated which places an added level of management on all cropping systems. The lack of sustained freezing temperatures in the main cropping areas of the state leads to unique problems with insects that have detrimental effects on plants. There is continuing need for research leading to the development of land, water, plant and insect management systems which insure the profitability and sustainability of arid land cropping enterprises while maintaining the quality of ground and surface waters. There will be continuing need for research leading to the development of a better understanding of basic plant genetics and genomics including an elucidation of the interactions among the physical, chemical, and biological mechanisms controlling the production of crops, as well as the degradation of water and soil resources at the source-area, farm, and watershed scales. Animal agriculture represents a significant component of farm gate sales in Arizona. Ensuring that animal agriculture remains profitable and sustainable in a public lands state is a challenge, particularly for beef cattle producers. It is incumbent on the Land Grant University to assist in the development of sustainable production systems that are compatible with arid environments and public lands grazing policies. In addition, dairy production is located in very hot environments which present a set of problems that have significant financial impacts in the State, as well as other hot and arid regions around the world. The proximity of some livestock production units adjacent to a foreign border have unique situations with respect to stress from both the environment and threats of disease. The plan of work deals with economic analysis and the resource allocation processes of businesses and or consumers in the global marketplace. It also deals with the strategic analysis of the environments in which marketers and retailers operate to create successful management strategies and tactics in the global, value-added chain for food, fiber, services and other consumer goods. The results of these efforts will impact on economic development, on the marketplace and the communities, on global trade and on natural resources and the environment.

**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

<b>KA Code</b>	<b>Knowledge Area</b>	<b>%1862 Extension</b>	<b>%1890 Extension</b>	<b>%1862 Research</b>	<b>%1890 Research</b>
101	Appraisal of Soil Resources	6%		6%	
201	Plant Genome, Genetics, and Genetic Mechanisms	13%		13%	
205	Plant Management Systems	10%		10%	
206	Basic Plant Biology	10%		10%	
211	Insects, Mites, and Other Arthropods Affecting Plants	12%		12%	
212	Pathogens and Nematodes Affecting Plants	12%		12%	
215	Biological Control of Pests Affecting Plants	6%		6%	
301	Reproductive Performance of Animals	2%		2%	
302	Nutrient Utilization in Animals	6%		6%	
305	Animal Physiological Processes	3%		3%	
306	Environmental Stress in Animals	14%		14%	
605	Natural Resource and Environmental Economics	4%		4%	
610	Domestic Policy Analysis	2%		2%	
	<b>Total</b>	100%		100%	

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

Although cotton was the prominent crop in Arizona for many years, vegetable production has surpassed cotton. International competition, price volatility, the high cost of irrigation water and the probability of losing the current commodity program all are drivers in crop production and profitability. Better cropping and management systems are needed for those currently engaged in cotton and produce, and new cropping systems need to be developed for alternative crops that are being developed, tested and adopted. Disease and insect problems are ever present. In animal agriculture, market conditions, limited rainfall, poisonous plants and a threat from cross-border diseases continue to provide challenges. The dairy industry is also challenged with volatile prices and a unique set of production problems related to the environment and size.

**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**

Economics and changes in the global economy will require that all forms of plant and animal production in Arizona will have to become more efficient. Cotton production may not increase significantly, but vegetables, forages and alternative crops will become more prevalent. New crops will require considerable effort for all aspects of management including identification of appropriate crop varieties and irrigation scheduling, fertilizer requirements, and insect and disease control. Dairy and beef production will continue to be an important component of Arizona agriculture.

**2. Ultimate goal(s) of this Program**

Develop new and more appropriate production systems to assure profitability and sustainability of production for those who grow cotton, vegetables, citrus, forages, small grains, and for the new and alternative crops that are adopted and adapted. Gain a better understanding of basic plant genetics and genomics including an elucidation of the interactions among the physical, chemical, and biological mechanisms controlling the production of crops. Develop cost effective means for controlling plant diseases and insect damage. Gain a better understanding of basic animal genetics and genomics and in particular gain an understanding of molecular mechanisms that allow animals to adapt to harsh environments to sustain growth, milk production and reproductive efficiency.

**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	8.0	0.0	30.0	0.0
2014	8.0	0.0	30.0	0.0
2015	11.0	0.0	44.0	0.0
2016	10.0	0.0	40.0	0.0
2017	11.0	0.0	41.0	0.0

**V(F). Planned Program (Activity)**

**1. Activity for the Program**

Effectiveness of the research program will be based on publications, external grant support and integration into extension programs.

**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"> <li>● Education Class</li> <li>● Workshop</li> <li>● Group Discussion</li> <li>● One-on-One Intervention</li> <li>● Demonstrations</li> </ul>	<ul style="list-style-type: none"> <li>● Public Service Announcement</li> <li>● Newsletters</li> <li>● TV Media Programs</li> <li>● Web sites other than eXtension</li> </ul>

**3. Description of targeted audience**

Commodity groups, state agencies, pest management advisors, pesticide applicators, youth, ag-ventures programs.

**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**

- Number of individuals participating in educational programs
  - Number of research projects conducted on all aspects of Plant Sciences, Animal Sciences, and Agriculture and Resource Economics
- 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	Adoption of better management practices for crop and animal production
2	Adoption of alternative crop and animal technologies
3	Adoption of more cost effective means for controlling plant and animal diseases along with insect issues

### **Outcome # 1**

#### **1. Outcome Target**

Adoption of better management practices for crop and animal production

#### **2. Outcome Type : Change in Action Outcome Measure**

#### **3. Associated Knowledge Area(s)**

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 205 - Plant Management Systems
- 206 - Basic Plant Biology
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 215 - Biological Control of Pests Affecting Plants
- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 305 - Animal Physiological Processes
- 306 - Environmental Stress in Animals
- 605 - Natural Resource and Environmental Economics
- 610 - Domestic Policy Analysis

#### **4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

### **Outcome # 2**

#### **1. Outcome Target**

Adoption of alternative crop and animal technologies

#### **2. Outcome Type : Change in Condition Outcome Measure**

#### **3. Associated Knowledge Area(s)**

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 205 - Plant Management Systems
- 206 - Basic Plant Biology
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 215 - Biological Control of Pests Affecting Plants

- 302 - Nutrient Utilization in Animals
- 305 - Animal Physiological Processes
- 306 - Environmental Stress in Animals
- 605 - Natural Resource and Environmental Economics
- 610 - Domestic Policy Analysis

#### **4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

### **Outcome # 3**

#### **1. Outcome Target**

Adoption of more cost effective means for controlling plant and animal diseases along with insect issues

#### **2. Outcome Type : Change in Action Outcome Measure**

#### **3. Associated Knowledge Area(s)**

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 205 - Plant Management Systems
- 206 - Basic Plant Biology
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 215 - Biological Control of Pests Affecting Plants
- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 306 - Environmental Stress in Animals
- 605 - Natural Resource and Environmental Economics
- 610 - Domestic Policy Analysis

#### **4. Associated Institute Type(s)**

- 1862 Extension
- 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 Public priorities
- Competing Programmatic Challenges

**Description**

Available resources will be the largest factor affecting outcomes followed by climate.

**V(K). Planned Program - Planned Evaluation Studies**

**Description of Planned Evaluation Studies**

All programs are currently in the process of being evaluated internally for existing areas to preserve, protect, or enhance, as well as areas to discontinue or modify. We will seek further input from stakeholders, advisory committees, and focus groups utilizing needs assessments with the assistance and expertise of an Evaluation Specialist. See State Defined Outcomes.

**V(A). Planned Program (Summary)**

**Program # 4**

**1. Name of the Planned Program**

Food Safety

**2. Brief summary about Planned Program**

These programs focus on the relationships of the life sciences to human health promotion, disease prevention and food safety. Programs will use innovative interdisciplinary approaches to discovering, translating, and applying how nutrition and physical activity can prevent disease and promote good health and well-being. The safety and quality of food for human consumption is addressed by programs directed towards transportation, processing and consumer handling of food. Programs will encompass a broad range of approaches from basic cellular and molecular research to clinical human research studies and education programs.

**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
702	Requirements and Function of Nutrients and Other Food Components	50%		50%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	50%		50%	
	<b>Total</b>	100%		100%	

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

**1. Situation and priorities**

The Center for Disease Control and Prevention estimates that food borne diseases cause approximately 76 million illnesses, 325,000 hospitalizations and 5,000 deaths annually in the United States. These conditions challenge both extension and research agendas.

**2. Scope of the Program**

- In-State Extension
- In-State Research
- Multistate Research

- Integrated Research and Extension
- Multistate Integrated Research and Extension

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

**1. Assumptions made for the Program**

Chronic illness will increase especially in certain Arizona populations (e.g., Hispanic and Native American). Food access, quality, and safety will continue to be a challenge especially for low income audiences and for the population as a whole.

**2. Ultimate goal(s) of this Program**

To foster innovative research and translate new discoveries into culturally-appropriate and effective individual and community programs for improving the health and well-being of people. To lead the way in advancing the understanding of the long term affects of physical activity and nutrition practices on health promotion and disease prevention. To continue to develop state-of-the-art exercise and nutrition research and education programs and evaluate the impact of these programs on health and wellness in diverse populations.

**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	9.0	0.0	9.0	0.0
2014	9.0	0.0	9.0	0.0
2015	9.0	0.0	9.0	0.0
2016	9.0	0.0	9.0	0.0
2017	9.0	0.0	9.0	0.0

**V(F). Planned Program (Activity)**

**1. Activity for the Program**

Conduct research, conduct workshops, meetings, deliver services and information.

**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"> <li>• Education Class</li> <li>• Workshop</li> <li>• Demonstrations</li> </ul>	<ul style="list-style-type: none"> <li>• Public Service Announcement</li> <li>• Newsletters</li> <li>• Web sites other than eXtension</li> </ul>



### 3. Description of targeted audience

General public, educators, health professionals, extension educators.

### 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

- Effectiveness of the research program will be based on publications, external grant support, and integration into existing extension programs

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	Create awareness and increase knowledge
2	Number of individuals adopting recommendations for nutrition and health

**Outcome # 1**

**1. Outcome Target**

Create awareness and increase knowledge

**2. Outcome Type** : Change in Action Outcome Measure

**3. Associated Knowledge Area(s)**

- 702 - Requirements and Function of Nutrients and Other Food Components
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**Outcome # 2**

**1. Outcome Target**

Number of individuals adopting recommendations for nutrition and health

**2. Outcome Type** : Change in Knowledge Outcome Measure

**3. Associated Knowledge Area(s)**

- 702 - Requirements and Function of Nutrients and Other Food Components
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**V(J). Planned Program (External Factors)**

**1. External Factors which may affect Outcomes**

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations

**Description**

Lack of money will be the major driver.

**V(K). Planned Program - Planned Evaluation Studies**

**Description of Planned Evaluation Studies**

All programs are currently in the process of being evaluated internally for existing areas to preserve, protect, or enhance, as well as areas to discontinue or modify. We will seek further input from stakeholders, advisory committees, and focus groups utilizing needs assessments with the assistance and expertise of an Evaluation Specialist. See State Defined Outcomes.

**V(A). Planned Program (Summary)**

**Program # 5**

**1. Name of the Planned Program**

Childhood Obesity

**2. Brief summary about Planned Program**

Nutrition, exercise, and education are key to addressing issues related to childhood obesity.

**3. Program existence :** Intermediate (One to 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
703	Nutrition Education and Behavior	100%		100%	
	<b>Total</b>	100%		100%	

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

**1. Situation and priorities**

A national crisis exists in childhood obesity.

**2. Scope of the Program**

- In-State Extension
- In-State Research
- Multistate Research

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

**1. Assumptions made for the Program**

Obesity will increase especially in certain Arizona populations (Hispanic and Native American populations, which involve a major population in Arizona).

**2. Ultimate goal(s) of this Program**

To foster innovative research and translational science through extension to allow young people to address some of these issues, while being culturally sensitive.

**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	2.0	0.0	2.0	0.0
2014	2.0	0.0	2.0	0.0
2015	2.0	0.0	2.0	0.0
2016	2.0	0.0	2.0	0.0
2017	2.0	0.0	2.0	0.0

**V(F). Planned Program (Activity)**

**1. Activity for the Program**

Conduct workshops, research, meetings, school enrichment, and information delivery.

**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"> <li>● Education Class</li> <li>● Workshop</li> <li>● Group Discussion</li> <li>● Demonstrations</li> </ul>	<ul style="list-style-type: none"> <li>● Public Service Announcement</li> <li>● Newsletters</li> <li>● Web sites other than eXtension</li> </ul>

**3. Description of targeted audience**

Special focus on youth/adult interaction.

## **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**

- School districts, youth, and adults will address obesity issues

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	Reduce childhood obesity



**Outcome # 1**

**1. Outcome Target**

Reduce childhood obesity

**2. Outcome Type : Change in Knowledge Outcome Measure**

**3. Associated Knowledge Area(s)**

- 703 - Nutrition Education and Behavior

**4. Associated Institute Type(s)**

- 1862 Extension
- 1862 Research

**V(J). Planned Program (External Factors)**

**1. External Factors which may affect Outcomes**

- Economy
- Populations changes (immigration, new cultural groupings, etc.)

**Description**

The ability to have food access, quality choices and healthy lifestyles will be influenced by the national and state economy and support for the education system.

**V(K). Planned Program - Planned Evaluation Studies**

**Description of Planned Evaluation Studies**

All programs are currently in the process of being evaluated internally for existing areas to preserve, protect, or enhance, as well as areas to discontinue or modify. We will seek further input from stakeholders, advisory committees, and focus groups utilizing needs assessments with the assistance and expertise of an Evaluation Specialist. See State Defined Outcomes.