

2009 University of Connecticut - Storrs Combined Research and Extension Plan of Work

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I. Plan Overview

1. Brief Summary about Plan Of Work

The vision of the College of Agriculture and Natural Resources is to be one of the highest quality institutions that generates new knowledge, disseminates knowledge in formal and informal settings, engages societal needs, provides leadership for problem solving, improves the quality of life for all people of the State of Connecticut, and participates in global citizenship.

The College expands the frontiers of knowledge through research and it enhances economic opportunities and quality of life for people of Connecticut and beyond. The College's guiding principles are that the College must engage the world as its partner, must honor traditions while building on strengths and developing areas of emphasis for future excellence.

Growth in human, financial and capital resources must be acquired for the College to advance and the College must enhance existing and develop new sources of funding to ensure excellence for the future.

The College's values include efficient effective communications; diversity through individuals, cultures, ideas and programs; cooperation through multidisciplinary, interdisciplinary, cross-functional teams; economic viability for agricultural, natural resource and environmental enterprises; excellence through creativity, originality and innovation in the development and dissemination of knowledge; scholarship in teaching, scholarship in research and scholarship in extension based on peer review; integrity and accountability through credibility, objectivity, honesty and trust; and quality education through the land grant mission of access to education for youth, adults and families in the classroom and communities.

The College has established initiatives for research and extension that build on traditions, strengths and excellence for the future. Initiatives include economic viability of agriculture, natural resources and environmental enterprises, sustainability of agriculture and the environment, food and health, agricultural biotechnology, aquaculture, formal and informal workforce development, agricultural and food bio-security, and stem cell and regenerative biology.

Research has three main goals: Improve the economic returns to agricultural producers through basic and applied research programs that improve productivity, quality and marketing of agricultural products; protect the country's natural resources by promoting and enhancing research into environmental sustainability; and promote the health and safety of citizens through the acquisition of research-based information.

Improved economic returns to agricultural producers through basic and applied research programs that improve productivity, quality and marketing of agricultural products will see particular emphasis on efforts through biotechnology driven programs to prevent the spread of invasive plant species, improve the quality and quantity of a number of agricultural/horticultural crops, study the mechanisms of specific plant diseases, develop transgenic plants that express edible vaccines, develop fusion genes to increase crop branching and flower bud numbers, study the hormonal mechanisms controlling fertility, growth and lactation in agricultural animals and understand the most important factors influencing embryonic development and the number and quality of clones in farm animals.

Additionally, meat science will see emphasis on understanding and controlling the factors governing the discoloration of fresh meats and all factors influencing meat safety while animal diseases will see emphasis on factors influencing the incidence and control of mastitis in dairy cattle, development of a mucosal vaccine against *Mycoplasma gallisepticum*, monitoring and research into 3 transmissible forms of spongiform encephalitis, monitoring and investigating the incidence of disease in a variety of economically important aquatic species.

Research also will address various aspects of both domestic and international marketing of food and fiber.

Protection of the country's natural resources by promoting and enhancing research into environmental sustainability will see particular emphasis on water quality and quantity to include groundwater contamination, sources of non-point pollution and use of rain gardens as part of urban best management practices; through wildlife and forest ecology and atmospheric science; methods of studying the impact of the progressively encroaching urbanization on the environment; integrated pest management program; limiting the spread of invasive species; and the impact of environmental toxins on marine mammals.

Promotion of health and safety of citizens will see particular emphasis on the acquisition of research-based information through effects of exercise on protein utilization in obese and non-obese children; quality and safety of milk and meat products; studies related to mercury contamination of freshwater fish; and studies into factors influencing the dispersal and distribution of air pollutants from aerosols.

The Cooperative Extension System has four main goals: Increase the economic opportunities for small businesses and specifically for agriculture and natural resource related businesses in the state; enhance the sustainability of the environment through balancing economic growth with the sustainability of natural resources; advance the public health of the state through a safe and secure food system and water supply; and strengthen and support families and communities in a rapidly changing environment.

Increased economic opportunities for small businesses and specifically for agriculture and natural resource related

businesses in the state will see particular emphasis on efforts to develop vaccines for West Nile virus, transmissible spongiform encephalopathies and porcine reproductive and respiratory syndrome in swine; develop DNA based molecular techniques for recognition of poultry disease for containment of avian influence; develop new business ventures in retail, manufacturing, and agriculture; focus on risk management for agricultural and natural resource based businesses; and develop economically viable marine based industries through our partnership with Sea Grant.

Enhanced sustainability of the environment through balancing economic growth with the sustainability of natural resources will see particular emphasis on efforts to develop a forest products industry in the state, focus on curriculum needs related to the environment for K-12 audiences building on the IPM curriculum and on the 4-H Center at Auer Farm, focus on energy alternatives based on a new national partnership with the Department of Energy, continue leading edge work in sustainable agricultural production including organics and reduced inputs such as chemical sprays, and build the home horticulture program as a means to disseminate research knowledge, to monitor for invasive plants and insects, and to protect the water quality of the state.

Advancing the public health of the state through a safe and secure food system and water supply will see particular emphasis on efforts to develop lead poisoning prevention education especially with Native Americans and home remodeling contractors, educate industry and consumers on preventable microbial food borne illness, develop animal emergency response plans as part of a state-wide team effort to protect both animals and humans, and focus nutrition efforts on future health needs based on obesity including education for children with special dietary needs and emphasizing healthy lifestyles.

Strengthening and supporting families and communities in a rapidly changing environment will see particular emphasis on leadership development, civic engagement leading to both a physical community infrastructure as well as a human one for a strong quality of life.

Particular emphasis will include efforts to develop public issues dialog around topics of focus including invasive plants and water resources, engage pre-college youth in educational and leadership experiences, build capacity in communities through training such as GIS (geographic information systems) for towns and PEP (People Empowering People) for prisoners, and build community capacity for parents, child care providers, youths and in the area of financial management.

Estimated Number of Professional FTEs/SYs total in the State.

Year	Extension		Research	
	1862	1890	1862	1890
2009	67.0	0.0	58.0	0.0
2010	67.0	0.0	58.0	0.0
2011	67.0	0.0	58.0	0.0
2012	67.0	0.0	58.0	0.0
2013	67.0	0.0	58.0	0.0

II. Merit Review Process

1. The Merit Review Process that will be Employed during the 5-Year POW Cycle

- Combined External and Internal University Panel
- Combined External and Internal University External Non-University Panel
- Expert Peer Review

2. Brief Explanation

The merit review process for Connecticut will continue to be based on the seven part test of guiding characteristics for an engaged institution as reported in the 1999 Kellogg Commission Report on The Engaged Institution. During recent years an external review process has been completed for all departments, including the Department of Extension. Results from this process were used for the development of the 2005-2010 college-wide five-year plan of work, as well as development of this Plan of Work.

The five year plan of work components include: planning by all faculty and staff on three levels, a university wide review of

the plan, a review by the peer institutions, and a review by the stakeholders. Peer Review for Hatch, McIntire-Stennis, and Animal Health Projects is designed to ensure that the highest quality research projects consistent with identified priorities are eventually approved. In brief, the review involves obtaining the objective opinion of other scientists, and/or administrators usually within the University of Connecticut, and users of research results when appropriate, to research proposals or completed projects.

The general goal of peer review is to subject every project to a rigorous and systematic evaluation for both its appropriateness and quality. The process is conducted within the framework of predetermined criteria whose objective is to assess whether each Storrs AES research project (1) is guided by state, regional, and national priorities, (2) is of high scientific merit and quality, (3) incorporates a state-of-the-art scientific approach to the topic investigated, (4) is likely to successfully meet the goals of the project, and (5) whether it is completed and prepared according to the Storrs AES guidelines. It is expected that the peer review process will afford the Principal Investigator(s) the benefit of the best counsel the system can provide.

The appropriate Department Heads serve as the focal point for the peer review process and suggests 2-3 faculty, usually within the University, as qualified reviewers for a given project. The Director of the Storrs AES (or his Associate Director) is the ultimate authority to finally approve projects once they have been critically reviewed and been endorsed by the Department Head.

III. Evaluation of Multis & Joint Activities

1. How will the planned programs address the critical issues of strategic importance, including those identified by the stakeholders?

The planned programs were based on input from stakeholder groups and scientists who identified the most critical issues. In many cases, stakeholders are involved in the implementation of applied research efforts and educational/demonstration programs. In other situations, stakeholders through their groups, provide additional funding to address issues of strategic importance.

2. How will the planned programs address the needs of under-served and under-represented populations of the State(s)?

Many of the planned programs will address the needs of under-served and under-represented populations. Included are lower income Hispanic residents in nutrition education, lower income residents through the EFNEP nutrition program, and lower income and minority youth and adults through parenting and child care programs. In addition lower income and minority populations will benefit through an anemia program for health care providers, lower income agricultural producers will benefit from risk management education programs, and decision-makers in less affluent municipalities will increase public policy decision-making as a result of natural resource/land use protection programs.

3. How will the planned programs describe the expected outcomes and impacts?

Planned programs will reach varying stages of expected outcomes during the planning period. The nature of research and educational programs are such that implementation strategies and program impacts occur at varying rates depending upon number of faculty and staff involved, resources available, audiences involved, partnerships required, and outcomes expected (short-term, mid-term, long-term).

4. How will the planned programs result in improved program effectiveness and/or efficiency?

Improved effectiveness and/or efficiency results are anticipated to be seen in many instances. For example, based on recent programs efforts, it is expected that many nutrition education programs will see improved diets and reduced financial allocations for purchased food items. Land use education programs can be expected to see improved decision making by local officials to protect natural resources and develop viable communities through better decision-making. Agricultural producers can be expected to see reduced pesticide usage, along with increased product quality through IPM program adoptions. Additional expectations for each program area are laid out within the planned program section of this Plan of Work.

IV. Stakeholder Input

1. Actions taken to seek stakeholder input that encourages their participation

- Targeted invitation to traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to non-traditional stakeholder groups
- Targeted invitation to non-traditional stakeholder individuals
- Survey of traditional stakeholder individuals
- Survey of the general public
- Survey of traditional stakeholder groups
- Use of media to announce public meetings and listening sessions

Brief explanation.

The stakeholder input process will follow upon efforts initiated in recent years. The college-wide stakeholder input process will include both research and extension. The annual key event has been the Leaders' Forum. The past four events have focused on leaders of non-private organizations with whom Extension and research works. Other efforts conducted within, as well as outside of the College, will include the State of Connecticut Voices of Children report, needs and trends as identified within the Extension Bulletin newsletter, the Connecticut Food Policy Council's annual report on food insecurity in the state, and assessments of the needs of non-English speaking farm employees.

2(A). A brief statement of the process that will be used by the recipient institution to identify individuals and groups stakeholders and to collect input from them

1. Method to identify individuals and groups

- Use Internal Focus Groups
- Open Listening Sessions
- Use Surveys
- Needs Assessments
- Use Advisory Committees
- Use External Focus Groups

Brief explanation.

As a result of the 2003 Department of Extension program review conducted by CSREES, action has occurred related to the identifying of needs to increase impact data. As a result, an increase in formal program planning for expected outcomes will include planning for stakeholder input. Extension volunteers comprise the state Extension Partners group that meets at least twice a year. The group is comprised of representatives of Extension Councils and other affiliated organizations such as 4-H camp boards, IFYE, and master gardener association. Extension Partners group are expected to conduct a general public needs assessment for statewide programming. The Extension Bulletin, published each month to update the extension faculty on programs, grants and conferences includes recent trend data and needs identified by clientele during the course of conversations over the past month.

2(B). A brief statement of the process that will be used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them

1. Methods for collecting Stakeholder Input

- Survey of traditional Stakeholder individuals
- Survey of the general public
- Survey specifically with non-traditional individuals
- Meeting with traditional Stakeholder individuals
- Meeting with the general public (open meeting advertised to all)
- Survey of traditional Stakeholder groups
- Meeting with traditional Stakeholder groups

Brief explanation

Traditional stakeholders such as vegetable producers and town officials will provide input through end of session evaluations of programs with suggestions for improvements. Radio spots will be used in both eastern and western Connecticut to reach out to the public. The CANR Journal, a quarterly newspaper, highlights research and extension efforts and is available to the public, with comment solicited. The Sea Grant program collects input from aquaculture producers and town officials that leads to changes in programming focus and direction. Meetings with state boards such as the Food Policy Council and Farm Services Agency provide non-traditional stakeholder input.

3. A statement of how the input will be considered

- To Set Priorities
- In the Action Plans
- Redirect Extension Programs
- To Identify Emerging Issues
- Redirect Research Programs

Brief explanation.

Input from stakeholders is critical to our future. In the past, input has been used to redesign programs, to initiate new programs, as the basis for grant proposals, and as a means for central administration to restructure programs. The new College five-year plan is based on needs identified from stakeholders and built into both research and Extension programs.

V. Planned Program Table of Content

S. NO.	PROGRAM NAME
1	Human Nutrition and Health
2	Economics Marketing and Policy
3	Family Youth and Communities
4	Forestry and Wildlife
5	Land Use
6	Plant Production
7	Plant Protection
8	Water and Weather
9	Animal Production
10	Animal Protection

V(A). Planned Program (Summary)

Program #1

1. Name of the Planned Program

Human Nutrition and Health

2. Brief summary about Planned Program

The economic impact of chronic disease on the United States economy is staggering. Chronic diseases such as heart disease, cancer, and diabetes are the leading causes of death and disability in the United States. Poor diet quality and lack of physical activity over a lifetime also place adults at greater risk for a multitude of chronic diseases. Connecticut's senior population faces complex issues affecting their nutritional status.

Among minority and low-income populations, large disparities exist in regards to prevention of and early diagnosis and treatment of both acute and chronic disease. It is now widely accepted that children have special vulnerabilities to environmental exposures.

The majority of food derived illness is caused by bacterial ingestion of bacterial contaminated food products.

Research will be directed at improving human health through a variety of activities, including identifying bioactive components of natural and processed foods, determining the impacts of dietary and lifestyle factors on cardiovascular diseases, effect of marine oils and omega-fatty acids on infant development ,and understanding how cells handle microelements such as zinc and the nature of the effects of their deficiencies and excesses.

Extension programs will focus on improving health of targeted populations through a variety of efforts, including healthy school nutrition environment, childhood iron-deficiency anemia and childhood overweight, decreasing childhood and adult obesity behaviors among low-income food stamp recipient, developing healthy meal planning skills which will improve the overall diet quality of families participating in the After School Healthy Meal Planning program, increased adoption of recommended food handling practices by cheesemakers and seafood processors, and reducing childhood lead poisoning.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

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

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
702	Requirements and Function of Nutrients and Other Food Components	25%		25%	
703	Nutrition Education and Behavior	35%		35%	
704	Nutrition and Hunger in the Population	20%		20%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	5%		5%	
724	Healthy Lifestyle	10%		10%	
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	5%		5%	
	Total	100%		100%	

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

1. Situation and priorities

The economic impact of chronic disease on the United States economy is staggering. Seventy five percent of the \$1.8 trillion the US spends on health care annually is spent on treating chronic diseases. Less than five percent of the annual health care spending goes toward chronic disease prevention – even less for at risk, low-income population groups.

Chronic diseases such as heart disease, cancer, and diabetes are the leading causes of death and disability in the United States. Poor diet quality and lack of physical activity over a lifetime also place adults at greater risk for a multitude of chronic diseases such as cancer, hypertension, cardiovascular disease, and diabetes. The American College of Cardiology has recently stated that the scientific evidence is now overwhelming demonstrating that obesity alone is an independent risk factor for coronary heart disease (CHD).

While inner city parents are typically not concerned about the overweight status of their child, they are concerned about immediate health problems, such as anemia and asthma, and the happiness of their children. Connecticut's senior population faces complex issues affecting their nutritional status. Among minority and low-income populations, large disparities exist in regards to prevention of and early diagnosis and treatment of both acute and chronic disease. Thirty percent of American children are overweight, 15% are obese, and millions more are at risk. Children from low-income households are at greatest risk for developing obesity given high calorie, but poor quality diets and limited opportunities for physical activity.

Low carbohydrate diets may be beneficial for those individuals who have the metabolic syndrome (high plasma triglycerides, low HDL, high blood glucose, hypertension and abdominal obesity). Recently a significant number of studies on very low-carbohydrate diets (VLCD) have, in general, pointed to carbohydrate restriction as a very effective option for losing weight. However, most professional organizations continue to discourage VLCD because they contradict low-fat diets.

Clinical studies and epidemiological surveys have investigated the relationship between dietary cholesterol and the risk of cardiovascular disease (CVD) and have shown that there is no relationship whatsoever. Evidence suggests that green tea or its catechins may lower the blood levels of cholesterol and retard the development or progression of atherosclerosis in animal models. It is now widely accepted that children have special vulnerabilities to environmental exposures.

The majority of food derived illness is caused by bacterial ingestion of bacterial contaminated food products. Between 1990 and 2002, produce (fruits, vegetables and fresh juices) caused 293 outbreaks-second only to seafood. Numerous disease outbreaks have occurred due to consumption of contaminated juices. Processors of fresh juice that sell wholesale are required to take a training course and develop a HACCP plan. Increasing number of outbreaks of foodborne illness is related to seafood. FDA regulations governing the safe processing and handling of fish and fishery products call for all processors to be trained.

2. Scope of the Program

- In-State Extension
- Integrated Research and Extension
- In-State Research
- Multistate Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Poor access to health services, lack of adequate health insurance, language barriers, and poor understanding of treatment options continue to pose huge challenges to public health. Correcting these disparities will require, in part, the best application of chronic disease program knowledge to the populations at greatest risk.

Families need to not only reevaluate nutrition that children get while in school but also while they are at home. Teaching youth to cook with vegetables and learn to change the bitter taste of vegetables is a step towards change. This will help them take control and make eating healthy and fun. It may be difficult to convince children to eat more vegetables if they are overly sensitive to bitter flavors.

Opportunities for Juice HACCP training in New England are very limited. The small food processing operations, which characterizes most NE processors, cannot afford (due to time and/or fiscal restraints) to travel to the Southeast or California to take advantage of other courses.

The availability of new scientific techniques combined with improved efforts to conduct diet interventions provides the opportunity to better define the affect of routine aerobic exercise on nutrient needs. In particular, the ability to correctly balance calorie intake with energy expenditure for optimal use of dietary protein is important to long term health and weight maintenance.

2. Ultimate goal(s) of this Program

Research: Improve human health through:

- Identifying bioactive components of natural and processed foods and investigating their mechanisms of action in improving human function, performance and reducing risks of chronic diseases
- Determining the impacts of dietary and lifestyle factors on lipid metabolism in relation to prevention and treatment of cardiovascular diseases
- Determining the effect of marine oils and omega-fatty acids on infant development and growth, and maternal health
- Characterizing protein utilization in healthy men and women who participate in routine aerobic exercise
- Determining the role of water soluble and fat soluble vitamins in carbohydrate and lipid metabolism and antioxidant defense system
- Understanding important and fundamental questions about how cells handle microelements such as zinc and the nature of the effects of their deficiencies and excesses.

Extension: Improve health of targeted populations through:

Extension through:

- Promoting a healthy school nutrition environment for Connecticut's schools
- Preventing, treating and minimizing the consequences of childhood iron-deficiency anemia and childhood overweight and providing nutrition education programs for seniors in Southeastern Connecticut and Rhode Island
- Providing food and nutrition education to food stamp recipients who also receive food from emergency food programs such as soup kitchens, food pantries and homeless shelters
- Decreasing childhood and adult obesity behaviors among low-income food stamp recipient families in Hartford and surrounding areas through increased nutrition knowledge and improved dietary practices and physical activity
- Decreasing childhood overweight and adult obesity by improving diet quality, increasing activity, and increasing food security
- Developing healthy meal planning skills to improve the overall diet quality of families participating in the After School Healthy Meal Planning program
- Educating senior citizens who parent young children about dietary recommendations presented through the Expanded Food and Nutrition Education Program (EFNEP)
- Improving nutrition of low-income, limited resource families with children through the EFNEP program
- Increasing adoption of recommended food handling practices by cheesemakers and seafood processors

- Significantly reducing childhood lead poisoning by 2010 through primary prevention education programs that promote the physical and psychological health of children

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
2009	12.0	0.0	10.0	0.0
2010	12.0	0.0	10.0	0.0
2011	12.0	0.0	10.0	0.0
2012	12.0	0.0	10.0	0.0
2013	12.0	0.0	10.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Conduct research experiments, educational workshops, conferences, individual consultations, trials, newsletters, fact sheets.

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

Extension	
Direct Methods	Indirect Methods
<ul style="list-style-type: none"> ● Education Class ● Demonstrations ● Workshop ● One-on-One Intervention 	<ul style="list-style-type: none"> ● Newsletters ● Web sites ● TV Media Programs ● Public Service Announcement

3. Description of targeted audience

Consumers, public policy decision-makers, health officials, academic researchers

V(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2009	5000	13500	130	550
2010	5500	14000	130	550
2011	6000	14000	135	600
2012	6000	14000	135	600
2013	6000	14000	135	600

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

Expected Patent Applications

2009 :0 2010 :0 2011 :0 2012 :0 2013 :0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2009	5	3	8
2010	5	3	8
2011	5	3	8
2012	5	3	8
2013	5	3	8

V(H). State Defined Outputs

1. Output Target

- Fact sheets, bulletins and newsletters

2009 50 2010 55 2011 :60 2012 60 2013 60

- Websites developed

2009 2 2010 2 2011 :2 2012 2 2013 2

- Media releases

2009 23 2010 23 2011 :23 2012 23 2013 23

- Books and monographs

2009 5 2010 5 2011 :6 2012 5 2013 5

- Workshops and conferences hosted

2009 3 2010 3 2011 :3 2012 3 2013 3

- Presentations and short courses

2009 65 2010 65 2011 :70 2012 65 2013 65

V(I). State Defined Outcome

O. No	Outcome Name
1	Understanding of basic dietary processes vis-a-vis nutrition and/or health
2	Public policy adoption of health management strategies (# of strategies adopted)
3	Reduced (%) levels of obesity by target populations

Outcome #1

1. Outcome Target

Understanding of basic dietary processes vis-a-vis nutrition and/or health

2. Outcome Type : Change in Knowledge Outcome Measure

2009 :2 **2010** :2 **2011** :2 **2012** :2 **2013** :2

3. Associated Institute Type(s)

- 1862 Research

4. Associated Knowledge Area(s)

- 702 - Requirements and Function of Nutrients and Other Food Components

Outcome #2

1. Outcome Target

Public policy adoption of health management strategies (# of strategies adopted)

2. Outcome Type : Change in Action Outcome Measure

2009 :2 **2010** :2 **2011** :2 **2012** :2 **2013** :2

3. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

4. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 704 - Nutrition and Hunger in the Population
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
- 724 - Healthy Lifestyle
- 804 - Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures

Outcome #3

1. Outcome Target

Reduced (%) levels of obesity by target populations

2. Outcome Type : Change in Condition Outcome Measure

2009 :10 **2010** :10 **2011** :10 **2012** :10 **2013** :10

3. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

4. Associated Knowledge Area(s)

- 702 - Requirements and Function of Nutrients and Other Food Components
- 703 - Nutrition Education and Behavior
- 704 - Nutrition and Hunger in the Population
- 724 - Healthy Lifestyle

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Economy
- Public Policy changes
- Competing Public priorities
- Appropriations changes

Description

Economic changes, particularly downturns in the general economy of Connecticut, may increase the number of targeted consumers. Appropriation changes may reduce the ability to offer Extension education to audiences. Funding changes may reduce the ability to conduct relevant nutrition-related research.

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

1. Evaluation Studies Planned

- Before-After (before and after program)
- Time series (multiple points before and after program)
- After Only (post program)
- Retrospective (post program)

Description

A variety of evaluation techniques will be followed, some will be pre and post program tests to monitor short term knowledge changes, and others will be more extensive to monitor dietary and health-related changes over time.

2. Data Collection Methods

- Case Study
- Mail
- Unstructured
- Telephone
- Journals
- On-Site
- Sampling
- Observation

Description

Targeted survey approaches will be used selectively over time to ascertain program impacts and outcomes, with the ones listed as the key approaches.

V(A). Planned Program (Summary)

Program #2

1. Name of the Planned Program

Economics Marketing and Policy

2. Brief summary about Planned Program

Improvement of the economic viability and profitability of Connecticut agricultural and associated enterprises is an important issue facing the State’s agricultural producers. On the natural resources and environmental front, conflicts between environment and markets are becoming more important.

Research will be designed to improve the viability of the food and fiber sectors and protect and enhance the environment in the state, nation and world through work in three sectors: food marketing, environmental and resource economics, and international agricultural development and trade.

Extension work will help maintain the rural character of Connecticut’s countryside, facilitate the growth and expansion of the food industry within the state, and help conserve the natural resources of Connecticut.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

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

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
602	Business Management, Finance, and Taxation	35%		35%	
603	Market Economics	15%		15%	
605	Natural Resource and Environmental Economics	35%		35%	
606	International Trade and Development	15%		15%	
	Total	100%		100%	

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

1. Situation and priorities

Issues of economics, marketing and policy are major concerns in Connecticut and the region. Improvement of the economic viability and profitability of Connecticut agricultural and associated enterprises has remained an important issue facing the State’s agricultural producers, including tax management.

Market issues of concern include direct marketing of locally produced products, milk market channel pricing issues, and regulatory options. On the natural resources and environmental front, conflicts between environment and markets are becoming more important. Natural resource and land use economics raise questions about amenity values from farm and forests as well as issues associated with land conservation.

On the global scale, many of the world’s dams and reservoirs are losing their storage capacity due to sedimentation and

preservation of wetlands is an issue, as is soil erosion from agriculture is often a major contributor to the deterioration of wetlands.

Fisheries face many concerns including integration of the recreational sector into the Gulf of Mexico red snapper fishery and management of the American lobster in Long Island Sound.

2. Scope of the Program

- Multistate Extension
- In-State Extension
- In-State Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Understanding market pricing issues will lead to improved public policy actions. Producers will be willing to improve farm management approaches as a result of risk management education programs.

2. Ultimate goal(s) of this Program

Research:

- Conduct economic research to improve the viability of the food and fiber sectors and protect and enhance the environment in the state, nation and world through work in three sectors: food marketing, environmental and resource economics, and international agricultural development and trade
- Food Marketing Policy Center to develop pricing and market information that will contribute to improved performance of the food production and marketing system
- Test ecolabel purchase decision-making hypotheses; understand rural resident’s economic development attitudes as compared to land conservation and farm land preservation approaches
- Understand approaches to more fully integrate the recreational sector into the management of fisheries; and determine sediment management strategies for dam that would be optimal from an economic perspective and meet technical feasibility criteria.

Extension:

- Help maintain the rural character of Connecticut’s countryside
- Facilitate the growth and expansion of the food industry within the state, and help conserve the natural resources of Connecticut
- Improve the viability and financial health of Connecticut agricultural producers through crop insurance and risk management education
- Enhance skills and knowledge of tax practitioners in the state through the Tax School

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
2009	4.0	0.0	4.0	0.0
2010	4.0	0.0	4.0	0.0
2011	4.0	0.0	4.0	0.0
2012	4.0	0.0	4.0	0.0
2013	4.0	0.0	4.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

A mix of research and Extension activities will be undertaken to address the issues identified above through economic assessments, program offerings, partnering and counseling.

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

Extension	
Direct Methods	Indirect Methods
<ul style="list-style-type: none"> ● Education Class ● Group Discussion ● One-on-One Intervention ● Workshop 	<ul style="list-style-type: none"> ● Web sites ● Newsletters

3. Description of targeted audience

Agricultural producers, tax practitioners, fishers and other water-based users, public policy personnel (including state, regional, national and international officials).

V(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2009	550	1500	0	0
2010	600	1500	0	0
2011	600	1500	0	0
2012	600	1500	0	0
2013	600	1500	0	0

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

Expected Patent Applications

2009 :0 2010 :0 2011 :0 2012 :0 2013 :0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2009	4	0	4
2010	4	0	4
2011	4	0	4
2012	4	0	4
2013	4	0	4

V(H). State Defined Outputs

1. Output Target

- Web sites developed

2009 :1	2010 :1	2011 :1	2012 :1	2013 :1
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- Media articles

2009 :3	2010 :3	2011 :3	2012 :3	2013 :3
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- Workshops and conferences hosted

2009 :5	2010 :5	2011 :5	2012 :5	2013 :5
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- Presentations and short courses

2009 :15	2010 :15	2011 :15	2012 :15	2013 :15
-----------------	-----------------	-----------------	-----------------	-----------------

- Books and monographs

2009 :0	2010 :0	2011 :1	2012 :0	2013 :1
----------------	----------------	----------------	----------------	----------------

- Conference abstracts

2009 :1	2010 :1	2011 :1	2012 :1	2013 :1
----------------	----------------	----------------	----------------	----------------

- Fact sheets, bulletins and newsletters

2009 :5	2010 :5	2011 :5	2012 :4	2013 :4
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V(I). State Defined Outcome

O. No	Outcome Name
1	Natural resource management policies adopted and/or amended at national, state, regional and local governmental levels
2	Number of new and/or strengthened partnerships with governmental agencies, NGOs and/or corporations resulting from research and Extension programmatic activities in the area of economics, marketing and policy
3	Acreage under crop insurance (% increase)
4	Adoption of recommended risk management strategies by defined target audience (% of audience)
5	New food policies adopted/amended at the national, state, regional and/or local level by governmental, non-profit and or corporate entities related to pricing, local buying, distribution and availability

2. Outcome Type : Change in Action Outcome Measure

2009 :15 **2010** : 15 **2011** : 15 **2012** :15 **2013** :15

3. Associated Institute Type(s)

- 1862 Extension

4. Associated Knowledge Area(s)

- 602 - Business Management, Finance, and Taxation
- 603 - Market Economics

Outcome #5

1. Outcome Target

New food policies adopted/amended at the national, state, regional and/or local level by governmental, non-profit and or corporate entitties related to pricing, local buying, distribution and availability

2. Outcome Type : Change in Action Outcome Measure

2009 2 **2010** : 2 **2011** : 2 **2012** 2 **2013** :2

3. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

4. Associated Knowledge Area(s)

- 603 - Market Economics
- 606 - International Trade and Development

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

A variety of external actions can impact the adoption of public and private actions in this area. In particular, changing economic environment can reduce or increase the number of producers in business and their willingness to adopt various strategies being presented.

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

1. Evaluation Studies Planned

- Time series (multiple points before and after program)
- Before-After (before and after program)
- After Only (post program)

Description

A mix of evaluation techniques and approaches will be utilized depending on the project focus.

2. Data Collection Methods

- Sampling
- On-Site
- Unstructured
- Structured
- Telephone
- Mail

Description

Targeted survey approaches will be used selectively over time to ascertain program impacts and outcomes, with the ones listed as the key approaches.

V(A). Planned Program (Summary)

Program #3

1. Name of the Planned Program

Family Youth and Communities

2. Brief summary about Planned Program

Caring adults play an essential role in the healthy development of youth and their involvement in an informal educational program, with a variety of subjects, provides youths with challenges, experiences, support and help which foster positive attitudes toward their futures and provide them with coping skills to be successful in today's world. Making financial decisions grows increasing complex. Each year an increasing number of products, services, features and options are marketed to consumers.

Research will be designed to conduct community needs assessments, evaluate studies, or other types of research projects for state or community programs.

Extension will focus its efforts on helping create a Connecticut where children, young people and their families will be safe, healthy, educated, socially and culturally aware and leading productive lives in their communities. 4-H members will achieve these goals through participation in a wide range of program areas grouped in nine major emphasis areas (citizenship and civic education, communications and expressive arts, consumer and family sciences, environmental education and earth sciences, healthy lifestyle education/personal development, leadership, plant science and animal science, science and technology and workforce preparation). People with low incomes and others facing financial challenges will become productive members of society by developing or improving their life skills.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

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

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
801	Individual and Family Resource Management	10%		10%	
802	Human Development and Family Well-Being	10%		10%	
803	Sociological and Technological Change Affecting Individuals, Families and Communities	10%		10%	
806	Youth Development	70%		70%	
	Total	100%		100%	

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

1. Situation and priorities

Research has shown that caring adults play an essential role in the healthy development of youth. Older youth need to take an active part in the planning, implementation and evaluation of the program in which they participate. Involvement in an

informal educational program, with a variety of subjects, provides youths with challenges, experiences, support and help that fosters positive attitudes toward their futures and provide them with coping skills to be successful in today's world.

Data suggests that healthy and productive citizens need to be skillful in interpersonal communication skills and confident in their ability to express themselves with people from diverse and divergent backgrounds. Making financial decisions grows increasing complex.

Each year an increasing number of products, services, features and options are marketed to consumers. Surveys suggest that 56% of parents believe high school graduates are totally unprepared to manage their personal finances responsibly. Only 15 % of high school graduates nationally have taken a course covering personal finance basics.

There is a trend toward consumers bearing greater financial responsibility for their health care insurance and planning for their retirement and debate concerning the future funding for Social Security and Medicare are increasing apparent in the national news. Close to 10 million American's are the victims of identity theft annually, with Connecticut 27th for victims of identity theft. The average victim spent \$500 and 30 hours resolving their problems related to their identity theft experience, with the cost to businesses and financial institutions averaging \$10,200 per victim.

2. Scope of the Program

- In-State Research
- In-State Extension
- Multistate Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

All youth need support and positive experiences to grow to their fullest capacity and to become productive adult citizens. Connecticut 4-H plays a significant role in making this vision a reality.

The critical elements in a 4-H experience are a positive relationship with a caring adult, a safe environment, an inclusive environment, engagement in learning, opportunity for mastery, opportunity to see oneself as an active participant in the future, opportunity for self-determination, and opportunity to value and practice service for others. Helping young adults learn to effectively manage their resources is important as they try to balance responsibilities as parents and workers and also as students. Involvement in a program of leadership education fosters important skills, knowledge and confidence required of all effective leaders.

Learning how to be an educated and experienced leader will help youth make the best decisions for themselves and others and will prepare them for the adult roles they will assume in the home, community, workplace, state, and nation. People with low incomes and others facing financial challenges often feel depressed and powerless about their situation. To become productive members of society, it is likely that they will need to make changes and develop or improve their life skills. Involvement in an informal program of citizenship education provides youth with challenges, experiences, support and help which foster a positive attitude toward current and future citizen and community responsibilities.

Involvement in workforce preparation projects provide youth with challenges, experiences, support and help that promotes positive and realistic outlooks on the world of work. It also fosters the development of skills (SCANS) recognized as critical for entrance into the workforce. Teens can and want to make a difference in their communities. In order for youth to develop into adults of integrity who are coping, caring, competent and contributing members of society, they need the opportunity to interact with youth and adults who are role models in a variety of settings. The concept of youth philanthropy is a growing movement dedicated to providing youth with a voice and a role in devising and carrying out important social initiatives.

2. Ultimate goal(s) of this Program

Research:

- To have the Center for Applied Research provide consultation to others engaged in evaluation projects;
- Conduct community needs assessments, evaluate studies, or other types of research projects for state or community programs;
- Offer training seminars, public presentations, or disseminate educational materials on topics related to children, youth, adults, or families.

Extension:

- A Connecticut where children, young people and their families will be safe, healthy, educated, socially and culturally aware and leading productive lives in their communities. 4-H members will achieve these goals through participation in a wide range of projects grouped in nine major emphasis areas (citizenship and civic education, communications and expressive arts, consumer and family sciences, environmental education and earth sciences, healthy lifestyle education/personal development, leadership, plant science and animal science, science and technology and workforce preparation).

- At-risk youth to benefit from safe and structured places designed to strengthen participation in enrichment activities and attention to homework. Improved quality of volunteers as members of community and neighborhood groups to address local

needs.

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
2009	17.0	0.0	2.0	0.0
2010	17.0	0.0	2.0	0.0
2011	17.0	0.0	2.0	0.0
2012	17.0	0.0	2.0	0.0
2013	17.0	0.0	2.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Extension programs, camps, workshops, 4-H clubs, School-enrichment programs, web-based educational programs.

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

Extension	
Direct Methods	Indirect Methods
<ul style="list-style-type: none"> ● Education Class ● One-on-One Intervention ● Workshop ● Group Discussion 	<ul style="list-style-type: none"> ● Web sites ● Newsletters ● Public Service Announcement

3. Description of targeted audience

Youth, schools and families.

V(G). Planned Program (Outputs)

1. Standard output measures

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

Year	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
	Target	Target	Target	Target
2009	4000	1500	24000	3500
2010	4000	1500	24000	3500
2011	4000	1500	24000	3500
2012	4000	1500	24000	3500
2013	4000	1500	24000	3500

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

Expected Patent Applications

2009 :0 2010 :0 2011 :0 2012 :0 2013 :0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2009	1	4	5
2010	1	4	5
2011	1	4	5
2012	1	4	5
2013	1	4	5

V(H). State Defined Outputs

1. Output Target

- Presentations and short courses

2009 :0 2010 :0 2011 :0 2012 :0 2013 :0

- Websites developed

2009 :1 2010 :1 2011 :1 2012 :1 2013 :1

- Curricula Developed

2009 :1 2010 :1 2011 :1 2012 :1 2013 :1

- Media Contacts

2009 :20 2010 :25 2011 :25 2012 :20 2013 :20

- Newsletters and marketing materials

2009 :15 2010 :15 2011 :15 2012 :15 2013 :15

- After-school programs

2009 :5 2010 :5 2011 :5 2012 :5 2013 :5

- eXtension committee participation

2009 :1 2010 :1 2011 :1 2012 :1 2013 :1

- Books and monographs

2009 :0 2010 :0 2011 :1 2012 :1 2013 :0

- Conference abstracts

2009 :1 2010 :1 2011 :1 2012 :1 2013 :1

- Workshops and conferences hosted

2009 2

2010 2

2011 2

2012 2

2013 1

- Fact sheets, bulletins and newsletters

2009 10

2010 10

2011 10

2012 10

2013 10

V(I). State Defined Outcome

O. No	Outcome Name
1	Participation in community service projects by youth and/or adults participating in program efforts (% of total defined audience)
2	Increased knowledge and skills in one or more of nine 4-H program emphasis areas by participating youth (% change)
3	Increased exploration of career opportunities by participating youth (% change)
4	Increased awareness and/or adoption of leadership knowledge and skills by adult volunteers working with youth (% change)
5	Increased endowment of 4-H Centennial account (\$)
6	Increased awareness of value of 4-H to Connecticut by targeted segment of general public (% change)
7	Increased awareness by non-profit organizations of 4-H value (% increase) as defined by new and/or enhanced partnerships, grant funding, publicity, referrals

Outcome #1

1. Outcome Target

Participation in community service projects by youth and/or adults participating in program efforts (% of total defined audience)

2. Outcome Type : Change in Knowledge Outcome Measure

2009 :15 **2010** : 15 **2011** : 15 **2012** :15 **2013** :15

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being
- 803 - Sociological and Technological Change Affecting Individuals, Families and Communities
- 806 - Youth Development

Outcome #2

1. Outcome Target

Increased knowledge and skills in one or more of nine 4-H program emphasis areas by participating youth (% change)

2. Outcome Type : Change in Knowledge Outcome Measure

2009 :15 **2010** : 20 **2011** : 20 **2012** :15 **2013** :15

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 806 - Youth Development

Outcome #3

1. Outcome Target

Increased exploration of career opportunities by participating youth (% change)

2. Outcome Type : Change in Action Outcome Measure

2009 :15 **2010** : 15 **2011** : 20 **2012** :15 **2013** :15

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 806 - Youth Development

Outcome #4

1. Outcome Target

Increased awareness and/or adoption of leadership knowledge and skills by adult volunteers working with youth (% change)

2. Outcome Type : Change in Knowledge Outcome Measure

2009 :20 **2010** : 20 **2011** : 20 **2012** :20 **2013** :20

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 806 - Youth Development

Outcome #5

1. Outcome Target

Increased endowment of 4-H Centennial account (\$)

2. Outcome Type : Change in Action Outcome Measure

2009 :35000 **2010** : 40000 **2011** : 40000 **2012** :40000 **2013** :40000

3. Associated Institute Type(s)

- 1862 Extension

4. Associated Knowledge Area(s)

- 806 - Youth Development

Outcome #6

1. Outcome Target

Increased awareness of value of 4-H to Connecticut by targeted segment of general public (% change)

2. Outcome Type : Change in Action Outcome Measure

2009 :15 **2010** : 15 **2011** : 15 **2012** :10 **2013** :10

3. Associated Institute Type(s)

- 1862 Extension

4. Associated Knowledge Area(s)

- 806 - Youth Development

Outcome #7

1. Outcome Target

Increased awareness by non-profit organizations of 4-H value (% increase) as defined by new and/or enhanced partnerships, grant funding, publicity, referrals

2. Outcome Type : Change in Action Outcome Measure

2009 :10 **2010** : 15 **2011** : 15 **2012** :10 **2013** :10

3. Associated Institute Type(s)

- 1862 Extension

4. Associated Knowledge Area(s)

- 806 - Youth Development

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Competing Programmatic Challenges
- Appropriations changes
- Economy

Description

Reduced funding may affect ability to offer programs.

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

1. Evaluation Studies Planned

- Other (Project reports)
- Case Study
- After Only (post program)
- During (during program)
- Before-After (before and after program)

Description

Multiple approaches will be used to include a comprehensive evaluation of youth leadership in the 4-H program, evaluation of submitted project records, pre and post assessments, self evaluation and performance appraisals to determine skills learned.

2. Data Collection Methods

- On-Site
- Structured
- Telephone
- Sampling
- Mail
- Whole population
- Observation

Description

Targeted survey approaches will be used selectively over time to ascertain program impacts and outcomes, with the ones listed as the key approaches.

V(A). Planned Program (Summary)

Program #4

1. Name of the Planned Program

Forestry and Wildlife

2. Brief summary about Planned Program

Connecticut's 1.8 million acres of forest provide raw material for over 350 forest products processing and manufacturing firms, clean the air and water, provide habitat for wildlife, and provide recreational opportunities for nearly a million citizens each year. Key wildlife and fish populations have been dwindling.

Research will be designed to improve Connecticut's wildlife through understanding how wildlife habitats can be maintained or restored, improved public understanding of the American Woodcock and demographics of the Burbot, a state-endangered fish.

Extension work will be designed to improve Connecticut's forestland, productivity and health through forest landowners learning enhanced knowledge about good forest stewardship, adoption of effective municipal tree ordinances and associated management practices, increased engagement of trained volunteers within the municipal tree communities, and increased acreage under long-term stewardship.

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

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

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
123	Management and Sustainability of Forest Resources	40%		40%	
124	Urban Forestry	20%		20%	
135	Aquatic and Terrestrial Wildlife	40%		40%	
Total		100%		100%	

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

1. Situation and priorities

Connecticut's 1.8 million acres of forest provide raw material for over 350 forest products processing and manufacturing firms, which employ 3,600 citizens and contribute over \$450 million annually to the state's economy.

Forests also clean the air and water, provide habitat for wildlife, and provide recreational opportunities for nearly a million citizens each year. Almost 85% of Connecticut's forest is privately owned. Research shows that Connecticut is losing some 6,000 acres of commercially harvestable forest annually to development and fragmentation, and that the average forested parcel size has declined 34% over the past 20 years.

For nearly a century, Connecticut state law has mandated that each city and town appoint a Tree Warden and that this public official is then responsible for all municipal trees. However, Connecticut state law does not specify what skills and knowledge Tree Wardens must possess. The extreme population density causes factors that not only shorten the lives of municipal trees (along streets, in parks, around schools, for example) but also creates hazardous ones. In spite of being a

wealthy state, Connecticut municipalities typically do not adequately fund municipal forestry/tree care operations thereby undermining the health of public and jeopardizing public safety.

American Woodcock (*Scolopax minor*) populations have been dwindling at a rate over 2 percent each year for nearly 40 years. Fifty years ago the Ruffed Grouse (*Bonassa umbellus*) was one of Connecticut's most common native game birds. Today populations have declined to record low numbers, sparking widespread concern and renewed efforts to restore populations to pre-1980 levels. The Burbot (*Lota lota*) is a freshwater gadoid fish and is listed on the State of Connecticut's list of endangered fish.

2. Scope of the Program

- Multistate Extension
- In-State Research
- In-State Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Volunteers who receive quality and timely community forestry education and training are able to augment community forestry efforts.

2. Ultimate goal(s) of this Program

Research: Improve Connecticut's wildlife through:

- Understanding how wildlife habitats can be maintained or restored to assure sustainable levels of indigenous species in the face of increasing pressures of population growth, urbanization, pollution, declining agriculture and inadequate public understanding.

- Improved public understanding of the life history, values and status of American Woodcock.
- Increased understanding about the status and demographics of the Burbot, a state-endangered fish.

Extension: Improve Connecticut's forestland, productivity and health through:

- Forest landowners learning enhanced knowledge about good forest stewardship
- Adoption of effective municipal tree ordinances and associated management practices
- Increased engagement of trained volunteers within the municipal tree community; increased acreage under long-term stewardship

- Within the Quinnebaug-Shetucket Heritage Corridor (QSHC) increased acres protected and managed as well as the number of natural resource volunteers engaged in education efforts with landowners and public officials

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
2009	3.0	0.0	2.0	0.0
2010	3.0	0.0	2.0	0.0
2011	3.0	0.0	2.0	0.0
2012	3.0	0.0	2.0	0.0
2013	3.0	0.0	2.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

A combination research and Extension program will address key issues related to forestry and wildlife considerations in Connecticut. Particular emphasis will be on training cadres of volunteers who will become engaged in forest stewardship

practices at the municipal and private landowner levels. Also, research will be designed to better understand the American Woodcock, Ruffed Grouse, and the State-endangered Burbot with an eye toward outreach efforts to protect these important species.

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

Extension	
Direct Methods	Indirect Methods
<ul style="list-style-type: none"> ● Demonstrations ● One-on-One Intervention ● Workshop ● Group Discussion 	<ul style="list-style-type: none"> ● Newsletters ● Public Service Announcement ● Web sites

3. Description of targeted audience

A mixture of public policy personnel (federal and state agencies as well as town conservation, planning and management officials), interested and involved citizens, and private landowners.

V(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2009	3000	5500	0	0
2010	3000	6000	0	0
2011	3000	6000	0	0
2012	3000	6000	0	0
2013	3000	6000	0	0

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

Expected Patent Applications

2009 :0 2010 :0 2011 :0 2012 :0 2013 :0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2009	1	1	2
2010	1	1	2
2011	1	1	2
2012	1	1	2
2013	1	1	2

V(H). State Defined Outputs

1. Output Target

- Fact sheets, bulletins and newsletters

	2009	2010	2011	2012	2013
	5	5	:5	5	5
● Short courses					
	2	2	:2	2	2
● Websites developed					
	:1	:1	:1	:1	:1
● Books and monographs					
	0	0	:1	0	:1
● Conference abstracts					
	0	0	:1	0	:1
● Workshops and conferences hosted					
	2	2	:2	:1	:1
● Presentations and short courses					
	:45	:45	:50	:40	:40

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of governmental and/or private sector entities utilizing GIS approaches resulting - in part - from research and/or Extension programming
2	Number of qualified tree wardens appointed/reappointed by municipalities
3	Municipal Shade Tree Ordinances developed and/or revised
4	Stewardship Plans Developed
5	Increased understanding of fish and wildlife population patterns and/or behavior (# of patterns and/or behaviors)

Outcome #1

1. Outcome Target

Number of governmental and/or private sector entities utilizing GIS approaches resulting - in part - from research and/or Extension programming

2. Outcome Type : Change in Knowledge Outcome Measure

2009 :15 2010 : 20 2011 : 20 2012 25 2013 :20

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 123 - Management and Sustainability of Forest Resources
- 124 - Urban Forestry

Outcome #2

1. Outcome Target

Number of qualified tree wardens appointed/reappointed by municipalities

2. Outcome Type : Change in Action Outcome Measure

2009 5 2010 : 5 2011 : 5 2012 5 2013 :5

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 124 - Urban Forestry

Outcome #3

1. Outcome Target

Municipal Shade Tree Ordinances developed and/or revised

2. Outcome Type : Change in Action Outcome Measure

2009 5 2010 : 5 2011 : 5 2012 5 2013 :5

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 124 - Urban Forestry

Outcome #4

1. Outcome Target

Stewardship Plans Developed

2. Outcome Type : Change in Knowledge Outcome Measure

2009 :10 2010 : 10 2011 : 10 2012 :10 2013 :10

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 123 - Management and Sustainability of Forest Resources

- 135 - Aquatic and Terrestrial Wildlife

Outcome #5

1. Outcome Target

Increased understanding of fish and wildlife population patterns and/or behavior (# of patterns and/or behaviors)

2. Outcome Type : Change in Knowledge Outcome Measure

2009 : 2 **2010** : 2 **2011** : 2 **2012** : 1 **2013** : 1

3. Associated Institute Type(s)

- 1862 Research

4. Associated Knowledge Area(s)

- 135 - Aquatic and Terrestrial Wildlife

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Competing Public priorities
- Government Regulations
- Public Policy changes
- Economy
- Competing Programmatic Challenges
- Appropriations changes

Description

Economic conditions may negatively affect land owners' willingness to implement stewardship plans or towns to implement urban forestry programs. Reduced funding may restrict Extension activity.

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

1. Evaluation Studies Planned

- Time series (multiple points before and after program)
- Before-After (before and after program)
- Retrospective (post program)
- After Only (post program)

Description

A variety of evaluation approaches will be employed and will vary from research and Extension effort.

2. Data Collection Methods

- Sampling
- Mail
- Observation
- Unstructured

Description

Targeted survey approaches will be used selectively over time to ascertain program impacts and outcomes, with the ones listed as the key approaches.

V(A). Planned Program (Summary)

Program #5

1. Name of the Planned Program

Land Use

2. Brief summary about Planned Program

Better land use decisions and practices are needed to protect our nation's natural resources. Nonpoint source pollution, or polluted runoff, is the number one source of water pollution in the United States.

Research will be designed to develop new approaches and techniques that will protect and enhance large natural and cultural systems, protect and enhance communities, including small rural communities to urban areas and new ideas to reduce the impacts of development on natural and cultural resources, and geospatial research to track, analyze and understand the changes to the landscape and gauge the impacts that these changes have on the economic and environmental health of communities.

Extension efforts will enable communities and regions to better manage land use development and protect important natural and agricultural resources through the Nonpoint Education for Municipal Officials (NEMO) program designed to educate local officials on the links between land use and water quality; the Green Valley Institute's (GVI) program designed to educate local officials and volunteers about ways to address growth and development issues – including community planning and design; and the Community Design Center (CDC) for communities to understand how natural resources, cultural resources and special scenic character could be protected

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

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

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
131	Alternative Uses of Land	100%		100%	
	Total	100%		100%	

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

1. Situation and priorities

Many national agencies and organizations have recognized that better land use decisions and practices are needed to protect our nation's natural resources. Despite its universal impact, in Connecticut, most land use decisions are made at the local level. Often by volunteers who have little knowledge or expertise in the areas of land planning, site design and site engineering that directly impact these important natural and cultural resources. They have few resources with which to track, analyze and understand the changes to their landscape, or to gauge the impacts that these changes have on the economic and environmental health of their towns. In Connecticut, the rate of growth in rural communities is more than triple that of the urban areas.

Thoroughfares and villages across Connecticut are slowly being developed, and, acre-by-acre, the character of rural areas of the state is changing. A recent report by the U.S. General Accounting Office concluded that non-regulatory education, information and technical tools are among the most effective, and cost effective, means by which to promote better local land use policies.

Nonpoint source pollution, or polluted runoff, is the number one source of water pollution in the United States. USDA's Water Quality Program, NOAA's Coastal Ecosystem Health Initiative, and EPA's Smart Growth and Water Strategies all call for nonpoint source pollution to be addressed. The Quinnebaug-Shetucket National Heritage Corridor (QSHC), a 35-town region in

eastern Connecticut and south-central Massachusetts, is officially recognized by the National Park Service as having natural, cultural and historic resources of national significance. The Corridor's population grew 4% between 1990 and 2000, and is projected to grow an additional 20% by 2020.

2. Scope of the Program

- Multistate Extension
- Integrated Research and Extension
- In-State Research
- In-State Extension
- Multistate Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Natural systems, agricultural lands, historic or culturally significant resources, recreation areas and lands important to the visual character of our communities can all be conserved. As population grows and technologies allow people to comfortably live in a dispersed pattern, the trend toward rural and sub-urban development will likely continue.

Continued development in a dispersed pattern will reduce ecological viability, diminish the traditional rural character, reduce quality agricultural land, and cause countless related problems. Commercial development can forever change the character of a community. Compact development, whether in urban center, small-city or rural village, provides a sensible and more sustainable alternative to dispersed development. At the same time, compact development patterns allow for the conservation of land resources with new development so the rural character is minimally impacted. A planned system of open space conservation, or 'green infrastructure', is as important to an area as its roads and sewers.

Preserving environmental quality and viable agriculture in the face of these pressures will require unprecedented inputs of education and information to several key audiences - private farm and forest owners and municipal officials and commissioners. This latter audience is overwhelmingly populated by lay volunteers who are in chronically short supply and often poorly supported with education and technical support.

Geospatial research and technology can play an enormously important role in providing decision support for land use decision making. In particular, there are new GIS, GPS and other remote sensing based tools that can help local decision makers to both visualize existing and future land use patterns, and model the various impacts of these patterns. Technology alone, however, is unlikely to have much of an impact with this busy audience, without the mediation of education and technical assistance.

2. Ultimate goal(s) of this Program

Research:

- Research into broad scale land planning including case studies of past methods and outcomes, current approaches and development of new ideas for the future that will protect and enhance large natural and cultural systems (e.g. river systems, animal movement and migration routes, scenic byways, coastal access)
- Research into community planning and design including case studies of past methods and outcomes, current approaches and development of new ideas for the future that will protect and enhance communities, including small rural communities to urban areas (e.g. form based zoning, economic development incentive programs, highway design and engineering, and streetscape improvements, civic/open space, etc.)
- Research into site planning and design including case studies of past methods and outcomes, current approaches and development of new ideas for the future that can reduce the impacts of development on natural and cultural resources (e.g. sustainable/LEED certified, wetlands, storm water management, historic walls, important views)
- Geospatial research to better understand methods and approaches to track, analyze and understand the changes to the landscape and gauge the impacts that these changes have on the economic and environmental health of communities

Extension: Communities and regions will better manage land use development and protect important natural and agricultural resources through:

- Nonpoint Education for Municipal Officials (NEMO) program designed to educate local officials on the links between land use and water quality
- Green Valley Institute's (GVI) program designed to educate local officials and volunteers about ways to address growth and development issues – including community planning and design
- The Community Design Center (CDC), part of the Program of Landscape Architecture, models for communities how natural resources, cultural resources and special scenic character could be protected while accommodating new sustainable development. CDC accomplishes this by providing design/planning expertise and the development of specific land use plans

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
2009	9.0	0.0	7.0	0.0
2010	9.0	0.0	7.0	0.0
2011	9.0	0.0	7.0	0.0
2012	9.0	0.0	7.0	0.0
2013	9.0	0.0	7.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Research will address issues related to land use and land cover through satellite-based technology. Education programs will be delivered with a mix of community and regional audiences receiving information through multiple means.

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

Extension	
Direct Methods	Indirect Methods
<ul style="list-style-type: none"> ● Education Class ● Demonstrations ● Group Discussion ● Workshop 	<ul style="list-style-type: none"> ● Web sites ● Newsletters

3. Description of targeted audience

Public policy decision makers, including federal and state level agency personnel, town and regional personnel associated with land use decision making, academic researchers and Extension personnel at the state, regional and national level. Professional development related design personnel.

V(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2009	500	1300	0	0
2010	550	1400	0	0
2011	550	1500	0	0
2012	500	1500	0	0
2013	500	1500	0	0

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

Expected Patent Applications

2009 :0 2010 :0 2011 :0 2012 :0 2013 :0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2009	4	3	7
2010	4	3	7
2011	4	3	7
2012	4	3	7
2013	4	3	7

V(H). State Defined Outputs

1. Output Target

- Fact sheets, bulletins and newsletters

2009 :10 2010 :10 2011 :10 2012 :10 2013 :10

- Web sites developed

2009 :1 2010 :0 2011 :1 2012 :1 2013 :1

- Presentations and short courses

2009 :55 2010 :60 2011 :60 2012 :50 2013 :50

- News releases and media appearances

2009 :15 2010 :15 2011 :15 2012 :10 2013 :10

- Books and monographs

2009 :0 2010 :0 2011 :1 2012 :0 2013 :1

- Workshops and conferences hosted

2009 :2 2010 :2 2011 :2 2012 :1 2013 :1

- Conference abstracts

2009 :1 2010 :1 2011 :2 2012 :1 2013 :1

V(I). State Defined Outcome

O. No	Outcome Name
1	Requests and/or use of developed land cover data by governmental and/or private sector entities
2	Adoption and/or revision of recommended land use public policies by governmental entities
3	Acres of land permanently protected and managed

Outcome #1

1. Outcome Target

Requests and/or use of developed land cover data by governmental and/or private sector entities

2. Outcome Type : Change in Action Outcome Measure

2009 :30 **2010** : 35 **2011** : 40 **2012** :20 **2013** :20

3. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

4. Associated Knowledge Area(s)

- 131 - Alternative Uses of Land

Outcome #2

1. Outcome Target

Adoption and/or revision of recommended land use public policies by governmental entities

2. Outcome Type : Change in Action Outcome Measure

2009 :20 **2010** : 20 **2011** : 20 **2012** :15 **2013** :15

3. Associated Institute Type(s)

- 1862 Extension

4. Associated Knowledge Area(s)

- 131 - Alternative Uses of Land

Outcome #3

1. Outcome Target

Acres of land permanently protected and managed

2. Outcome Type : Change in Condition Outcome Measure

2009 :3500 **2010** : 3500 **2011** : 3500 **2012** :2500 **2013** :2500

3. Associated Institute Type(s)

- 1862 Extension

4. Associated Knowledge Area(s)

- 131 - Alternative Uses of Land

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Competing Programmatic Challenges
- Government Regulations

Description

An economic recession may negatively impact local communities' abilities to protect natural resources through purchase and other land use actions. Adjusted government regulations could increase or decrease the attention local communities pay to natural resource protection issues such as stormwater, farmland preservation, and open space protection.

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

1. Evaluation Studies Planned

- After Only (post program)
- Case Study

Description

A variety of evaluation techniques will be followed, some as post test, along with targeted case studies to monitor and measure changes over time.

2. Data Collection Methods

- Sampling
- Mail
- Case Study
- Structured
- On-Site
- Unstructured

Description

Targeted survey approaches will be used selectively over time to ascertain program impacts and outcomes, with the ones listed as the key approaches.

V(A). Planned Program (Summary)

Program #6

1. Name of the Planned Program

Plant Production

2. Brief summary about Planned Program

The nursery and environmental horticulture industry is the most significant component of Connecticut’s agriculture. Turfgrass is growing rapidly in response to increasing urbanization of the region. Interest in organically grown food and organic gardening has been steadily increasing over the last several years. Almost 80% of US households participate in some type of indoor or outdoor lawn and garden activity.

Research will be designed to understand cytogenetics and gene transfer to develop unique and commercially valuable ornamental plants; understand turfgrass management related concerns.

Extension programs will be designed to enable growers to adopt research-based cutting-edge solutions designed to protect and maintain a safe, secure and highly competitive agricultural system, while protecting natural resources and the environment for a healthy and well-nourished population. Organic farmers and gardeners manage pests without synthetic materials; agricultural producers and home owners will adopt wise soil management and fertility practices; green industry managers will be able to obtain high quality turf while not negatively impacting the environment; and improved horticultural management approaches will be adopted in the areas of urban and community horticulture.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

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

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	20%		20%	
201	Plant Genome, Genetics, and Genetic Mechanisms	10%		10%	
202	Plant Genetic Resources and Biodiversity	20%		20%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	10%		10%	
205	Plant Management Systems	40%		40%	
	Total	100%		100%	

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

1. Situation and priorities

The nursery and environmental horticulture industry is the most significant component of Connecticut’s agriculture and is

valued at \$855 million. There are more than 2,500 firms that employ over 25,000 workers and actively keep 35,000 acres in agriculture. Nursery and landscape businesses need to seek out employees with a good working knowledge of the vast array of landscape plant species used in the Northeast. Computer technology has been identified as one way that information can be made available to a large audience at times when personnel are limited. It is estimated that there are around 23,000 migrant and seasonal workers in the Connecticut River valley region, yet little is known about the status and educational needs of these workers, many of whom are likely to be non-English speakers.

The United States has led the world in the adoption of genetically modified (GM) crops and has the largest number of acres of GM food and fiber crops with over 80% of the soybeans expressing a transgene. The process of risk analysis could play a role in predicting the risks and benefits of each GM crop to human health and the environment. Cells expend as much as 50% of their total intracellular energy reserves to maintain gradients of ions across their membranes. The different structure and energy requirements of two plant enzymes may offer plants the biochemical and regulatory plasticity with which to generate proton electrochemical gradients (PEG) in a range of growth and developmental conditions. Plants are envisioned to play a central role in future long-duration space exploration initiatives by providing food while simultaneously cleansing water and the breathable atmosphere through their functions in a Biological Life Support System (BLSS). However, growth of plants in microgravity had been problematic, especially with regard to seed production.

Turfgrass represents one of the largest agricultural commodities in the Northeastern U.S., and the industry is growing rapidly in response to increasing urbanization of the region. The turfgrass industry in the State of Connecticut encompasses many areas of expertise including sod production, golf courses, athletic fields, residential and commercial lawn care, cemeteries, and parks schools and municipalities.

Interest in organically grown food and organic gardening has been steadily increasing over the last several years. The National Organic Program accredits certifiers from the United States and abroad to enforce the certification standards, with which all certified farmers now must comply. Almost 80% of US households participate in some type of indoor or outdoor lawn and garden activity, yet it is estimated that a majority of US households follow only three out of 12 recommended environmentally-friendly lawn and garden practices.

2. Scope of the Program

- Multistate Extension
- In-State Extension
- In-State Research
- Integrated Research and Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Unique traits that either enhance aesthetic appeal to the consumer, or provide an obvious and direct benefit to the producer, or that enhance the utility of a plant in the landscape have great economic potential in ornamental horticulture. Understanding molecular genetics in terms of cloning and manipulating DNA can and should be within the grasp of the high school student as it has the ability to inform and educate all segments of the population in the area of how humans affect the biological world and how the biological world affects humans. Plants can be an important teaching tool in primary school education programs as they provide children with an appreciation of plants and stimulates their curiosity about how's and why's of plant growth and development.

Best management practices for turf need to be developed and implemented to maximize turf quality and minimize negative outcomes. Educating farmers in sustainable, profitable and environmentally-sound, food production practices provides benefits by helping to maintain a safe and secure food source. A labor force that is knowledgeable in landscape plant material identification and use is essential for the continued success of Connecticut's nursery and landscape industry.

2. Ultimate goal(s) of this Program

Research: Improve plant production capabilities through:

- Biotechnology research designed to understand embryo rescue, micropropagation, somaclonal variation, somatic embryogenesis, anther culture, botanical substance production, meristem culture for pathogen elimination, plant nutritional analysis, germplasm preservation, morphogenesis, cytogenetics, and gene transfer
- Development of unique and commercially valuable ornamental plants; research risk assessment techniques to predict the impact of GM crops on the environment
- Better understand chemical reactions in the soil matrix to include modeling the adsorption and entrapment of oxyanions on goethite
- Better understand turfgrass management and its effects on turfgrass communities and environmental quality
- Understand biochemical and physiological roles in controlling plant growth and development;

- Understand challenges to seed production posed by spaceflight
- Better understand molecular approaches for purpose of developing new and improved crops with focus on plant growth and development under normal and stress conditions
- Development of agriculturally-relevant crops with enhanced drought resistance and nutrient uptake capacities.

Extension:

- Commercial growers to adopt research-based cutting-edge solutions designed to protect and maintain a safe, secure and highly competitive agricultural system, while protecting natural resources and the environment for a healthy and well-nourished population
- Organic farmers and gardeners manage pests without synthetic pesticides improve soil fertility through the addition of natural materials and develop farm management skills that will increase sustainability
- Agricultural producers and home owners adopt wise soil management and fertility practices through use of an inexpensive means to test soil fertility and receive environmentally sound limestone and fertilizer recommendations
- Increase internet access to landscape plant information through provision of a free, online resource so they can make informed decisions regarding the use of plant material
- Green industry managers obtain the highest quality turf while not negatively impacting the environment through application of new technologies that will improve nitrogen fertilizer recommendations
- Bilingual Extension programs and educational opportunities on issues related to hiring workers from other countries developed based on assessed need
- High school students better understand molecular genetics
- Improved horticultural management approaches in the areas of urban and community horticulture, and historical and sustainable landscapes implemented through the Master Gardener education program
- Limited-income urban residents grow part of their own produce in an inner-city environment

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
2009	6.0	0.0	10.0	0.0
2010	6.0	0.0	10.0	0.0
2011	6.0	0.0	10.0	0.0
2012	6.0	0.0	10.0	0.0
2013	6.0	0.0	10.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Research, demonstration sites, Extension programs

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

Extension	
Direct Methods	Indirect Methods
<ul style="list-style-type: none"> ● Education Class ● Workshop ● Demonstrations ● One-on-One Intervention 	<ul style="list-style-type: none"> ● Newsletters ● Web sites

3. Description of targeted audience

Agricultural producers, industry, consumers

V(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2009	3000	12000	0	0
2010	3000	12000	0	0
2011	3000	12000	0	0
2012	3000	12000	0	0
2013	3000	12000	0	0

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

Expected Patent Applications

2009 :1 2010 :0 2011 :1 2012 :0 2013 :1

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2009	5	2	7
2010	5	2	7
2011	5	2	7
2012	5	2	7
2013	5	2	7

V(H). State Defined Outputs

1. Output Target

- Fact sheets, brochures and newsletters

2009 :35 2010 :35 2011 :35 2012 :30 2013 :30

- Web sites developed

2009 :1	2010 :1	2011 :1	2012 :1	2013 :1
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- Presentations and short courses

2009 :50	2010 :50	2011 :55	2012 :50	2013 :50
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- News releases and media events

2009 :35	2010 :40	2011 :45	2012 :40	2013 :40
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- Books and monographs

2009 :1	2010 :1	2011 :1	2012 :1	2013 :1
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- Workshops and conferences hosted

2009 :4	2010 :4	2011 :4	2012 :3	2013 :2
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- Conference abstracts

2009 :1	2010 :1	2011 :2	2012 :1	2013 :1
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V(I). State Defined Outcome

O. No	Outcome Name
1	Adoption of recommended BMP approaches by defined targeted industry and growers (% of participating entities)
2	Awareness of recommended BMP approaches by defined participating industry and growers (% of participating entities)
3	Understanding of basic plant production processes (#)

Outcome #1

1. Outcome Target

Adoption of recommended BMP approaches by defined targeted industry and growers (% of participating entities)

2. Outcome Type : Change in Action Outcome Measure

2009 :25 **2010** : 25 **2011** : 25 **2012** : 25 **2013** :20

3. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

4. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 205 - Plant Management Systems

Outcome #2

1. Outcome Target

Awareness of recommended BMP approaches by defined participating industry and growers (% of participating entities)

2. Outcome Type : Change in Knowledge Outcome Measure

2009 :15 **2010** : 15 **2011** : 15 **2012** :15 **2013** :10

3. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

4. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 205 - Plant Management Systems

Outcome #3

1. Outcome Target

Understanding of basic plant production processes (#)

2. Outcome Type : Change in Knowledge Outcome Measure

2009 : 2 **2010** : 2 **2011** : 2 **2012** : 2 **2013** :2

3. Associated Institute Type(s)

- 1862 Research

4. Associated Knowledge Area(s)

- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 202 - Plant Genetic Resources and Biodiversity
- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

- Economy
- Appropriations changes
- Government Regulations
- Natural Disasters (drought, weather extremes, etc.)

Description

Droughts and water events (hail storms, hurricanes) may impact the ability of producers to follow recommended BMPs. Economic downturns may affect impact of producers to follow BMPs, especially as costs are needed to be incurred for implementation. Government regulations may also affect implementation.

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

1. Evaluation Studies Planned

- Time series (multiple points before and after program)
- During (during program)
- Before-After (before and after program)

Description

A variety of pre and post program evaluations will be given. Also, on occasion a more focused comprehensive longitudinal evaluation will be conducted.

2. Data Collection Methods

- Journals
- Mail
- Structured
- Observation
- Sampling

Description

Targeted survey approaches will be used selectively over time to ascertain program impacts and outcomes, with the ones listed as the key approaches.

V(A). Planned Program (Summary)

Program #7

1. Name of the Planned Program

Plant Protection

2. Brief summary about Planned Program

There are many problems and concerns related to the use of pesticides and nutrients in agriculture and the green industry. Integrated Pest Management (IPM) is the use of a variety of pest control methods designed to protect public health and the environment and to produce high quality crops and other commodities with the most judicious use of pesticides. Greenhouse crops are very high value crops that are grown for their ornamental value. Soilborne pathogens can cause major crop losses for the greenhouse industry. Turfgrass is susceptible to injury by various insect and fungal pests. Disease-related issues within commercial turfgrass systems (e.g., golf courses) are a major concern for turfgrass managers throughout Connecticut and New England. Invasive non-native plants have become a serious concern because they decrease the abundance of native species and reduce biological diversity.

Research will be designed to increase understanding of various crop protection approaches including perimeter trap cropping (PTC), tritrophic level interactions involving biological control agents, ascertaining the effects of plant morphology on insect predators, and optimum use and application of plant protectants.

Extension programs will be designed to enable commercial operations to reduce potential threats to human health and the environment; Connecticut citizens to increase knowledge about environmental concerns in the state and about IPM methods designed to restore and preserve the environment; and turfgrass industry managers implement proper insect and disease management strategies; and public officials, NGOs and consumers to adopt techniques to control invasive non-native plants.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

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

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
212	Pathogens and Nematodes Affecting Plants	10%		10%	
215	Biological Control of Pests Affecting Plants	10%		10%	
216	Integrated Pest Management Systems	80%		80%	
	Total	100%		100%	

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

1. Situation and priorities

There are many problems and concerns related to the use of pesticides and nutrients in agriculture and the green industry. Some of the concerns include overuse and misuse of pesticides and nutrients, pollution of ground and surface waters, unwanted residues on food and feed, drift to non-target areas, hazards to beneficial and other non-target organisms, resistance of pests to pesticides, and public and pesticide applicator safety. More than 500 insect pests, 270 weed species and 150 plant diseases have become resistant to one or more pesticides. Moreover, concerns for human and environmental health and the cost of

pesticide regulation stress the need to increase our understanding of bio-intensive pest management systems.

Integrated Pest Management (IPM) is the use of a variety of pest control methods designed to protect public health and the environment and to produce high quality crops and other commodities with the most judicious use of pesticides. Such IPM systems rely on tactics such as host-plant resistance, biological control, and cultural controls. The Federal Insecticide Fungicide and Rodenticide Act (FIFRA) directs the EPA to cooperate with the USDA and use the services of the Cooperative Extension System to inform and educate pesticide users about the accepted uses and other regulations made under the Act. The State of Connecticut requires that individuals using restricted-use pesticides on their own property or property which they rent for agricultural purposes become certified as private pesticide applicators. There are 750 private applicator certificates issued in CT and 2,625 commercial certificates. Greenhouse crops are very high value crops that are grown for their ornamental value and customers have a very low tolerance for any evidence of insect pests or diseases. In the enclosed greenhouse environment, pest populations can develop rapidly, so there is a need for timely up-to-date information to make pest management decisions.

Soilborne pathogens can cause major crop losses for the greenhouse industry, which is a high value component of agriculture in Connecticut and growers routinely apply preventative chemical fungicides to avoid losses. Microbial inoculants (MI) supply beneficial microbes to suppress soilborne pathogens and reduce the incidence of plant disease but growers are reluctant to rely on MI because they must be applied prior to any incidence of disease and it is impossible to determine if the microbes persist in the potting mix or colonize roots.

Turfgrass in the Northeast is susceptible to injury by various insect and fungal pests which can negatively impact on the root system and above ground plant parts. Conventional plant protectants continue to be the major tool to manage these turfgrass pests in sod production areas, recreational and private settings. Disease-related issues within commercial turfgrass systems (e.g., golf courses) are a major concern for turfgrass managers throughout Connecticut and New England. The pathogens that affect turf are very diverse and several are capable of rapidly killing large swards in a relatively short period of time.

2. Scope of the Program

- In-State Research
- Integrated Research and Extension
- In-State Extension
- Multistate Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

There is a growing need to develop and implement integrated pest management (IPM) systems that include biologically based tactics. There is a need for up-to-date research based information for companies to remain profitable and competitive. Turf is an important part of the community landscape and the agricultural sector and the advancement of turf Integrated Pest Management (IPM) is as important as IPM of other managed systems. Providing educational outreach on invasive plants and management recommendations will provide opportunities for citizens to learn about invasives, how they threaten our natural areas, and how they can be controlled with best management practices for environmental stewardship.

2. Ultimate goal(s) of this Program

Research: Better understanding of Integrated Pest Management practices as effective means to control pests while minimizing costs and adverse effects on the environment through:

- Greater understanding of perimeter trap cropping (PTC)
- Improve understanding of the biology, ecology, and management of *Colletotrichum cereale*
- Understand tritrophic level interactions involving biological control agents so as to understand how plant traits influence natural enemies which can lead to ways of improving their effectiveness
 - Ascertain the effects of plant morphology on insect predators commonly used in biological control efforts, such as the ladybird beetle *Coccinella septempunctata* and the green lacewing *Chrysoperla rufilabris*
- Determine if purple-leaved forms of barberry are invasive in shaded woodland
- Better understand the persistence and proliferation of microbial inoculants (MI) in potting mixes and on plant roots
- Determine optimum use and application of plant protectants in an effort to reduce overall use

Extension:

- Commercial growers increase knowledge of research-based pest management strategies and pesticide handling practices and apply such as part of normal production strategies so as to reduce potential threats to human health and the environment

- Connecticut citizens increase knowledge about environmental concerns in the state and about IPM methods designed to restore and preserve the environment
- Turfgrass industry managers establish close relations with UConn so they will be able to implement proper insect and disease management strategies in a timely manner through the provision of rapid and accurate diagnoses of turfgrass maladies
- Public officials, NGOs and consumers learn about invasive non-native plants and adopt techniques to control them in the landscape

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
2009	7.0	0.0	2.0	0.0
2010	7.0	0.0	2.0	0.0
2011	7.0	0.0	2.0	0.0
2012	7.0	0.0	2.0	0.0
2013	7.0	0.0	2.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Research, Extension programs, demonstrations

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

Extension	
Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Workshop • One-on-One Intervention • Education Class • Demonstrations 	<ul style="list-style-type: none"> • Web sites • Newsletters

3. Description of targeted audience

Agricultural producers, consumers, agency personnel at federal, state and local level.

V(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2009	3000	12000	0	0
2010	3000	14000	0	0
2011	3000	14000	0	0
2012	3000	14000	0	0
2013	3000	14000	0	0

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

Expected Patent Applications

2009 :0 2010 :0 2011 :1 2012 :0 2013 :1

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2009	1	1	2
2010	1	1	2
2011	1	1	2
2012	1	1	2
2013	1	1	2

V(H). State Defined Outputs

1. Output Target

- Websites developed

2009 :1 2010 :1 2011 :1 2012 :1 2013 :1

- Presentations and short courses

2009 :35 2010 :40 2011 :40 2012 :30 2013 :30

- Fact sheets, bulletins and newsletters

2009 :30 2010 :30 2011 :30 2012 :20 2013 :20

- Media contacts

2009 :30 2010 :30 2011 :30 2012 :30 2013 :30

- Books and monographs

2009 :0 2010 :0 2011 :1 2012 :0 2013 :1

- Conference abstracts

2009 :0 2010 :1 2011 :1 2012 :0 2013 :1

- Workshops and conferences hosted

2009 2

2010 2

2011 2

2012 2

2013 1

V(I). State Defined Outcome

O. No	Outcome Name
1	Increased adoption (%) of recommended BMPs by targeted consumer populations
2	Increased adoption (%) of recommended BMPs by targeted grower populations
3	Pesticide use reduction (%) by participating growers
4	Increased certification (%) by pesticide applicators

Outcome #1

1. Outcome Target

Increased adoption (%) of recommended BMPs by targeted consumer populations

2. Outcome Type : Change in Action Outcome Measure

2009 :10 2010 : 10 2011 : 10 2012 :10 2013 :10

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 215 - Biological Control of Pests Affecting Plants
- 216 - Integrated Pest Management Systems

Outcome #2

1. Outcome Target

Increased adoption (%) of recommended BMPs by targeted grower populations

2. Outcome Type : Change in Action Outcome Measure

2009 :15 2010 : 15 2011 : 15 2012 :10 2013 :10

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 212 - Pathogens and Nematodes Affecting Plants
- 215 - Biological Control of Pests Affecting Plants
- 216 - Integrated Pest Management Systems

Outcome #3

1. Outcome Target

Pesticide use reduction (%) by participating growers

2. Outcome Type : Change in Action Outcome Measure

2009 :15 2010 : 15 2011 : 15 2012 :10 2013 :10

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 212 - Pathogens and Nematodes Affecting Plants
- 215 - Biological Control of Pests Affecting Plants
- 216 - Integrated Pest Management Systems

Outcome #4

1. Outcome Target

Increased certification (%) by pesticide applicators

2. Outcome Type : Change in Knowledge Outcome Measure

2009 :10

2010 : 10

2011 : 10

2012 :10

2013 :10

3. Associated Institute Type(s)

- 1862 Extension

4. Associated Knowledge Area(s)

- 212 - Pathogens and Nematodes Affecting Plants
- 215 - Biological Control of Pests Affecting Plants
- 216 - Integrated Pest Management Systems

V(J). Planned Program (External Factors)**1. External Factors which may affect Outcomes**

- Appropriations changes
- Economy
- Natural Disasters (drought,weather extremes,etc.)

Description

Severe weather events (drought, hurricanes, and hail storms) may impact the ability of producers and consumers to address appropriate BMP approaches. Government regulations may affect availability of pesticides for control.

V(K). Planned Program (Evaluation Studies and Data Collection)**1. Evaluation Studies Planned**

- Time series (multiple points before and after program)
- Before-After (before and after program)
- After Only (post program)
- During (during program)

Description

Multiple techniques to evaluate outcomes will be employed including longitudinal studies, post program or intervention assessments, and pre and post program evaluation to determine knowledge gained.

2. Data Collection Methods

- Unstructured
- Observation
- Journals
- Structured
- Mail
- On-Site
- Sampling

Description

Targeted survey approaches will be used selectively over time to ascertain program impacts and outcomes, with the ones listed as the key approaches.

V(A). Planned Program (Summary)

Program #8

1. Name of the Planned Program

Water and Weather

2. Brief summary about Planned Program

Nonpoint source pollution from urban, suburban and agricultural sources is the primary cause of water quality problems in Connecticut and the U.S. There is need to reduce nonpoint source pollution to meet the goals of the Clean Water Act.

Concerns related to pollutant transport, rainfall-runoff relationships, and ground water resources are increasingly becoming public issues. Shortages of water for human, industrial and agricultural use are raising conflicts in the public policy arena.

Biosphere-atmosphere interactions are of increasing concern due to issues related to pesticide spray drift, atmospheric deposition, greenhouse microclimates and so on.

Research will be conducted to understand a variety of water quality and quantity management approaches through reducing unnecessary use of chemicals and other inputs to the landscape, understanding of ground water concerns related to fuel contamination, quantifying ground and surface water availability issues, identifying the long term fate of air pollutants with critical airsheds, and understanding multi-media environmental problems at the regional scale.

Extension programs will be designed to protect water resources by Connecticut policymakers, companies and residents through a variety of programs including communities addressing groundwater availability concerns during regulatory approval processes, policymakers adopting air quality management plans, homeowners learning about relationships of landscape management practices on water quality and their implementation of research-based management practices (improved turf management practices, native plants, and other low input management techniques), and agricultural producers learning about and adopting appropriate BMPs to reduce loss of nutrients.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

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

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	10%		10%	
111	Conservation and Efficient Use of Water	10%		10%	
112	Watershed Protection and Management	20%		20%	
132	Weather and Climate	10%		10%	
133	Pollution Prevention and Mitigation	40%		40%	
141	Air Resource Protection and Management	10%		10%	
	Total	100%		100%	

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

1. Situation and priorities

Water quality and quantity issues are among the most pressing environmental concerns in the region today. Nonpoint source pollution from urban, suburban and agricultural sources is the primary cause of water quality problems in Connecticut and the U.S.

There is need to reduce nonpoint source pollution to meet the goals of the Clean Water Act. Concerns related to pollutant transport, rainfall-runoff relationships, and ground water resources are increasingly becoming public issues.

Shortages of water for human, industrial and agricultural use are raising conflicts in the public policy arena. Biosphere-atmosphere interactions are of increasing concern due to issues related to pesticide spray drift, atmospheric deposition, greenhouse microclimates and so on.

2. Scope of the Program

- Integrated Research and Extension
- Multistate Extension
- In-State Extension
- In-State Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Land use characteristics and anticipated changes create conflicts between the developed and undeveloped environment and between land managers and others. This situation is predicted to become exacerbated due to increased land use development patterns over the near term. The development and transmission of relevant information is needed to enable public and private decision makers to best manage this evolving situation.

2. Ultimate goal(s) of this Program

Research: Better understand water quality and quantity management approaches through:

- Understanding pollutant movement through the natural and man-made environment
- Understanding methods and processes that reduce unnecessary use of chemicals and other inputs to the landscape

- Better understanding of ground water concerns related to fuel contamination
- Better ability to quantify ground and surface water availability issues
- Identifying the long term fate of air pollutants with critical airsheds; and better understanding multi-media environmental problems at the regional scale.

Extension: Protection of water resources by Connecticut policymakers, companies and residents through:

- Communities addressing groundwater availability concerns during regulatory approval processes
- Policymakers adopting air quality management plans
- Homeowners learning about relationships of landscape management practices on water quality and their implementation of research-based management practices (improved turf management practices, native plants, and other low input management techniques)
- Agricultural producers learning about and adopting appropriate BMPs to reduce loss of nutrients from the working landscape

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
2009	5.0	0.0	7.0	0.0
2010	5.0	0.0	7.0	0.0
2011	5.0	0.0	7.0	0.0
2012	5.0	0.0	7.0	0.0
2013	5.0	0.0	7.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

A variety of research and Extension activities will be undertaken. Specifically, certain river and ground water systems will be modeled to determine variation, residential and agricultural water quality concerns will be researched, BMPs developed, and outreach efforts to the agricultural, residential and engineering/regulatory community conducted. Demonstration sites will be established for use in such research and Extension programs. Publications, fact sheets, web sites will be made available.

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

Extension	
Direct Methods	Indirect Methods
<ul style="list-style-type: none"> • Education Class • One-on-One Intervention • Demonstrations • Workshop 	<ul style="list-style-type: none"> • Public Service Announcement • Newsletters • Web sites

3. Description of targeted audience

Target audiences will include agricultural producers, public decision makers to include federal and state agencies, municipal planners, various NGOs (land trusts, environmental organizations, etc.), and the general public.

V(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2009	1200	3500	0	0
2010	1200	3500	0	0
2011	1200	3500	0	0
2012	1200	3500	0	0
2013	1200	3500	0	0

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

Expected Patent Applications

2009 :0 2010 :0 2011 :0 2012 :0 2013 :0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2009	4	1	5
2010	4	1	5
2011	4	1	5
2012	4	1	5
2013	4	1	5

V(H). State Defined Outputs

1. Output Target

- Fact sheets, bulletins and newsletters

2009 :15 2010 :15 2011 :15 2012 :15 2013 :10

- Training manuals and instructional CDs developed

2009 :2 2010 :2 2011 :1 2012 :1 2013 :1

- News releases/articles

2009 :10 2010 :10 2011 :15 2012 :10 2013 :10

- Websites developed

2009 :1 2010 :1 2011 :1 2012 :1 2013 :1

- Books and monographs

	2009	2010	2011	2012	2013
● Conference abstracts	0	0	:1	0	:1
● Workshops and conferences hosted	2	1	:1	:1	:1
● Presentations and short courses	4	4	:4	3	2
	50	50	:50	50	50

V(I). State Defined Outcome

O. No	Outcome Name
1	Adoption of recommended sustainable landscape/turf BMP approaches by defined commercial and/or residential target audiences (% of target population)
2	Development of new models
3	Number of agricultural nutrient management plans adopted by defined target audience
4	Number of rain gardens installed by defined targeted audience/s
5	Awareness of recommended sustainable landscape/turf BMP approaches by targeted commercial and/or residential audiences (% of audience)

Outcome #1

1. Outcome Target

Adoption of recommended sustainable landscape/turf BMP approaches by defined commercial and/or residential target audiences (% of target population)

2. Outcome Type : Change in Action Outcome Measure

2009 :5 **2010** : 10 **2011** : 15 **2012** :15 **2013** :10

3. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

4. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 133 - Pollution Prevention and Mitigation

Outcome #2

1. Outcome Target

Development of new models

2. Outcome Type : Change in Knowledge Outcome Measure

2009 :1 **2010** : 1 **2011** : 1 **2012** :1 **2013** :1

3. Associated Institute Type(s)

- 1862 Research

4. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 112 - Watershed Protection and Management
- 132 - Weather and Climate
- 141 - Air Resource Protection and Management

Outcome #3

1. Outcome Target

Number of agricultural nutrient management plans adopted by defined target audience

2. Outcome Type : Change in Action Outcome Measure

2009 :10 **2010** : 10 **2011** : 10 **2012** :10 **2013** :10

3. Associated Institute Type(s)

- 1862 Extension

4. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 133 - Pollution Prevention and Mitigation

Outcome #4

1. Outcome Target

Number of rain gardens installed by defined targeted audience/s

2. Outcome Type : Change in Action Outcome Measure

2009 :35 **2010** : 40 **2011** : 50 **2012** :60 **2013** :40

3. Associated Institute Type(s)

- 1862 Extension

4. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 133 - Pollution Prevention and Mitigation

Outcome #5

1. Outcome Target

Awareness of recommended sustainable landscape/turf BMP approaches by targeted commercial and/or residential audiences (% of audience)

2. Outcome Type : Change in Knowledge Outcome Measure

2009 :15 **2010** : 15 **2011** : 15 **2012** :10 **2013** :10

3. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

4. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 133 - Pollution Prevention and Mitigation

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Use and management of various inputs to the working landscape will be impacted by various weather events. Also, reduced funding for Extension programs will reduce the ability to conduct educational programs, demonstration sites, etc.

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

1. Evaluation Studies Planned

- Before-After (before and after program)
- Comparisons between program participants (individuals,group,organizations) and non-participants
- Retrospective (post program)
- After Only (post program)

Description

Evaluation studies will be varied in terms of time and program area. Main efforts will be to evaluate on an ongoing basis attitudes changed due to knowledge gained from our programs.

2. Data Collection Methods

- Observation
- Sampling
- Mail
- Unstructured

Description

Targeted survey approaches will be used selectively over time to ascertain program impacts and outcomes, with the ones listed as the key approaches.

V(A). Planned Program (Summary)

Program #9

1. Name of the Planned Program

Animal Production

2. Brief summary about Planned Program

Animal production issues and priorities center on efficiency, management, and technology. Biological sciences education in elementary and secondary schools is being limited by the types of living creatures they are allowed to study in the classroom with chick embryos one of the species allowed for live study. Small flock owners who raise chickens, ducks, turkeys, geese, game birds and other fancy fowl for non-commercial use are more likely to mismanage the birds under their care due to less experience.

Research efforts will be designed to improve understanding in a variety of areas, including reproductive physiology and animal biotechnology, production of transgenic rabbits, pigs and cattle to serve as bioreactors or for xenotransplantation, improve cloning techniques, develop feeding systems that optimize the use of dietary energy and proteins for growth and milk production, evaluate the performance of antibiotic residue screening tests for the detection of antibiotic residues in milk, and develop environmental and technical assessments of alternative methods to cultivate bivalve shellfish.

Extension programs will be designed to achieve a variety of objectives, including the adoption of new technology associated with livestock production, shellfish industry implementation of ecologically-sound and economically-viable based, increased interest by teachers related to chick incubation and embryology projects, increased awareness by small poultry flock owners about proper management and health care of their poultry, and increased awareness by horse owners about equine management approaches.

3. Program existence : Intermediate (One to five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

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

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
301	Reproductive Performance of Animals	10%		10%	
302	Nutrient Utilization in Animals	20%		20%	
304	Animal Genome	40%		40%	
305	Animal Physiological Processes	10%		10%	
306	Environmental Stress in Animals	5%		5%	
307	Animal Production Management Systems	15%		15%	
	Total	100%		100%	

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

1. Situation and priorities

Animal production issues and priorities center on efficiency, management, and technology.

Production efficiency improvements through genetic and nutrition approaches are needed to improve the overall production and quality of meat and animal protein. Production of transgenic swine for xeno-transplantation are needed as currently there are not enough organs and tissue available for the number of patients needing them; additionally when tissue from two divergent species is mixed the host usually destroys the donor tissue. Mastitis is a costly animal agriculture disease.

One of the greatest challenges facing dairy farmers today is successfully managing high producing cows during the transition period as the risk of diseases, especially mastitis, is greatest during this time. While there have been great improvements in mastitis prevention and control, there are still large gaps in our knowledge of this complex problem.

The past two decades have seen a rapid expansion of alternative and innovative methods for the cultivation of oysters and hard-shell clams; however, there is little information on the impacts of these practices on the surrounding environment. Frequent changes in legislation and a high turnover rate of local and state regulatory officials require that Extension collaborate with industry and regulators.

Biological sciences education in elementary and secondary schools is being limited by the types of living creatures they are allowed to study in the classroom with chick embryos one of the species allowed for live study. Small flock owners who raise chickens, ducks, turkeys, geese, game birds and other fancy fowl for non-commercial use are more likely to mismanage the birds under their care due to less experience.

Adoption of new health regulations requires the testing of birds going to shows for Pullorum as well as Avian Influenza.

2. Scope of the Program

- In-State Research
- Integrated Research and Extension
- Multistate Extension
- In-State Extension

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

Livestock producers deserve help with adopting new technology in their operations as livestock production efficiency improvement would culminate in lower cost of production and reduced food costs to the consumer.

A greater understanding of the intimate relationship between body condition, negative energy balance, the immune system, and periparturient diseases such as mastitis will allow for the development of better management practices and the potential to develop intervention strategies that reduce the need for antibiotic use on dairy farms.

There is a place and need for tissue from a species such as swine to be engineered to allow transplantation into humans. Shellfish regulatory agencies and the public are much more accepting of research conducted within an area or region directly affected by the cultural activity. Small flock owners need to be educated about testing programs.

2. Ultimate goal(s) of this Program

Research. Improved animal production through:

- Understanding reproductive physiology and animal biotechnology, particularly cloning embryonic stem cells, sexing, and transgenic technology
 - Understanding the interaction of the endocrine system with nutritional status in growing animals
 - Identifying changes in several components of the somatotrophic axis in growing beef cattle to more clearly define changes in the somatotrophic axis with age in order to increase the potential for economic success of beef producers that may utilize somatotropin in the future
 - Producing, identifying and breeding transgenic rabbits, pigs and cattle to serve as bioreactors or for xenotransplantation
 - Producing swine that possess and express human genes that will allow swine tissue to be transplanted into humans;
 - Improving cloning techniques and understanding of various mechanisms in nuclear-cytoplasmic interactions and genetic reprogramming during nuclear transfer
 - Developing feeding systems that optimize the use of dietary energy and proteins for growth and milk production
 - Evaluating the performance of antibiotic residue screening tests for the detection of antibiotic residues in milk
 - Identifying the relationship between negative energy balance, ketosis, immune system function and mastitis during the transition period in high producing dairy cows and developing environmental and technical assessments of alternative methods to cultivate bivalve shellfish.

Extension

- Improve the adoption of new technology associated with livestock production in Connecticut and region
- Enable the shellfish industry to implement ecologically-sound and economically-viable based approaches to achieve regulatory compliance
- Increase interest by teachers related to chick incubation and embryology projects so they can perform within their classrooms
 - Increase awareness of small poultry flock owners about proper management and health care of their poultry
 - Increase awareness of horse owners about a variety of equine management topics.

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
2009	2.0	0.0	5.0	0.0
2010	2.0	0.0	5.0	0.0
2011	2.0	0.0	5.0	0.0
2012	2.0	0.0	5.0	0.0
2013	2.0	0.0	5.0	0.0

V(F). Planned Program (Activity)**1. Activity for the Program**

Research activities will include a mix of focused research projects primarily in the areas of biotechnology and nutrition.

Extension activities will be focused in the areas of equine, dairy and shellfish, with emphasis on production through aquaculture, nutrition and management.

Peer reviewed publications will emanate from both research and Extension activities, along with presentations, training of graduate students, conferences, meetings, fact sheets and panel service.

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

Extension	
Direct Methods	Indirect Methods
<ul style="list-style-type: none"> ● Workshop ● Education Class ● One-on-One Intervention 	<ul style="list-style-type: none"> ● Newsletters ● Web sites

3. Description of targeted audience

Policy makers, industry, producers, scientific community, agencies, regulators, youth.

V(G). Planned Program (Outputs)**1. Standard output measures**

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2009	500	1200	100	200
2010	500	1500	150	250
2011	550	1500	150	300
2012	500	1500	100	300
2013	500	1500	100	100

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

Expected Patent Applications

2009 :1 2010 :1 2011 :0 2012 :1 2013 :0

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2009	3	2	5
2010	3	2	5
2011	3	2	5
2012	3	2	5
2013	3	2	5

V(H). State Defined Outputs

1. Output Target

- Books and monographs

2009 :1 2010 :1 2011 :1 2012 :1 2013 :1

- Conference abstracts

2009 :1 2010 :1 2011 :1 2012 :1 2013 :1

- Workshops and conferences hosted

2009 :3 2010 :3 2011 :3 2012 :2 2013 :1

- Fact sheets and bulletins

2009 :10 2010 :10 2011 :10 2012 :10 2013 :10

- Websites developed

2009 :1 2010 :1 2011 :1 2012 :1 2013 :1

- Presentations and short courses offered

2009 :20 2010 :20 2011 :20 2012 :20 2013 :20

V(I). State Defined Outcome

O. No	Outcome Name
1	Specific characteristics of genomes identified
2	Fundamental understandings of animal growth identified
3	Public policy actions supporting biotechnology adopted and/or amended by governmental and other entities at international, national, regional, state and local levels.
4	Treatment methods developed for human and/or animal diseases
5	Adoption of recommended BMPs by targeted producers and/or industry sectors (% of target audience)
6	Animal production regulatory procedures adopted and/or amended by governmental agencies at national, regional, state and local levels.

Outcome #1

1. Outcome Target

Specific characteristics of genomes identified

2. Outcome Type : Change in Knowledge Outcome Measure

2009 :1 **2010 :**1 **2011 :**1 **2012 :**1 **2013 :**1

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 304 - Animal Genome

Outcome #2

1. Outcome Target

Fundamental understandings of animal growth identified

2. Outcome Type : Change in Knowledge Outcome Measure

2009 :1 **2010 :**1 **2011 :**1 **2012 :**1 **2013 :**1

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 305 - Animal Physiological Processes

Outcome #3

1. Outcome Target

Public policy actions supporting biotechnology adopted and/or amended by governmental and other entities at international, national, regional, state and local levels.

2. Outcome Type : Change in Action Outcome Measure

2009 :1 **2010 :**1 **2011 :**1 **2012 :**1 **2013 :**1

3. Associated Institute Type(s)

•1862 Extension
•1862 Research

4. Associated Knowledge Area(s)

- 304 - Animal Genome

Outcome #4

1. Outcome Target

Treatment methods developed for human and/or animal diseases

2. Outcome Type : Change in Action Outcome Measure

2009 :1 **2010 :**0 **2011 :**1 **2012 :**0 **2013 :**1

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 305 - Animal Physiological Processes
- 306 - Environmental Stress in Animals
- 307 - Animal Production Management Systems

Outcome #5

1. Outcome Target

Adoption of recommended BMPs by targeted producers and/or industry sectors (% of target audience)

2. Outcome Type : Change in Action Outcome Measure

2009 :15 **2010** : 15 **2011** : 15 **2012** :15 **2013** :10

3. Associated Institute Type(s)

- 1862 Extension

4. Associated Knowledge Area(s)

- 301 - Reproductive Performance of Animals
- 302 - Nutrient Utilization in Animals
- 306 - Environmental Stress in Animals
- 307 - Animal Production Management Systems

Outcome #6

1. Outcome Target

Animal production regulatory procedures adopted and/or amended by governmental agencies at national, regional, state and local levels.

2. Outcome Type : Change in Knowledge Outcome Measure

2009 :1 **2010** : 1 **2011** : 1 **2012** : 1 **2013** :1

3. Associated Institute Type(s)

- 1862 Extension

4. Associated Knowledge Area(s)

- 307 - Animal Production Management Systems

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Description. Weather extremes, along with other external factors such as economic conditions, may affect the ability of land and water based producers and managers to reduce adoption of BMPs. Public policy changes may affect regulatory adoptions. Reduced funding may affect research and Extension activities.

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

1. Evaluation Studies Planned

- Before-After (before and after program)
- After Only (post program)
- During (during program)
- Case Study

Description

A mix of evaluation studies will be conducted, especially through Extension activities.

2. Data Collection Methods

- Sampling
- Mail
- Observation
- Journals
- Unstructured
- On-Site

Description

Targeted survey approaches will be used selectively over time to ascertain program impacts and outcomes, with the ones listed as the key approaches.

V(A). Planned Program (Summary)

Program #10

1. Name of the Planned Program

Animal Protection

2. Brief summary about Planned Program

Pathologists assist the veterinary community (private, state and federal) and the animal owning public by providing investigation, diagnostic and surveillance functions for animal diseases.

Diseases in chickens and turkeys result in considerable economic losses. Contagious bovine pleuropneumoniae (CBPP), although eradicated from the United States in 1892, is an economically significant disease of cattle and is classified as a high consequence livestock pathogen by the United States Department of Agriculture (USDA) and as a list A disease by the International Office of Epizootics (OIE).

A massive die-off of lobsters could have occurred, in part, due to a new pathogen.

Research will be designed to advance understanding in a variety of areas, including Mycoplasma gallisepticum, molecular diagnostic system in the effective control of contagious bovine pleuropneumoniae (CBPP) in the event of a natural or intentional outbreak, swine response to infection or vaccination, determining the yet unculturable chlamydia-like bacteria responsible for gill disease in farmed salmonids, and the effects of pesticides on lobsters.

Extension programs will address a variety of areas, including high quality and reliable expert diagnostic services pertaining to the anatomic pathology of non-domestic and aquatic species, involvement in emerging disease surveillance testing, maintaining the Salmonella enteritidis and Avian Influenza reduction and control programs at the poultry farm, and maintaining active communications between the research community and the lobster industry .

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Expending formula funds or state-matching funds : Yes

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

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
311	Animal Diseases	100%		100%	
	Total	100%		100%	

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

1. Situation and priorities

Pathologists assist the veterinary community (private, state and federal) and the animal-owning public by providing investigation and diagnostic services for animal diseases, as well as a surveillance function.

Current surveillance programs include: bovine spongiform encephalitis, scrapie, chronic wasting disease of deer, avian influenza and Newcastle disease, avian salmonellosis, Johne’s disease of cattle and mastitis of dairy herds. Infectious diseases hold high research priority. These include: Lyme disease, West Nile encephalitis, avian influenza, porcine reproductive and respiratory syndrome, clostridial infections of poultry, mycoplasma infections of chickens and turkeys, salmonella infections of chickens and dairy cattle, and diseases of fish and other aquatic species at fish farms and aquariums. Concerns about toxins in our environment hold priority as well. Efforts are underway to define levels of toxins, hosts in which they accumulate, and the health consequences for marine species, domestic animals and man. Basic understanding of disease processes and the pathogenesis of viral and bacterial infections hold high priority.

2. Scope of the Program

- Multistate Integrated Research and Extension
- In-State Extension
- In-State Research

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

The diagnosis of disease allows prompt decision making for treatment and control. Such diagnostic service may also provide early detection of introduced or emerging diseases.

2. Ultimate goal(s) of this Program

Research: Advance knowledge about animal disease causes and treatments through:

- Understanding the molecular mechanisms of pathogenesis of Mycoplasma gallisepticum infections through sequencing and annotation of the genome;
- Identifying genetic differences in Mycoplasma gallisepticum vaccine strains, based on the hypothesis that the reduced virulence of vaccine strains of M. gallisepticum can be accounted for by genomic and transcriptional differences in genes
- Understanding the response of swine to infection or with vaccination against porcine reproductive and respiratory syndrome (PRRS).
- Identifying and phylogenetically determining the yet unculturable chlamydia-like bacteria responsible for gill disease in farmed salmonids.
- Identifying the cause of Crohn’s disease of man, a chronic disease of the small intestine that appears to have no counterpart in our animal species.

Extension:

- Provide high quality and reliable, expert pathology services for the diseases of domestic, non-domestic and aquatic animals, as well as diagnosis, therapy, and surveillance of poultry and pet bird diseases through the Connecticut Veterinary Medical Diagnostic Laboratory (CVMDL)
- Remain actively involved in emerging disease surveillance testing, in cooperation with USDA APHIS, the CT Department of Agriculture, CT Department of Environmental Protection and CT Department of Public Health
- Maintain the Salmonella enteritidis and avian influenza control programs at the poultry farm level through active involvement in environmental monitoring in poultry farms

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
2009	2.0	0.0	9.0	0.0
2010	2.0	0.0	9.0	0.0
2011	2.0	0.0	9.0	0.0
2012	2.0	0.0	9.0	0.0
2013	2.0	0.0	9.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Research will be focused on molecular level work to identify disease mechanisms and prevention approaches, often in collaboration with other labs and institutions. Extension will be focused on workshops, conferences, individual consultations.

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

Extension	
Direct Methods	Indirect Methods
<ul style="list-style-type: none"> ● One-on-One Intervention ● Workshop 	<ul style="list-style-type: none"> ● Web sites ● Newsletters

3. Description of targeted audience

Scientists, regulatory and health agencies, land and water based producers and managers, consumers.

V(G). Planned Program (Outputs)

1. Standard output measures

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

	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Year	Target	Target	Target	Target
2009	250	1200	0	0
2010	250	1500	0	0
2011	300	1500	0	0
2012	300	1500	0	0
2013	300	1500	0	0

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

Expected Patent Applications

2009 :0 2010 :0 2011 :1 2012 :0 2013 :1

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2009	7	1	8
2010	7	1	8
2011	7	1	8
2012	7	1	8
2013	7	1	8

V(H). State Defined Outputs

1. Output Target

- Workshops and conferences

2009 :1 2010 :1 2011 :1 2012 :1 2013 :1

- Fact sheets, bulletins and newsletters

2009 5	2010 5	2011 :5	2012 4	2013 3
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- Websites developed

2009 0	2010 1	2011 :1	2012 :1	2013 :1
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- Animal cases examined

2009 :1300	2010 :1300	2011 :1300	2012 :1400	2013 :1300
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- Disease surveillance programs implemented

2009 2	2010 1	2011 :1	2012 :1	2013 :1
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- Books and monographs

2009 0	2010 1	2011 :0	2012 :1	2013 0
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- Conference abstracts

2009 :1	2010 1	2011 :0	2012 :1	2013 0
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- Presentations and short courses

2009 :10	2010 :10	2011 :10	2012 :10	2013 :10
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V(I). State Defined Outcome

O. No	Outcome Name
1	Development of new recombinant vaccines
2	New diagnostic tests and approaches developed
3	Animal protection-related actions/procedures adopted and/or implemented by governmental and other entities at the international, national, regional, state and local levels.

Outcome #1

1. Outcome Target

Development of new recombinant vaccines

2. Outcome Type : Change in Knowledge Outcome Measure

2009 : 0 **2010 :** 1 **2011 :** 1 **2012 :** 0 **2013 :** 1

3. Associated Institute Type(s)

- 1862 Research

4. Associated Knowledge Area(s)

- 311 - Animal Diseases

Outcome #2

1. Outcome Target

New diagnostic tests and approaches developed

2. Outcome Type : Change in Knowledge Outcome Measure

2009 : 0 **2010 :** 1 **2011 :** 1 **2012 :** 0 **2013 :** 1

3. Associated Institute Type(s)

- 1862 Research

4. Associated Knowledge Area(s)

- 311 - Animal Diseases

Outcome #3

1. Outcome Target

Animal protection-related actions/procedures adopted and/or implemented by governmental and other entities at the international, national, regional, state and local levels.

2. Outcome Type : Change in Action Outcome Measure

2009 : 1 **2010 :** 0 **2011 :** 1 **2012 :** 1 **2013 :** 1

3. Associated Institute Type(s)

- 1862 Extension
- 1862 Research

4. Associated Knowledge Area(s)

- 311 - Animal Diseases

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Weather disasters and economic changes may negatively affect disease levels and management approaches. Funding and public policy changes may affect ability to conduct research and Extension programs.

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

1. Evaluation Studies Planned

- Case Study
- Before-After (before and after program)
- After Only (post program)

Description

A combination of approaches will be used to evaluate success of Extension programming. Industry adoption of developed approaches from research will be measured.

2. Data Collection Methods

- Sampling
- Mail
- Observation
- Unstructured
- Journals
- Structured
- On-Site

Description

Targeted survey approaches will be used selectively over time to ascertain program impacts and outcomes, with the ones listed as the key approaches.