V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Climate Change

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
132	Weather and Climate	80%		40%	
133	Pollution Prevention and Mitigation	10%		50%	
605	Natural Resource and Environmental Economics	10%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Actual	6.0	0.0	1.4	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
307469	0	105703	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
307469	0	136777	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

On -going research activities related to climate change include both basic and applied research. This research takes place in all academic departments/schools within the College of Food, Agricultural, and

Environmental Sciences. CFAES faculty manage in college centers such as the Carbon Sequestration Center and are also members of multi college groups such the University's Climate, Air and Water Target Investment group that has received university funding for research in the Planned Program. Laboratories for experiments, pilot plants, a feedstock processing plant, greenhouses, and research plots and stations support this program. All functional laboratories and sites are improved over time as program need warrants. OSU Extension provides parallel programs in this Planned Program to advance knowledge, promote adoption and change, and develop human capital. OARDC and OSU Extension faculty and staff engage in appropriate levels of outreach, engagement, and consultation, with both internal and external stakeholders. OSU Extension Educators and Specialists conduct programs and relate climate change policy and economic issues; give presentations on climate change to interested groups; participation of the OSU Extension Climate Change Team. The primary method of workshops and presentations is via Webinars.

2. Brief description of the target audience

In the Climate Change Planned Program, targeted audiences include, but are not limited to: business and industry that have expressed a need for climate change information that is derived through new research, extracted from on-going research, or is derived from scientific literature; other stakeholders; fellow academic units that partner with program scientists to create systems and processes needed to support not only the research, but also the adoption of the research findings by industrial partners; fellow agencies or support organizations who will not only use the information but will also be brokers of that information, including embedding it into groups to encourage change; populations who have not requested the information but will likely benefit from that information, e.g. general public; other scientists and scientific groups; political entities; other education, outreach, and extension personnel; students from elementary school to post doctorate studies; and news organizations. Ohio citizens; state agency personnel (Ohio Department of Natural Resources, Ohio Environmental Protections Agency, Ohio Department of Agriculture, Ohio Department of Development, Ohio Department of Transportation); environmental groups and NGO's; Ohio businesses; Ohio farmers.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	{NO DATA	{NO DATA	{NO DATA	{NO DATA
Actual	1500	100	0	0

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

Patent Applications Submitted

Year: 2010

Plan:

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	2	8	10

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of participants attending educational programs of one teaching hour or more.

Year	Target	Actual
2010	{No Data Entered}	1500

Output #2

Output Measure

- Number of workshops offered to producers and agri-business leaders

Year	Target	Actual
2010	{No Data Entered}	5

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Create strategies/technologies within our program mission to reduce atmospheric pollution that can contribute to global climate change. climate change.

Outcome #1

1. Outcome Measures

Create strategies/technologies within our program mission to reduce atmospheric pollution that can contribute to global climate change. climate change.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
ENHANCED DEEP SOIL CARBON STORAGE - Storing or sequestering carbon in the soil is one way to mitigate climate change. No-till farming aids in carbon sequestration by minimizing soil disturbance and slowing the release of carbon dioxide into the atmosphere. No - till is practiced on 35% of Ohio farmlands, with 20% of the Ohio corn and 80% of Ohio soybean and wheat in no - till. Carbon dioxide has been linked to climate variability. Soil carbon is stored both in the soil surface and in the deeper soils, those below eight (8) inches.

What has been done
OARDC researchers are finding that carbon stored on the soil surface (first 8 inches) degrades more rapidly than carbon at deeper depths (up to 3 feet). Some reasons - higher microbial biomass, more soil surface activity, and fewer soil minerals. Lignin and cellulosic plant materials in the soil surface area are not stable, so carbon will be lost when plant litter decomposes. But organic carbon associated with soil minerals at deeper depths will last a long time, maybe thousands of years. Methods to promote deep carbon storage include: manure application, which supports earthworm activity; practices supporting stable soil structure with conduits for moving carbon deeper; and growing plants with deep roots.

Results
Maintaining healthy soil carbon levels is critical to supporting Ohio's more than $100 billion agbioscience industry. Likewise, sequestering carbon in the soil helps to slow climate change. This research focuses on the impacts that changes in climate and carbon have on the environment, and how we can respond through scientific and policy-oriented solutions. The

Intergovernmental Panel on ClimateChange estimates that roughly 100 billion metric tons of carbon over the next 50 years could be sequestered with beneficial land management practices, offsetting 10 - 20% of the worlds projected carbon emissions from fossil fuels.

4. Associated Knowledge Areas

KA Code	Knowledge Area
132	Weather and Climate
133	Pollution Prevention and Mitigation
605	Natural Resource and Environmental Economics

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)

Evaluation Results

Developed and helped implement five webinars on topics focused on and relating to climate change: Climate Change and Water Resources Impacts in the Great Lakes Region; Climate Change and Public Health Impacts in the Great Lakes Region;Effects of Climate Change on Species Interactions in Natural and Agricultural Ecosystems; Potential Impacts of Climate Change on Great Lakes Farms and Forests; Climate Change and Water Quality in the Great Lakes. The series will continue in 2011.

Key Items of Evaluation