

Agricultural, Natural Resources, and Biological Engineering

Agricultural, Natural Resources, and Biological Engineering

V(A). Planned Program (Summary)

1. Name of the Planned Program

Agricultural, Natural Resources, and Biological Engineering

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
401	Structures, Facilities, and General Purpose Farm Supplies	19%		19%	
402	Engineering Systems and Equipment	27%		27%	
403	Waste Disposal, Recycling, and Reuse	38%		38%	
404	Instrumentation and Control Systems	9%		9%	
405	Drainage and Irrigation Systems and Facilities	7%		7%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2007	Extension		Research	
	1862	1890	1862	1890
Plan	5.9	0.0	15.5	0.0
Actual	17.5	0.0	30.1	0.0

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

Extension		Research	
Smith-Lever 3b & 3c 650124	1890 Extension	Hatch 486762	Evans-Allen 0
1862 Matching 732607	1890 Matching 0	1862 Matching 549517	1890 Matching 0
1862 All Other 82483	1890 All Other 0	1862 All Other 1682735	1890 All Other 0

V(D). Planned Program (Activity)

1. Brief description of the Activity

•Energy workshops and educational programs were conducted throughout the state that involve key research scientists ranging from chemical engineers to logistics experts to economists •A team of scientists including experts in animal nutrition, soil fertility, and farm management conducted research and worked with farmers to reduce water pollution, especially phosphorus •Food safety experts, along with microbiologists and nanotechnology experts, worked on developing sensors that will enhance food safety and risks from bioterrorism •Livestock facilities were designed and analyzed to determine optimal nutrient management systems from an environmental and cropping systems perspective •Electro-hydraulic sensors and off-road machine operation systems were designed and tested. •Scientists monitored air quality of selected concentrated livestock systems on farms in multiple states to facilitate the determination of science-based EPA regulatory standards. •Teams of experts have come together to research and address concerns surrounding CAFOS. The goal is to provide consumers, producers, and community leaders the information to make well-informed decisions regarding issues related to the expansion of animal agriculture within the state. Teams have been exploring and addressing environmental, social, economic, and public health issues related to CAFOs. A public web site with numerous publications describing research efforts is now available.

2. Brief description of the target audience

•Indiana livestock producers, especially those managing confined feeding operations •Crop farmers interested in applying animal wastes to enhance yields and reduce water pollution •Stakeholders in the bio-energy industry including Country Mark Cooperative, Indiana State Department of Agriculture, Indiana Soybean Alliance, Indiana Corn Growers, grain processors such as ADM, Cargill, and Tate & Lyle •Officials with federal (EPA) and state (IDEM) regulatory agencies •Off-road farm and industrial equipment manufacturers will be contacted and offered patent licensing opportunities as sensors for machine operation and maintenance are developed and tested

V(E). Planned Program (Outputs)

1. Standard output measures

Target for the number of persons (contacts) reached through direct and indirect contact methods

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
Plan	5000	40000	2500	5000
2007	38782	174012	18869	10434

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

Patent Applications Submitted

Year	Target
Plan:	3
2007:	5

Patents listed

- * Peptide Silane Material
- * Structures for Integral Sensing Capability
- * Detecting Multiple markers in a Test Tube or on Cell Surfaces
- * Electroporative Flow Cytometry
- * In Silico Biological Sensing Array for Multianalysis Detection

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

	Extension	Research	Total
Plan			
2007	0	0	164

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

Number of educational workshops and seminars on nutrient management and air quality

Year	Target	Actual
2007	500	13

Output #2

Output Measure

Number of research-based educational programs on bio-fuel production, distribution, and policy

Year	Target	Actual
2007	25	25

Output #3

Output Measure

Number of websites and publications developed

Year	Target	Actual
2007	200	164

Output #4

Output Measure

Number of patents applied for and licensing arrangements entered into with off-road farm and industrial equipment manufacturers

Year	Target	Actual
2007	5	8

Output #5

Output Measure

Number of farm and rural safety and health programs

Year	Target	Actual
2007	{No Data Entered}	22

V(G). State Defined Outcomes

O No.	Outcome Name
1	Number of producers who increase awareness and knowledge concerning science-based methods to manage animal wastes so as to minimize potential soil and air pollution
2	Percent reduction in environmental pollution from inappropriate application of animal wastes to soils or emission of animal odors from production facilities
3	Percentage change in number of farmers who enhance soil fertility and reduce soil pollution through less reliance on commercial fertilizer and increased reliance on properly applied animal waste
4	Number of energy producers, farmers, and consumers who increase their knowledge of the technical and economic implications of increased use of Indiana produced corn and soybeans in bio-fuels
5	Number of technologies developed and disseminated that will increase the efficiency of bio-fuel production
6	Percent increase in the use of Indiana produced corn and soybeans in bio-fuels
7	Number of farmers who increase their knowledge of livestock building designs that are energy efficient as well as more animal welfare friendly
8	Optimize livestock welfare through the design of efficient and animal sensitive farm structures
9	Percentage increase in total livestock production and farmer profitability through the adoption of building designs that are energy efficient as well as more animal welfare friendly
10	Design livestock facilities that minimize odor emissions and potential air pollution
11	Number of students with increased awareness and knowledge of energy and water conservation and food safety
12	Number of Amish farmers with increased awareness of farm safety and health
13	Number of turfgrass specialists with increased knowledge of nutrient and soil management

Outcome #1

1. Outcome Measures

Not reporting on this Outcome for this Annual Report

2. Associated Institution Types

3a. Outcome Type:

3b. Quantitative Outcome

Year	Quantitative Target	Actual
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3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
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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

Brief Explanation

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

1. Evaluation Studies Planned

After Only (post program)

Retrospective (post program)

Before-After (before and after program)

During (during program)

Time series (multiple points before and after program)

Case Study

Comparisons between program participants (individuals, group, organizations) and non-participants

Comparison between locales where the program operates and sites without program intervention

Other (hits and use of web site)

Evaluation Results

Key Items of Evaluation