V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Climate Change

2. Brief summary about Planned Program

AgriLife Extension
Develop and conduct educational programs utilizing direct and indirect educational methods to support knowledge gain and adoption of practices to abate impact of climate change. Information will be shared on weather patterns, ET estimates to support irrigation scheduling and management of crops, livestock, landscapes, wildlife and natural resources in an increasingly variable climate in Texas counties. Best management practices will be discussed with a potential to reduce factors contributing to climate change.

AgriLife Research
The primary research effort is to develop crops, forages and management systems that are climate resilient, allowing producers to take advantage of favorable weather patterns while minimizing risk associated with drought and high temperatures.

The second area of response to this pressing issue is to generate reliable, verifiable data regarding carbon sequestration, carbon cycling, and interrelationships of cropping systems, livestock production and climate change. An example of this effort is using carbon dioxide from coal fired power generation as a feedstock for algae production. Research is also ongoing to develop and add value to co-products from algae production. Additional research focuses on development of models for predicting our total water resources. Current weather conditions influence our soil water, surface water and groundwater resources. As climate changes result in variable weather conditions better decision support systems are needed to predict our available water resources. Remotely sensed realtime data is needed as inputs to these models for prediction soil water, surface water and groundwater availability. This research supports the strategic plan imperative to mitigate negative effects of global climate change.

Cooperative Agricultural Research Center and Cooperative Extension Program
The Plant Systems Research focus area has numerous projects that have been designed based on stakeholder input and strategic directions with regard to the weather conditions of Texas Gulf Coast Prairie farmland ecosystem. Research projects on plants will focus on the establishment of medicinal plants (Lippia and Hoodia) garden and evaluation of the responses of the accumulation of some of the plants' dietary constituents (camphor, zero-caloric sweetener, appetite suppressant) to weather (drought and flooding, light and temperature) conditions; analyses of sweetpotato and cucumber genetics that regulate the responses of maturity dates to climatic changes; analyses of the biochemical responses of biomass sorghum lignocellulose yield to sustainable agronomic (drought, crop rotation, residue return, N fertilizer rates, soil tillage) management that affect soil organic carbon contents and manifest climate change.

3. Program existence :

- ○ New (One year or less)
- ◉ Intermediate (One to five years)
- ○ Mature (More than five years)

4. Program duration :

- ○ Short-Term(One year or less)
- ○ Medium-Term (One to five years)
- ◉ Long-Term (More than five years)

5. Expending formula funds or state-matching funds :

- ◉ Yes
- ○ No

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

- ○ Yes
- ◉ No

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	0%	0%	20%	0%
112	Watershed Protection and Management	0%	0%	20%	0%
132	Weather and Climate	100%	100%	0%	100%
133	Pollution Prevention and Mitigation	0%	0%	20%	0%
201	Plant Genome, Genetics, and Genetic Mechanisms	0%	0%	20%	0%
206	Basic Plant Biology	0%	0%	20%	0%
	Total	100%	100%	100%	100%

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

1. Situation and priorities

AgriLife Extension

Clientele are faced with decisions on how to best respond to climatic patterns that pose unacceptable levels of risk to their operations. Agricultural operations must utilize available water resources to meet their needs and plan for abatement strategies when faced with limited water supplies. Efficient use of water resources is one component of responding to varying weather conditions.

Production systems in the state are geared to "normal" weather conditions and a range either side of

normal. When the climate throws producers an outlier and rainfall is absent due to variability abnormal climatic patterns, the resulting drought conditions can be devastating to agricultural operations. Awareness of drought conditions in Texas counties supports decision makers in an effort to respond to local needs. The extension disaster education network facilitates collection of information and sharing of information about practices to abate the effect of drought.

AgriLife Research
Climate change is a critical issue requiring development or crops, germplasm and management practices to abate the factors leading to climate change and predictive tools for estimating the status of our water resources. Practices which sequester significant quantities of carbon will potentially mitigate climate changes while offering additional economic opportunities for agricultural producers. Development of simulation models capable of predicting the status of our soil water, surface water and groundwater resources will assist decision makers in responding to changing weather conditions.

Cooperative Agricultural Research Center and Cooperative Extension Program
Crop production and energy resources within the state of Texas and the U.S.A. must be precisely managed with respect to variable weather changes in order to maintain good quality of human life as well as to provide stable economic growth for limited resource families. Identified growth areas for continued collaborative research on plants and their systems will strengthen our partnerships on all levels, including: university (departmental), extension leaders serving rural and urban limited resource families, regional (other universities and state agencies) and national (federal agencies).

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

The research and extension program assumptions include: (1) continued funding for maintaining a critical mass of faculty; (2) development of targeted initiatives evaluating best management practices to mitigate the impact of variable weather conditions and climate change; (3) development of targeted initiatives evaluating methods to efficiently utilize water resources, define interrelationships with cropping systems, and mitigate impacts on livestock production; (4) implementation of targeted educational programs increasing knowledge regarding efficient use of water resources, and migration practices to limit the impact of weather and climate change.; (5) plant systems research is valued highly by our stakeholders: (6) environmental systems components are beneficial to communities; and (7) applied and supporting basic research serve to bolster our fundamental knowledge within the food and agricultural sciences

2. Ultimate goal(s) of this Program

AgriLife Extension
To facilitate the ability of agricultural producers and community leaders to make informed decisions when responding to climate change.

AgriLife Research
To develop management practices and predictive tools that allow people to respond to changing climatic conditions.

Cooperative Agricultural Research Centerand Cooperative Extension Program
1. To develop and maintain a premier research program focused on applied and basic research in plant and environmental systems studies.
2. To promote a central core research concept with associated integrated research, teaching, and extension components.
3. To serve our local and regional communities by providing plant and environmental systems information which guides the growth of the urban fringe.

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
2015	5.0	2.0	1.5	2.0
2016	5.0	2.0	1.5	2.0
2017	5.0	2.0	1.5	2.0
2018	5.0	2.0	1.5	2.0
2019	5.0	2.0	1.5	2.0

V(F). Planned Program (Activity)

1. Activity for the Program

AgriLife Extension
Develop and conduct educational programs utilizing direct and indirect educational methods to increase knowledge of and support adoption of management practices capable of mitigating the effect of weather and climate change.

AgriLife Research
The research response to this pressing issue is to generate reliable, verifiable data regarding carbon sequestration, carbon cycling, and interrelationships of cropping systems, livestock production and climate change. An example of this effort is using carbon dioxide from coal fired power generation as a feedstock for algae production. Research is also ongoing to develop and add value to co-products from algae production.

Cooperative Agricultural Research Center and Cooperative Extension Program
Conduct research activities centered around the biological consequences of climate change on plant systems: 'The effects of vegetable crops and bioenergy feedstock production on the soil organic carbon contents, and climate change.' Research and Cooperative Extension will collaborate to bring research

results to benefit the limited resource farmers.

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

Extension

Direct Methods	Indirect Methods
☑ Education Class	☐ Public Service Announcement
☐ Workshop	☐ Billboards
☐ Group Discussion	☑ Newsletters
☑ One-on-One Intervention	☐ TV Media Programs
☐ Demonstrations	☐ eXtension web sites
☐ Other 1	☑ Web sites other than eXtension
☐ Other 2	☐ Other 1
	☐ Other 2

3. Description of targeted audience

Research products and educational programs focusing on the issue of weather and climate change address target audiences including but not limited to producers, corporate businesses, landscape managers, water resource managers, decision makers, and others who identify themselves with this issue.

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

- # of educational programs conducted.
- # of research related projects.
- # of graduate/undergraduate students involved in research projects.

☑ 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	# of people reporting knowledge gained through participation in educational activities.
2	# of people reporting a willingness to adopt practices through participation in educational programs.
3	# of farmers gain knowledge for improved cultivation of bio-energy crops
4	# of farmers adopt improved cultivation of bio-energy crops

Outcome # 1

1. Outcome Target

# of people reporting knowledge gained through participation in educational activities.

2. Outcome Type :

- (●) Change in Knowledge Outcome Measure
- ( ) Change in Action Outcome Measure
- ( ) Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- ☐ 102 - Soil, Plant, Water, Nutrient Relationships
- ☐ 112 - Watershed Protection and Management
- ☑ 132 - Weather and Climate
- ☐ 133 - Pollution Prevention and Mitigation
- ☐ 201 - Plant Genome, Genetics, and Genetic Mechanisms
- ☐ 206 - Basic Plant Biology

4. Associated Institute Type(s)

- ☑ 1862 Extension
- ☑ 1862 Research
- ☐ 1890 Extension
- ☐ 1890 Research

Outcome # 2

1. Outcome Target

# of people reporting a willingness to adopt practices through participation in educational programs.

2. Outcome Type :

- ( ) Change in Knowledge Outcome Measure
- (●) Change in Action Outcome Measure
- ( ) Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- ☐ 102 - Soil, Plant, Water, Nutrient Relationships
- ☐ 112 - Watershed Protection and Management
- ☑ 132 - Weather and Climate
- ☐ 133 - Pollution Prevention and Mitigation

- ☐ 201 - Plant Genome, Genetics, and Genetic Mechanisms
- ☐ 206 - Basic Plant Biology

4. Associated Institute Type(s)

- ☑ 1862 Extension
- ☑ 1862 Research
- ☐ 1890 Extension
- ☐ 1890 Research

Outcome # 3

1. Outcome Target

# of farmers gain knowledge for improved cultivation of bio-energy crops

2. Outcome Type :

- ◉ Change in Knowledge Outcome Measure
- ◯ Change in Action Outcome Measure
- ◯ Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- ☐ 102 - Soil, Plant, Water, Nutrient Relationships
- ☐ 112 - Watershed Protection and Management
- ☑ 132 - Weather and Climate
- ☐ 133 - Pollution Prevention and Mitigation
- ☐ 201 - Plant Genome, Genetics, and Genetic Mechanisms
- ☐ 206 - Basic Plant Biology

4. Associated Institute Type(s)

- ☐ 1862 Extension
- ☐ 1862 Research
- ☑ 1890 Extension
- ☑ 1890 Research

Outcome # 4

1. Outcome Target

# of farmers adopt improved cultivation of bio-energy crops

2. Outcome Type :

- ○ Change in Knowledge Outcome Measure
- ◉ Change in Action Outcome Measure
- ○ Change in Condition Outcome Measure

3. Associated Knowledge Area(s)

- ☐ 102 - Soil, Plant, Water, Nutrient Relationships
- ☐ 112 - Watershed Protection and Management
- ☑ 132 - Weather and Climate
- ☐ 133 - Pollution Prevention and Mitigation
- ☐ 201 - Plant Genome, Genetics, and Genetic Mechanisms
- ☐ 206 - Basic Plant Biology

4. Associated Institute Type(s)

- ☐ 1862 Extension
- ☐ 1862 Research
- ☑ 1890 Extension
- ☑ 1890 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
- ☐ Populations changes (immigration, new cultural groupings, etc.)
- ☑ Other (changing programming areas)

Description

The factors listed above could have either positive or negative effects on the educational programs and research activities. The issue of climate change requires an inter-disciplinary response to development of practices and sharing of information. External factors affecting individual disciplinary fields can impact the ability to develop and deliver information on weather and climate change.

Our regional climatic dynamics can have an extremely adverse effect on our applied systems research. Economic, appropriations, and policy changes will determine our ability to address focus areas. Government regulations will direct our focus as landowners and end-users seek our knowledge to address plant and environmental systems needs.

V(K). Planned Program - Planned Evaluation Studies

Description of Planned Evaluation Studies

Participants in selected programming activities will be administered a Retrospective-Post Test immediately after an educational activity. The issue-based questions will record the knowledge/awareness of the participants before and after the activity. Case studies will be implemented to evaluate the effectiveness of specific educational programs at reaching their target audience.

Methods to address data collection will include sampling of research outcomes based on observation and portfolio reviews. Care will be given to maintain confidentiality within the project framework while allowing outcomes to be clearly recorded based upon level of importance to stakeholders.