V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Soil, Air and Water (OARDC Led)

☑ Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources	0%		10%	
102	Soil, Plant, Water, Nutrient Relationships	0%		25%	
103	Management of Saline and Sodic Soils and Salinity	0%		5%	
104	Protect Soil from Harmful Effects of Natural Elements	0%		10%	
111	Conservation and Efficient Use of Water	0%		15%	
112	Watershed Protection and Management	0%		10%	
132	Weather and Climate	0%		5%	
133	Pollution Prevention and Mitigation	0%		10%	
141	Air Resource Protection and Management	0%		10%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	4.5	0.0
Actual Paid	0.0	0.0	3.8	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	0	571679	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	458715	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 OARDC research activities include both basic and applied agbioscience. Both laboratory and multiple field sites/research stations are available throughout state to permit data gathering and to continue long-term experiments, such as no-till plots. On-farm research takes place, as do national and international studies, as is evidenced by programs such as OARDC's carbon sequestration program. All functional laboratories and sites will continue to be improved over time as program need and resources available warrants. OARDC faculty and staff engage in appropriate levels of outreach, engagement, and consultation, with both internal stakeholders such as fellow Extension personnel and with external stakeholders.

2. Brief description of the target audience

OARDC's targeted audiences for this Planned Program include, but are not limited to:

- Specific individuals or groups who have expressed a need for certain information that is to be derived through new research, extracted from on-going research, or is derived from scientific literature. Often those requests are communicated to OARDC by an intermediary such as a staffer at Ohio Dept. of Natural Resources or a county Extension agent;
- Fellow agencies or support organizations that 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. immigrant populations;
- Other scientists and scientific groups;
- Political entities;
- Extension personnel;
- Students from pre-school to post doctorate studies;
- News organizations;
- Business groups such as chambers of commerce and community coalitions.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

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

Patent Applications Submitted

Year: 2014

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	0	26	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of graduate students completed
  Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Continue to advance soil, water, nutrient, and plant research to, among other outcomes, ensure Ohio continues to be one of the top five states in corn and soybean production and has knowledge to support growing niche market agriculture, organic farming, and biobased products.
2	Provide the necessary research finding (scientific knowledge and techniques) to support stakeholder compliance with Ohio and federal EPA regulations, and future regulations, regarding odors and other air quality issues in ag production and processing.
3	Expand watershed and ecosystem level modeling to the extent that scientific data and watershed management protocols can bring all streams effected by agriculture and natural resource runoff into compliance with Ohio EPA standards.
4	Through the provisioning of watershed specific data, support the creation of and conservation action of community-based watershed networks in each major watershed in Ohio.
5	Advance the basic knowledge contribution so that Ohio continues to be viewed as a center of excellence in terms of soils and water sciences, and associated extension programming.
6	Provide the necessary soil, air, weather/climate, and water research, in conjunction with actions in other planned programs KA (e.g. IPM), to permit continued adoption of conservation tillage practices in the face of problems such as climatic changes, pest, etc.

Outcome #1

1. **Outcome Measures**

Continue to advance soil, water, nutrient, and plant research to, among other outcomes, ensure Ohio continues to be one of the top five states in corn and soybean production and has knowledge to support growing niche market agriculture, organic farming, and biobased products.

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

Provide the necessary research finding (scientific knowledge and techniques) to support stakeholder compliance with Ohio and federal EPA regulations, and future regulations, regarding odors and other air quality issues in ag production and processing.

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

Expand watershed and ecosystem level modeling to the extent that scientific data and watershed management protocols can bring all streams effected by agriculture and natural resource runoff into compliance with Ohio EPA standards.

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

Through the provisioning of watershed specific data, support the creation of and conservation action of community-based watershed networks in each major watershed in Ohio.

2. **Associated Institution Types**

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual

2014 0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
There is a growing trend toward removing dams to restore rivers, but studies documenting the ecological responses and the resulting benefits are limited.

What has been done
To fill this gap, OARDC scientists are studying the impacts of dam removals at two former dams in Columbus: one on the Olentangy River on The Ohio State University's Columbus campus, and another in proximity to OSU on the Scioto River. The researchers are documenting the exact physical changes seen at the sites, especially in terms of channel shape, water flow, and features like pools and riffles. Then they are trying to show the changes' effects on fish, birds, insects and other biological species within the river and the surrounding environment. They are also looking at changes in river ecosystem processes, such as sediment transport, contaminant buildup, and the flow of energy and carbon in food webs between creatures in the water and on land. The findings should improve future dam removals, especially in similar urbanized areas, by giving a clearer idea of what to expect.

Results
Current results indicate removal of dams has a definite impact on water flow. Researchers are already seeing differences in water quality, and beginning to determine what that means for the water itself and the surrounding landscape. They have also found that benefits to removing dams include improved water flow, which eliminates the buildup of sediments full of accumulated toxins--including health threats such as polychlorinated biphenyls (PCBs). These sites offer the potential to become long-term comparative study sites for river ecology and natural resource management of water systems.

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management

Outcome #5

1. Outcome Measures

Advance the basic knowledge contribution so that Ohio continues to be viewed as a center of excellence in terms of soils and water sciences, and associated extension programming.

Not Reporting on this Outcome Measure

Outcome #6

1. **Outcome Measures**

Provide the necessary soil, air, weather/climate, and water research, in conjunction with actions in other planned programs KA (e.g. IPM), to permit continued adoption of conservation tillage practices in the face of problems such as climatic changes, pest, etc.

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Climatic extremes, coupled with pest and diseases that are often climate related, can impact soil-related outcomes. As the soil-dependent food, fiber, and environmental economies adjust to the global marketplace, in conjunction with public policy shifts, regulations, and shifts in demand, outcomes are being impacted. Worldwide the availability of productive soils is a limiting factor. Also, the availability of base funding to ensure a core faculty and staff, availability of extramural funds, and programmatic demands that exceed available personnel and resources are affecting outcomes.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

For 2014, CFAES-OARDC has conducted no formal studies regarding evaluation of our research program. Surrogate evaluation metrics--inclusive but not limited to--that are considered indicators of research success are:

- Research contracts and awards received/ongoing/completed ($166 million plus in active projects during 2014);
- Number of referred publications reported elsewhere in this report;
- Number of business, industries an groups engaged in CFAES's research programs;
- Number of patents received;
- Economic impact of this college's research program as reported elsewhere in this

report;
- The level of base funding from USDA-NIFA and the State of Ohio in 2014;
- Impacts submitted in this report, and the continued robustness of CFAES' research program throughout 2014, both in terms of breadth of programs and depth of new knowledge generated and applied.

The research reported herein is also supported by an informal yet effective formative evaluation. Very little research is conducted at OARDC without early engagement of business, industry, commodity groups, special interest or community groups, or other interested parties given these are the individuals who have the need for and will be the adopters of our research output/impacts. Even in the case of very theoretical research, fellow researchers in industry, government, and academic institutions are consulted (formative evaluation/needs assessment) in the formulation of studies.

Key Items of Evaluation

Ohio has removed 60-plus dams in the past four decades, in large part to improve water quality. The improved water flow from dam removal keeps sediment from building up. Dam sediment can be full of accumulated toxins, including health threats such as polychlorinated biphenyls (PCBs). The following feedback is from a partner at the Ohio Department of Natural Resources Division of Wildlife who is working with our researchers to study the impacts of dam removals at two former dams in Columbus, Ohio:

"The partnership between Ohio State and the ODNR Division of Wildlife, through the Ohio Biodiversity Conservation Partnership, supports the research being conducted by [OARDC scientists] Mazeika (Sullivan) and Kris (Jaeger), and will provide concrete evidence of the benefits of dam removals."

-- John Navarro, program administrator, Ohio Department of Natural Resources Division of Wildlife.