

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Soil, Water and Air Systems-OARDC Led

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%	
111	Conservation and Efficient Use of Water	0%		15%	
112	Watershed Protection and Management	0%		10%	
131	Alternative Uses of Land	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 professional FTE/SYs expended this Program

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	7.9	0.0
Actual	0.0	0.0	8.2	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	700645	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	743636	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

Activities within this planned program for 2010 were: 1) in print and electronic media/social media communicating research-based information targeted to: (a) specific stakeholder groups, (b) support publics such as fellow agencies, political entities, (c) targeted populations, and (d) the broader general public, including mass media releases; 2) peer-reviewed journal articles; 3) commercialized techniques; 4) non-commercialized techniques e.g. wetland construction techniques; 5) intellectual properties; 6) consultation services such as carbon management in soils; 7) meetings with stakeholders and supporters; 8) facilitation of training programs/workshops for other scientists and for specific groups of stakeholders, including international visitors; and 9) planning meetings with advisory groups to communicate findings and plan new research.

2. Brief description of the target audience

Targeted audiences were 1) Specific individuals or groups who 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; 2) 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 such as US NRCS; 3) Populations who have not requested the information but will likely benefit from that information, e.g. immigrant populations; 4) Other scientists and scientific groups; 5) Political entities; 6) Extension personnel; 7) Students from pre-school to post doctorate studies; 8) News organizations; and 9) Business groups such as chambers of commerce and community coalitions.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	0	0	0	0
Actual	0	0	0	0

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

Patent Applications Submitted

Year: 2010
 Plan: 0
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Plan	0	40	
Actual	0	46	46

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Peer-reviewed publications will be tracked in terms of name and tier of journal

Year	Target	Actual
2010	40	0

Output #2

Output Measure

- Patents by number and who partnered/purchased/commercialized

Year	Target	Actual
2010	0	0

Output #3

Output Measure

- Number of graduate students completed

Year	Target	Actual
2010	8	0

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 ensure Ohio continues to be one of the top five states in corn and soybean production and has knowledge to support <u>growing niche market agriculture, organic farming, and biobased products.</u>
2	Provide the necessary research finding (scientific knowledge and techniques) to support stakeholder compliance with Ohio and federal EPA regulations, and future regulations, <u>regarding odors and other air quality issues in ag production and processing.</u>
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	Support the mapping of county level soils with a target of three new counties per year
7	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 <u>conservation tillage practices in the face of problems such as climatic changes, pest, etc.</u>
8	Advance carbon sequestration research to the point that Ohio farmers can enter the carbon trading market.

Outcome #1

1. Outcome Measures

Continue to advance soil, water, nutrient, and plant research to 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.

Not Reporting on this Outcome Measure

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.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	2	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

CLONING GENES FROM MAGNETOTACTIC BACTERIA - Deindustrialization of urban areas in the past several decades has resulted in a large amount of vacant land. Several cities in Ohio and elsewhere have established stabilization projects to facilitate the redevelopment of vacant urban land. Vacant land reuse opportunities include (1) urban agriculture/gardening, that improves the availability of healthy, fresh foods, and can improve nutrition and health of residents, and (2) the creation of parks, playgrounds, and other commons. Soil contamination with metal(loid)s, i.e., lead, arsenic, and organic chemical contaminants, i.e., polyaromatic hydrocarbons, presents the greatest challenge to vacant land reuse.

What has been done

A new novel method was developed for cloning genes from magnetotactic bacteria. The researchers successfully cloned genes from a magnetotactic bacteria. The bacteria are beneficial in removing, via bioremediation, contaminants.

Results

A new novel method was developed for cloning genes from magnetotactic bacteria. OARDC scientists successfully cloned three genes (mms5, mms7, and mms13) from a magnetotactic bacteria. This will enable other scientists who are studying mineral biomineralization to use this technique to clone genes for their research. The magnetotactic bacteria was isolated from the Olentangy River in Columbus, Ohio. This discovery demonstrates that these microbes inhabit freshwater ecosystems in Ohio and encourages the exploration for other species of magnetotactic bacteria in other Ohio watersheds.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
131	Alternative Uses of Land
133	Pollution Prevention and Mitigation

Outcome #6

1. Outcome Measures

Support the mapping of county level soils with a target of three new counties per year

Not Reporting on this Outcome Measure

Outcome #7

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

Outcome #8

1. Outcome Measures

Advance carbon sequestration research to the point that Ohio farmers can enter the carbon trading market.

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

For 2010 all planned programs in the CFAES were impacted by multiple factors. Perhaps the greatest factor has been the overall decline in base financial support over the past decade resulting in a significant reduction in research faculty and staff. While a portion of the research funds have been made up by increased extramural support, rehiring lost tenure-line research faculty members on those funds is not possible. Also as we commit more personnel time to meet research obligations associated with extramural contracts, less

personnel time is available to address day to day science and consultation needs of our traditional stakeholders, as well as less time to address growing needs of new populations moving into the state and the underserved. Further reductions in base budgets, either in real dollars or in losses due to not keeping up with inflation, will reduce our capacity to compete for extramural support and further erode our capacity to respond to day-to-day stakeholder needs. The tornado that struck the Wooster Ohio campus in 2010 will have long lasting impacts even though remediation has been rapid and rebuilding was moving well at the end of 2010. Loss of facilities and even experiments, per se, disruption of the research process, and demands to redirect funds for remediation and reconstruction beyond insurance payments, collectively, did and will continue affect our productivity.

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

1. Evaluation Studies Planned

Evaluation Results

Key Items of Evaluation