2010 Michigan State University Combined Research and Extension Plan of Work

Status: Accepted
Date Accepted: 05/29/09

I. Plan Overview

1. Brief Summary about Plan Of Work

Michigan State University (MSU), the state's land-grant institution, is charged with generating research-based knowledge and educational programs people can access to make informed decisions to improve their lives. The mission of the Michigan Agricultural Experiment Station (MAES) is to generate knowledge through strategic research to enhance agriculture, natural resources, and families and communities in Michigan. The MAES strives to maintain a balance between basic and applied research and relies heavily on the input of its constituents in identifying research priorities. Michigan State University Extension (MSUE) helps people improve their lives through an educational process that applies knowledge to critical issues, needs, and opportunities.

The success and accomplishments of the MAES and MSUE are fueled by close ties with each other, as well as close linkages to state agencies, commodity groups and other stakeholders, plus outstanding legislative support.

Agriculture is one of Michigan's top three industries. The state's agrif-ood system accounts for $71.3 billion in total economic activity (direct and indirect) and more than 1 million jobs. The direct economic impact of the agri-food system is estimated to be $42.6 billion; the direct economic impact of the agri-energy system (ethanol) is estimated to be $600 million. In total, the agricultural/food system employs a quarter of all people working in Michigan. The system is likely second only to the auto industry in importance to the state's economy. Michigan also has one of the most diverse agricultural industries in the United States. The state is second only to California in variety of crops grown. From field crops such as corn, wheat and soybeans to fruits such as cherries, apples, grapes and blueberries; to horticultural crops such as ornamental trees and flowering plants; and livestock, honey and fish, Michigan grows just about anything one can think of except citrus.

At the same time, Michigan is a state defined, literally, by water. Without the Great Lakes, Michigan's peninsulas and much of the state's agriculture, shipping and tourism offerings wouldn’t exist.

For Michigan and MSU, the possibilities to expand ties between industry and agriculture go far beyond alternative energy. The state is uniquely positioned to build a new biobased economic sector upon the existing foundation of its agriculture, forestry, natural resources, industrial and manufacturing sectors. The result would be the advancement of a new, sustainable biobased sector that provides a competitive advantage in meeting the growing global demand for renewable sources of materials, chemicals and energy in products, processes and packaging.

The MAES and MSUE have the research, education and outreach capabilities to partner with other MSU units and with other Michigan universities to drive Michigan forward to achieve this goal. The MAES and MSUE have created a statewide, cohesive plan that uses the MSU research capability and knowledge base. This plan fosters economic development, improved quality of life, a healthy environment and a plentiful and secure food supply for all Michigan residents.

It is important to note that this report reflects only a portion of MAES and MSUE and not the whole breadth of research and educational initiatives.MAES total budget for 2008 was $110.5 million with this report representing $5 million in federal Hatch dollars and equivalent match.MSUE's total funding in 2008 was over $88 million with this report representing approximately $8 million federal formal dollars and equivalent match.Due to the complexity of the funding sources, matching of funds and inadequate information systems this report was limited to federal dollars and match.

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

Year	Extension		Research	
	1862	1890	1862	1890
2010	170.0	0.0	89.0	0.0
2011	170.0	0.0	91.0	0.0
2012	170.0	0.0	93.0	0.0
2013	170.0	0.0	95.0	0.0
2014	170.0	0.0	97.0	0.0

II. Merit Review Process

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

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

2. Brief Explanation

The challenges facing Michigan agriculture and natural resources are increasingly complex and diverse. MAES research programs are continuously evaluated for relevance and progress. A strategic visioning process, linked to those of MAES-affiliated colleges at MSU (Agriculture and Natural Resources, Veterinary Medicine, Engineering, Social Science and Natural Science), has identified five strategic priority areas that will drive the MAES research agenda over the next decade. This process also involves industry experts, university faculty members and MSU Extension and Experiment Station Council members, and includes scientific review by peers (local, national and international) and industry experts. These target areas address the research priorities of Michigan agriculture and natural resources industries, but are also linked to national goals and new initiatives. The target areas are: Food and Health, Environmental Stewardship and Natural Resources Policy and Management, Enhancing Profitability in Agriculture and Natural Resources, Secure Food and Fiber System, and Families and Community Vitality.

Michigan State University Extension (MSUE) uses several continuous processes that assist in setting priorities and evaluating program goals and plans. At the county level, the public, local government officials, advisory group members, extension council members, staff members and industry experts are involved in both the stakeholder process and review of the county and individual agents' plans. Each Area of Expertise (AoE) Team reviews the county needs, agents' plans, and research to support these programs as well as others that may reflect emerging trends. In addition, the AoE goals are reviewed by state leaders and industry experts for quality and relevance. Collectively these plans are reviewed by MSUE and MAES directors who not only evaluate them, but use them in their regional and statewide presentations to describe future plans.

Jointly, MSUE and the MAES address issues of concern in local communities with research and teaching by using a network of citizen advisory groups at the local and state levels. County Extension councils identify and prioritize issues, seek collaborations and resources, and communicate to others the importance of Extension’s educational programming. Citizen Advisory Councils help establish research priorities at the 15 MAES field research stations. The MSU Extension and Experiment Station Council serves as a liaison among county councils, field station advisory groups and state agencies and organizations.

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?

As the state's land-grant institution, MSU is charged with generating research-based knowledge and educational programs so that people can make informed decisions to improve their lives. To accomplish this important mission, the MAES and MSUE are constantly evaluating and updating the areas they focus on to best meet the ever-changing needs of Michigan's people, industries and communities. As the state's priorities change, research and educational programs, research agendas and external relationships also must change.

The MAES and MSUE worked collaboratively in 2005-06 to gather public input on the issues of greatest concern to Michigan citizens. This issues identification process, called Strengthening Michigan's Economy, ensured that relevant, research-based educational programming is available to address local issues. Both organizations continue to use and fine-tune this input to guide state-level decisions for research priorities and program support. Due to stakeholder input, MSUE and the MAES has focused more sharply on biobased products that can help boost the Michigan economy, including fuels, chemicals, nutraceuticals and food products, as well as youth and family issues, the environment, land use issues and biotechnology. This process has continued throughout the past several years. More detailed information is included in the stakeholder input section.

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

Soil, Water and Natural Resources: Urban sprawl and community vitality research and education programs are partnering with local urban agencies and groups that have never worked with MSUE or the MAES before. Program directors have made sure that under-served people are members of advisory and planning boards. Plant Sciences: Of the 52,800 farms in Michigan, about 205 are classified as organic with 45,500 certified organic acres. Organic growers and growers who are considering incorporating more organic production practices into their operations have been asking for research on pest control methods that meet organic certification standards. In partnership with Michigan Food and Farming Systems (MIFFS), the USDA Risk Management Agency and the Black Farmers Association, programs are reaching underrepresented racial/ethnic farm operators. Food Quality, Nutrition and Processing: Economics, Marketing and Policy: Destination marketers and technology managers are non-traditional audiences. Many research programs employ multi-cultural graduate and post-graduate students. Human Health, Environment, Family, Youth, Society and Community: Individuals, families and communities that are low income, at risk, and under-served are targeted in this area through family resource management, parenting and community development programs. 4-H after-school programs are used to target non-traditional audiences.

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

Each of the planned programs have specific outcomes that are expected to happen during the five-year plan of work. In some programs, the specified outcomes and impacts are scheduled to happen in the first or second year, but other outcomes will continue to occur throughout the five-year period and beyond. Under each planned program, specific progress toward the outcomes and impacts will be documented.

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

MSUE and MAES programs have a well-documented history of increasing efficiency, improving productivity, both of which result in better quality of life for the state's residents. Because of their close working relationship, MSUE education programs are research-based and the results of MSUE programs inform MAES research. Specific examples of this tightly integrated interaction are provided in each planned program section.

IV. Stakeholder Input

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

- Targeted invitation to non-traditional stakeholder groups
- Survey of selected individuals from the general public
- Use of media to announce public meetings and listening sessions
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to traditional stakeholder groups
- Targeted invitation to selected individuals from general public
- Survey of the general public
- Survey of traditional stakeholder individuals
- Targeted invitation to non-traditional stakeholder individuals
- Other (Conferences and meetings)
- Survey of traditional stakeholder groups

Brief explanation.

During 2005-2006, The Michigan Agricultural Experiment Station (MAES) and Michigan State University Extension (MSUE) completed a comprehensive statewide process – Strengthening Michigan's Economy: Roles for MAES and MSUE. Nearly 10,000 people took part in this issues identification process to help define future research and educational priorities for the two organizations. The five strategic priorities that emerged were: developing entrepreneurs, promoting healthy lifestyles, preparing for the expanding economy, educating and supporting decision makers, and building leaders for today and tomorrow.

In 2008, a several activities added to the leveraging of this process.The entire 2008 MSUE Fall conference was organized around the five priority areas. On opening night, members of an expert panel detailed how their organizations have worked to develop the five priority areas identified in the Strengthening Michigan's Economy process in urban neighborhoods, as well as how Extension staff members might be able to identify needs and develop methods to carry these concepts and efforts out to communities. During the conference, off-site workshops with targeted site visits based on each priority area were held, as well as concurrent priority area-based research sessions so attendees could participate in sessions for at least two of the priority areas.

As mentioned in last year's Plan of Work, MSUE has contracted with the Institute for Public Policy and Social Research (IPPSR) to include questions related to the five priorities on its State of the State Survey (SOSS) for three years (2007 to 2009). In 2008, survey questions were posed related to home foreclosure in Michigan and Michiganders' perspectives on locally-grown food. The results of these surveys are included in the "What you Learned from Your Stakeholders" section of this executive summary. This surveying will be a continuing source of information to help update and refine how critical issues are approached.

The results of Strengthening Michigan's Economy, SOSS survey results and ongoing input from a variety of sources have also helped MAES and MSUE's Area of Expertise (AoE) teams do a better job of reporting what they've done and to inform future programming. As demonstrated above, the five priority areas are being used to better clarify and drive the organizations' programs and resources. This has also translated into asking those seeking internal resources to explain how their proposed project or program fits into one or more of the five priority areas. For 2009, AoEs are being asked to use logic models to report on the impacts of their programs.For 2010, a new comprehensive statewide process for stakeholder input will be collected and integrated into future Plan of Works.

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

Brief explanation.

With a mission to generate knowledge through strategic research to enhance agriculture, natural resources, and families and communities in Michigan, the MAES has an extremely broad and long list of stakeholders. In reality, every Michigan citizen is an MAES and MSUE stakeholder.

The Strengthening Michigan's Economy process and ongoing efforts offer multiple ways for people in various roles and locations to help identify the issues and opportunities for MAES research and MSUE educational programming during the years ahead.

•Statewide telephone surveys for the State of the State Survey (SOSS) and citizen focus groups were used to identify the major issues and opportunities in Michigan and assign a priority ranking to each. The use of SOSS quarterly surveys to gain insight and input into programming is being continued over the next three years. •A Web-based survey asked what do you see as the role for MAES and MSUE related to key issues and opportunities. Similar surveys may be developed and disseminated to seek additional input. •Community-based discussions in all Michigan counties, involving the local MAES advisory committees, MSUE councils and others were held to discern what issues and opportunities these stakeholders believed should be addressed by MAES research and MSUE educational programs? •Area of Expertise (AoE) Teams conducted subject-specific focus groups comprising a variety of stakeholders and continue to assess and revise their reporting and work. •Community groups, commodity and producer groups and other state and local partners were asked what specific issues and opportunities should be addressed by MAES research and MSUE educational programs. •The MAES/MSUE State Council responded to the question: "Looking at the results of the SOSS survey, what are the implications for MAES research and MSUE educational programming in the future?" •AoE co-chairs representing 29 teams were asked to identify emerging issues and opportunities. Each team conducted stakeholder/constituent input sessions and reflected the

results in their respective plans of work. •Faculty focus groups, with representatives from all MSU colleges and units, were held to learn faculty perceptions of emerging Michigan issues and opportunities and identify ways that MSU science might be used to address those issues and opportunities. •MSU faculty and MSUE/MAES staff surveys were used to develop a better understanding of MSU's ability to respond to the issues and opportunities identified in the faculty focus groups. •County teams, including MAES field station managers, synthesized and submitted local priorities identified by local MSUE councils and MAES advisory committees. •AoE teams synthesized and prioritized content-specific program and research needs generated from input of their advisory bodies and continue to fine-tune based on additional input combined with the 2005-2006 survey results.

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
- Meeting with traditional Stakeholder individuals
- Survey of the general public
- Meeting with the general public (open meeting advertised to all)
- Meeting with invited selected individuals from the general public
- Survey of selected individuals from the general public
- Survey of traditional Stakeholder groups
- Meeting with traditional Stakeholder groups

Brief explanation

During 2005-2006, the Michigan Agricultural Experiment Station (MAES) and Michigan State University Extension (MSUE) completed a comprehensive statewide process – Strengthening Michigan's Economy: Roles for MAES and MSUE. Nearly 10,000 people took part in this issues identification process to help define future research and educational priorities for the two organizations. The five strategic priorities that emerged were: developing entrepreneurs, promoting healthy lifestyles, preparing for the expanding economy, educating and supporting decision makers, and building leaders for today and tomorrow.

The five strategic priorities continued to be discussed with the joint MAES/MSUE state council at its spring and fall meetings. Ideas continue to be generated about ways to identify stakeholders and collect information from them. Another statewide survey is being planned for 2010.

Progress and revisions based on the five priorities are updated also on a continuous basis at the county level. An aggregate county report for the past year is being prepared and will be presented to the state coalition in Spring 2009. County staff also submits two partner reports a year to highlight partnership efforts. These are used to customize information provided to county commissioners, state legislators or others who use MAES/MSUE information resources.

As mentioned in last year's Plan of Work, MSUE has contracted with the Institute for Public Policy and Social Research (IPPSR) to include questions related to the five priorities on its State of the State Survey (SOSS) for three years (2007 to 2009). In 2008, survey questions were posed related to home foreclosure in Michigan and Michiganders' perspectives on locally-grown food. The results of these surveys are included in the "How the input will be considered" section of this executive summary. This surveying will be a continuing source of information to help update and refine how critical issues are approached.

3. A statement of how the input will be considered

- Redirect Extension Programs
- In the Action Plans
- In the Budget Process
- In the Staff Hiring Process
- Redirect Research Programs
- To Identify Emerging Issues
- To Set Priorities

Brief explanation.

As discussed earlier, stakeholder input provides the foundation for the research and educational programs developed by the MAES and MSUE. Stakeholders help decide the future direction for the MAES through programs such as Project GREEEN, the Animal Agriculture Initiative (AAI), FACT, commodity advisory boards and the AoE teams. Due to stakeholder input, the MAES has focused more sharply on food nutrition and food product safety, the environment, land use issues and biotechnology. Stakeholder input has changed the direction of youth programming to focus on job readiness and health, which are not traditional programming areas. The stakeholder input collected in 2005-06 and ongoing data collection and input have guided the creation and in-stream modifications documented in the Michigan 2009-14 Plan of Work for Agricultural Research and Extension Formula Funds for the MAES and MSUE.

More specifically, the entire 2008 MSUE Fall conference was organized around the five priority areas. On opening night, members of an expert panel detailed how their organizations have worked to develop the five priority areas identified in the Strengthening Michigan's Economy process in urban neighborhoods, as well as how Extension staff members might be able to identify needs and develop methods to carry these concepts and efforts out to communities. During the conference, off-site workshops with targeted site visits based on each priority area were held, as well as concurrent priority area-based research sessions so attendees could participate in sessions for at least two of the priority areas. The research sessions were: Promoting Healthy Lifestyles – "The Housing Crisis: History, Policy and Problem Solving," "Building Leaders for Today and Tomorrow – Connecting with Fathers for Better Child Outcomes," Preparing for the Bioeconomy – "Michigan's Bioeconomy Future," Developing Entrepreneurs – "Women and Minority Businesses," and Educating and Supporting Decision Makers – "Decision Making Models for Stakeholders."

Progress and revisions based on the five priorities are updated also on a continuous basis at the county level. An aggregate county report for the past year is being prepared and will be presented to the state coalition in Spring 2009. County staff also submits two partner reports a year to highlight partnership efforts. These are used to customize information provided to county commissioners, state legislators or others who use MAES/MSUE information resources.

As mentioned in last year's Plan of Work, MSUE has contracted with the Institute for Public Policy and Social Research (IPPSR) to include questions related to the five priorities on its State of the State Survey (SOSS) for three years (2007 to 2009). In 2008, survey questions were posed related to home foreclosure in Michigan and Michiganders' perspectives on locally-grown food.This surveying will be a continuing source of information to help update and refine how critical issues are approached.

The results of Strengthening Michigan's Economy, SOSS survey results and ongoing input from a variety of sources have also helped MAES and MSUE's Area of Expertise (AoE) teams do a better job of reporting what they've done and to inform future programming. As demonstrated above, the five priority areas are being used to better clarify and drive the organizations' programs and resources. This has also translated into asking those seeking internal resources to explain how their proposed project or program fits into one or more of the five priority areas. For 2009, AoEs are being asked to use logic models to report on the impacts of their programs.

In 2008, MSUE initiated a major restructure with the establishment of a new unit that combines its 4-H Youth and Family and Child Sciences programs. The major aim of the restructure is to better equip MSUE to determine how its education programs interact with citizens throughout their lifespan. This more consolidated approach is organized around the priority areas within the broad unit of children, youth, families and communities.

V. Planned Program Table of Content

S. NO.	PROGRAM NAME
1	Human Health, Environment, Family, Youth, Society and Community
2	Soil, Water and Natural Resources
3	Plant Sciences
4	Food and Non-Food Quality, Nutrition, Engineering and Processing
5	Economics, Marketing and Policy
6	Animal Production and Protection

V(A). Planned Program (Summary)

Program #1

1. Name of the Planned Program

Human Health, Environment, Family, Youth, Society and Community

2. Brief summary about Planned Program

Michigan's children are among the most inactive and sedentary in the nation. Many other health risks also face children, including poor diets, teenage smoking, unintended pregnancies, infectious diseases and lead poisoning. By high school graduation, more than 80 percent of all students have been harassed or bullied by classmates. Almost two of three Michigan residents are overweight or obese. Studies show that a lack of competitively priced fresh produce in urban grocery stores contributes to obesity, as does a lack of consistent, easy-to-understand information about nutrition. Food safety is a concern to Michigan residents, as is keeping themselves and their families safe. The past several years have been very difficult for the Michigan economy. The slumping auto industry has deeply affected the state's finances. Downturns in other manufacturing sectors and record-high gasoline prices have pushed the situation from bad to worse. To improve the health and safety of Michigan's adults, youth and communities, the Michigan Agricultural Experiment Station and MSU Extension have developed broad and comprehensive research and education programs to address specific Michigan needs. Youth development, community development, nutrition and food safety research and education, and family and parenting skills are focus areas that stakeholders have identified as important.

At the request of the Grand Traverse Band of Ottawa and Chippewa Indians, MSUE will create a capacity building program that foucses on tribal governance. American Indian Members of Federally Recognized Tribal Communities in Michigan have been increasing over the past 25 years. This increase in members has created a complex need to develop governing capacity among the recognized tribes and to help Tribal Councils deal with more complex and difficult financial, governance, planning, inter-governmental cooperation and leadership issues. MSUE has assisted other governmental units increase capacity in these areas through a variety of capacity building and training programs, such as "New County Commissioners Training, Citizen Planner, Working with Treasures and Clerks, and leadership development programs". This project will help the tribes develop a complete framework for tribes to adopt for tribal governance. This will build upon our existing programs but will be altered to be culturally sensitive.

This program will:

•Help Michigan residents eat healthier, become more active, be better caregivers, and prevent and manage chronic health conditions. •Improve management of financial resources by individuals and families. •Help prepare youth for life and work. •Assist Michigan communities in making critical policy decisions and functioning more smoothly with citizen involvement. •

Increase capacity of American Indian Tribes in Michigan to govern and manage themselves, focusing on governance, financial management, leadership, planning and inter-governmental cooperation.

3. Program existence : Mature (More then 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	3%		10%	
703	Nutrition Education and Behavior	5%		7%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources.	2%		2%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	5%		5%	
721	Insects and Other Pests Affecting Humans	1%		0%	
723	Hazards to Human Health and Safety	7%		12%	
724	Healthy Lifestyle	11%		20%	
802	Human Development and Family Well-Being	12%		8%	
803	Sociological and Technological Change Affecting Individuals, Families and Communities	3%		6%	
805	Community Institutions, Health, and Social Services	5%		10%	
806	Youth Development	46%		20%	
	Total	100%		100%	

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

1. Situation and priorities

Antibiotic resistance, bacterial pathogens, food allergies and viruses continue to be issues in food safety, especially *Listeria,Salmonella*, *E. coli* O157:H7 and *Campylobacter*. New solutions to time-temperature control in food are needed, as are new methods to detect pathogens quickly, accurately and efficiently.

Health-care costs have skyrocketed. The number of overweight adolescents in the United States has tripled in 30 years. Overweight kids have a 70 to 80 percent chance of becoming overweight adults. More than 60 percent of Michigan residents are overweight. Physical inactivity and obesity are the leading health indicators targeted for intervention by the Centers for Disease Control. The effects of physical inactivity cost billions annually. More than 61 percent of youth don't participate in any organized physical activity outside school. Children involved in after-school programs are much less likely to be obese than nonparticipants. Eighth-graders who do not participate in supervised after-school activities double their risk of smoking, drinking

and using drugs. In the 2005 State of the State survey, 68 percent of respondents identified disease research and education programs as high priority.

Research by the Federal Reserve indicates that household debt is at a record high relative to disposable income. The average American family carries nearly $20,000 in credit debt. Bankruptcy rates have increased tenfold in five years. U.S. life expectancies have risen, but many people are not prepared to successfully manage their finances in anticipation of retirement. Fewer than half of all minority and low-income families own their residence.

By the time a child is three, 85 percent of the brain is developed, but many children enter school unprepared to learn. Many parents and caregivers lack knowledge of developmentally appropriate practices, physical health and wellness, social competence, emotional well-being and cognitive development. Families lack family communication skills. Affordable, high-quality childcare supports business productivity and quality of life for families.

Many communities are not prepared for the health care, housing and transportation needs of seniors.

Leaders in urban centers look for help revitalizing struggling downtowns; government officials in municipalities of all sizes need assistance with economic development. In many communities, multicultural differences are not recognized, understood and appreciated. Citizens lack awareness of the level and funding of public services, the complexity of public issues and the methods of citizen involvement.

According to a report of the Governor's Commission on Higher Education and Economic Growth, many students are not prepared for life and work. In a recent State of the State survey, 80 percent of respondents identified youth job training as a high priority. Tenth graders who aren't involved in extracurricular activities are 57 percent more likely to drop out of school. Michigan's high-school graduation rate is only 74 percent.

2. Scope of the Program

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

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

1. Assumptions made for the Program

•Funding for these research projects and educational programs will remain constant or possibly decrease; therefore, some expertise will be lost. •The methodology used to determine program direction is sound. •People who are trained in nutrition and food safety will change their nutritionally unsound behavior and handle food safely. •Reducing the number of overweight and obese adults and children in Michigan will reduce health-care costs and improve residents' quality of life. •Given appropriate information and tools, people with chronic medical conditions will manage their condition effectively. •Financial literacy training will result in better financial decisions. •Training parents and caregivers will improve children's readiness to enter school. •Improved parenting and family management skills will improve quality of life. •Given accurate information, communities will act positively to meet the needs of seniors. •Citizens and local officials who are trained will use the information learned to improve their communities. •Helping Michigan communities of all sizes with economic development will provide improved quality of life, a more robust economy and a more attractive business climate for Michigan. •Preparing youth for meaningful, well-paying careers will lead to better employment opportunities, which will improve their quality of life and boost the state's economy.

2. Ultimate goal(s) of this Program

•To ensure that all Michigan residents have access to safe, healthful, affordable food. •Develop new tests to detect current and emerging food pathogens quickly, accurately and efficiently. •To give individuals, parents and caregivers the knowledge and tools to choose healthful food, physically active lifestyles and behaviors consistent with federal dietary guidelines to prevent obesity or deal with it in a positive way, practice safe food handling, and effectively manage chronic medical conditions. •Individuals will gain financial literacy, management and organizational skills, including credit, budgeting, savings and investing, homebuying, energy and affordable housing options. This will increase savings and reduce consumer debt. •To ensure that children enter school ready to learn by teaching parents and caregivers how to use developmentally appropriate practices to ensure their children's physical health and wellness, social competence, emotional well-being and cognitive development. •Family relationships will be strengthened. •To prepare communities to meet the health care, housing and transportation needs of seniors. •To prepare public officials to seek and hold office and gain knowledge about funding, the most efficient and effective ways to provide services, strategic planning, conflict management, communication, engaging the public in policy development, and intergovernmental cooperation. This will enable local public officials to be confident, efficient, effective leaders in their communities. •Michigan citizens will be knowledgeable, prepared and willing to serve in public roles and make good decisions. •To ensure that youth have the knowledge and skills needed for well-paying, fulfilling employment and to meet the challenges of a changing world, as well as enhanced physical, social, emotional and cognitive health and well-being. •To enhance the personal growth of youth through volunteering in community service.

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
2010	70.0	0.0	10.0	0.0
2011	70.0	0.0	10.0	0.0
2012	70.0	0.0	11.0	0.0
2013	70.0	0.0	11.0	0.0
2014	70.0	0.0	12.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

Develop an understanding of how n-3 polyunsaturated fatty acids affect human health and disease, especially cardiovascular disease and inflammation.

Determine the relationships between obesity and family meals/lifestyle factors; family lifestyle factors/education and food choices and general health; and environmental influences and obesity/general health/physical activity.

Increase understanding about how environmental pollutants, especially ozone and endocrine disruptors affect human health.

Establish new programs and policies to help young people move successfully from foster care to independent living after they are too old for foster care.

Analyze the relationships among social support, public policy and family characteristics and how they affect the function and well-being of rural low-income families.

Increase understanding and develop more effective environmental management systems.

Develop better models for the human health and human services sectors.

Educational programs to:

•Teach how to choose healthful food, physically active lifestyles and behaviors consistent with dietary guidelines. •Teach consumers to keep their food safe by offering programs on food safety, home food preservation and healthy, hygienic food-handling practices. •Teach people living with chronic medical conditions to manage their condition effectively. •Teach financial literacy and prepare individuals to manage their finances in anticipation of retirement. •Teach caregivers and parents how to prepare children for school. •Increase access to affordable, high-quality childcare. •Prepare communities for the health care, housing and transportation needs of seniors. •Educate citizens and public officials about funding methods, service provision and intergovernmental cooperation. •Provide counties and municipalities with technical assistance related to intergovernmental contracting, consolidating services and financial and strategic planning. •Assist government officials in leadership, conflict management, communication and engaging the public in policy development. •Prepare youth with knowledge and skills needed for life and employment. •Enhance the physical, social, emotional and cognitive health and well-being of youth. •Improve better tribal governance in Michigan.

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

Extension	
Direct Methods	Indirect Methods
• Group Discussion • Workshop • Education Class	• Other 2 (Annual Report/Magazine) • TV Media Programs • Web sites • Other 1 (News Releases)

- Newsletters

3. Description of targeted audience

Michigan private citizens, state agencies, farmers, food processors, commodity groups and agricultural industry representatives are targets of research programs. Individuals of all ages and life stages are targeted for healthy lifestyle and food-safety education programs. Human development and family well-being programs target parents and caregivers of preschool children, people living with chronic medical conditions and senior citizens. Community institutions, health and social services programs target citizens and public/government officials. Youth age 9 to 18 are targets of youth development programs.Tribal members in Michigan.

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
2010	3800	7600	4400	6600
2011	3750	7550	4350	6550
2012	3750	7550	4350	6550
2013	3700	7500	4300	4300
2014	5280	10560	9300	9300

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

Expected Patent Applications

2010 : 1 **2011 :** 1 **2012 :** 1 **2013 :** 1 **2014 :** 1

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2010	30	1	0
2011	30	1	0
2012	32	1	0
2013	32	1	0
2014	32	1	0

V(H). State Defined Outputs

1. Output Target

- Number of research programs on human health, environment, family, youth, society and community.

  2010 : 31 **2011 :** 31 **2012 :** 32 **2013 :** 32 **2014 :** 33

- Number of adult participants trained in healthy lifestyles.

  2010 : 1400 **2011 :** 1400 **2012 :** 1400 **2013 :** 1400 **2014 :** 1400

- Number of youth participants trained in healthy lifestyles.

2010 2500 **2011** 2500 **2012** 2500 **2013** 2500 **2014** 2500

- Number of adult participants trained in human development and family well-being.

2010 2500 **2011** 2500 **2012** 2500 **2013** 2500 **2014** 2500

- Number of youth participants trained in human development and family well-being.

2010 2500 **2011** 2500 **2012** 2500 **2013** 2500 **2014** 2500

- Number of adult participants trained in community institutions, health and social services.

2010 100 **2011** 100 **2012** 100 **2013** 100 **2014** 100

- Number of adult participants trained in youth development.

2010 1500 **2011** 1500 **2012** 1500 **2013** 1500 **2014** 1500

- Number of youth participants trained in youth development.

2010 2200 **2011** 2200 **2012** 2200 **2013** 2200 **2014** 2200

- Number of adults trained in topics that support tribal governance.

2010 30 **2011** 30 **2012** 30 **2013** 30 **2014** 30

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of research programs to determine the relationship between family lifestyle factors/education and food choices/environmental influences/physical activity and general health and well-being.
2	Number of research programs to understand how environmental pollutants, especially ozone and endocrine disruptors, affect human health.
3	Number of research programs to analyze the relationships among social support, public policy and family characteristics and/or develop better models for the human health and human services sector.
4	Number of adult participants with increased knowledge about healthy lifestyles.
5	Number of youth participants with increased knowledge about healthy lifestyles.
6	Number of adult participants with increased knowledge of human development and family well-being.
7	Number of youth participants with increased knowledge of human development and family well-being.
8	Number of adult participants with increased knowledge of community insititutions, health and social services.
9	Number of adult participants with increased knowledge of youth development.
10	Number of youth participants with increased knowledge of youth development.
11	Number of native american adults with improved knowledge and skills in tribal governance.
12	Number of research programs to develop more effective environmental/natural resources management systems.

Outcome #1

1. Outcome Target

Number of research programs to determine the relationship between family lifestyle factors/education and food choices/environmental influences/physical activity and general health and well-being.

2. Outcome Type : Change in Action Outcome Measure

2010 : 12	**2011 :** 12	**2012 :** 14	**2013 :** 14	**2014 :** 16

3. Associated Institute Type(s)

•1862 Extension
•1862 Research

4. Associated Knowledge Area(s)

- 703 - Nutrition Education and Behavior
- 724 - Healthy Lifestyle
- 802 - Human Development and Family Well-Being
- 806 - Youth Development

Outcome #2

1. Outcome Target

Number of research programs to understand how environmental pollutants, especially ozone and endocrine disruptors, affect human health.

2. Outcome Type : Change in Condition Outcome Measure

2010 : 3	**2011 :** 3	**2012 :** 4	**2013 :** 4	**2014 :** 4

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 723 - Hazards to Human Health and Safety
- 805 - Community Institutions, Health, and Social Services

Outcome #3

1. Outcome Target

Number of research programs to analyze the relationships among social support, public policy and family characteristics and/or develop better models for the human health and human services sector.

2. Outcome Type : Change in Condition Outcome Measure

2010 : 6	**2011 :** 7	**2012 :** 7	**2013 :** 8	**2014 :** 8

3. Associated Institute Type(s)

•1862 Extension
•1862 Research

4. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being
- 803 - Sociological and Technological Change Affecting Individuals, Families and Communities
- 805 - Community Institutions, Health, and Social Services
- 806 - Youth Development

Outcome #4

1. Outcome Target

Number of adult participants with increased knowledge about healthy lifestyles.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :	**2011 :**	**2012 :**	**2013 :**	**2014 :**
1100	1100	1100	1100	1100

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 724 - Healthy Lifestyle

Outcome #5

1. Outcome Target

Number of youth participants with increased knowledge about healthy lifestyles.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :	**2011 :**	**2012 :**	**2013 :**	**2014 :**
2125	2125	2125	2125	2125

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 724 - Healthy Lifestyle
- 806 - Youth Development

Outcome #6

1. Outcome Target

Number of adult participants with increased knowledge of human development and family well-being.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :	**2011 :**	**2012 :**	**2013 :**	**2014 :**
1494	1494	1300	1300	2125

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being

Outcome #7

1. Outcome Target

Number of youth participants with increased knowledge of human development and family well-being.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :	**2011 :**	**2012 :**	**2013 :**	**2014 :**
2125	2125	2125	2125	2125

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being
- 806 - Youth Development

Outcome #8

1. Outcome Target

Number of adult participants with increased knowledge of community insititutions, health and social services.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :	**2011 :**	**2012 :**	**2013 :**	**2014 :**
100	100	100	100	100

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 805 - Community Institutions, Health, and Social Services

Outcome #9

1. Outcome Target

Number of adult participants with increased knowledge of youth development.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :	**2011 :**	**2012 :**	**2013 :**	**2014 :**
1275	1275	1275	1275	1275

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being
- 806 - Youth Development

Outcome #10

1. Outcome Target

Number of youth participants with increased knowledge of youth development.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :	**2011 :**	**2012 :**	**2013 :**	**2014 :**
1800	1800	1800	1800	1800

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 802 - Human Development and Family Well-Being
- 806 - Youth Development

Outcome #11

1. Outcome Target

Number of native american adults with improved knowledge and skills in tribal governance.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :	**2011 :**	**2012 :**	**2013 :**	**2014 :**
25	25	25	25	25

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 803 - Sociological and Technological Change Affecting Individuals, Families and Communities
- 805 - Community Institutions, Health, and Social Services

Outcome #12

1. Outcome Target

Number of research programs to develop more effective environmental/natural resources management systems.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :4 **2011 :** 4 **2012 :** 4 **2013 :** 5 **2014 :** 5

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 803 - Sociological and Technological Change Affecting Individuals, Families and Communities

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

These programs are based on priorities set in the 2005-2006 issues identification process, as well as ongoing refinement and modification of these priorities and related programs moving forward. Public policy changes may affect priorities. Obesity, good nutrition and career-ready graduates are high priorities for Michigan's elected officials. If priorities change, funds may be reallocated among programs. If funding is reduced, programming will be reduced. A drastic change in population could necessitate a change in priorities to meet the needs of the target audiences. Public reactions to and perceptions of food safety and quality will influence the research and its outcomes.

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

1. Evaluation Studies Planned

- After Only (post program)
- Comparison between locales where the program operates and sites without program intervention
- Retrospective (post program)
- Time series (multiple points before and after program)
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Case Study
- Before-After (before and after program)
- During (during program)
- Comparisons between program participants (individuals,group,organizations) and non-participants

Description

The research will be evaluated in a variety of ways. To determine whether knowledge/behavior has changed, we will query participants. To determine whether the environment/human health has improved, we will use agreed-upon parameters to evaluate any benefits/risks. MSU Extension will use pre- and post-program surveys to determine the change in competency level of participants in educational programs.

2. Data Collection Methods

- Sampling
- Whole population
- On-Site
- Unstructured
- Structured
- Case Study
- Observation
- Tests

Description

When collecting data, we will consider the relative merit of each method of data collection. The method we choose will be influenced by the type of information we desire to analyze, the time available and the cost. While there are many data we could collect about each project, we will choose those that provide the most useful information and are within our budget. Most important, we want to ensure that the data collected are credible, accurate and useful to our organizations.

V(A). Planned Program (Summary)

Program #2

1. Name of the Planned Program

Soil, Water and Natural Resources

2. Brief summary about Planned Program

Michigan has more than 36 million acres of land with more than 10,000 inland lakes and 36,000 miles of streams. No place in Michigan is more than 85 miles from one of the Great Lakes. The state's land and water support the plants and animals that provide shelter, food and fiber. They provide minerals and other inorganic materials and are the final repository for all the state's waste. Agriculture and natural resources industries -- the two most economically important industries in Michigan after the automobile industry -- depend completely on the state's soil and water resources to remain viable.

To preserve, protect and enhance these resources, the Michigan Agricultural Experiment Station and MSU Extension have extensive research and education programs addressing specific Michigan needs. Soil conservation, waste management and use of waste products, ecosystem management, water research (quality, watershed management, and water use for agriculture and natural resources businesses) are all areas of focus that have been identified as important by stakeholders.

3. Program existence : Mature (More then 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
101	Appraisal of Soil Resources	1%		2%	
102	Soil, Plant, Water, Nutrient Relationships	19%		15%	
111	Conservation and Efficient Use of Water	12%		15%	
112	Watershed Protection and Management	15%		10%	
123	Management and Sustainability of Forest Resources	8%		7%	
131	Alternative Uses of Land	18%		15%	
132	Weather and Climate	1%		10%	
133	Pollution Prevention and Mitigation	12%		15%	
134	Outdoor Recreation	1%		0%	
135	Aquatic and Terrestrial Wildlife	5%		8%	
806	Youth Development	8%		3%	
	Total	100%		100%	

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

1. Situation and priorities

Michigan is a state defined, literally, by water. Without the Great Lakes, Michigan's peninsulas would not exist. Nor would much of the state's agriculture, manufacturing, shipping and tourism offerings. Water is necessary for life -- every human needs water to live, as do the plants and animals that provide food and shelter. Michigan has more households -- 1.12 million -- served by private wells than any other state.

At the same time, Michigan's land resources provide food, shelter and space and materials for the state's industries, as well as recreation.

Research and education are needed to:

•Identify the trends, causes, and consequences of urban sprawl and to provide recommendations to state government to minimize the negative effects of current land use patterns on Michigan's environment and economy. •Determine the best way

to remove pollutants from soil and water and turn over these areas into safe, productive sites. •Provide farmers with techniques to maintain the health and productivity of their soils. •Offer growers a more thorough understanding of the relationships among crops, nutrients and water and how crops can be grown efficiently and productively with the fewest inputs possible. •Understand how the warming trend in Michigan's climate will affect agricultural crops, weeds, insects and diseases. •Determine how agriculture can hold carbon in the soil, which would help reduce the amount of carbon dioxide in the atmosphere, as well as how carbon markets may benefit Michigan farmers. •Keep Michigan's surface and groundwater clean and make all citizens aware of why this is a critical issue. •Ensure that a safe, secure and plentiful water supply is available for the state's citizens, industries, wildlife and natural areas. •Develop tools and technology to help Michigan's natural resources-based tourism industry grow by meeting consumer demands. •Determine how wildlife, fisheries, and natural resources areas respond to habitat management to encourage management for sustainable benefits.

These priorities have been identified as important by Michigan citizens, farmers, state government representatives, private industry and commodity groups.

2. Scope of the Program

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

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

1. Assumptions made for the Program

•Determining the causes of undesirable outcomes will lead to techniques to change the undesirable outcome into a desirable outcome. •Developing best practices to remove pollutants will lead to safe, healthy soil and water resources. Farmers depend on their land for their livelihoods. They want to ensure that it is sustainable and productive. All Michigan citizens should have access to clean land and water. Two of Michigan's top industries (agriculture and tourism) depend on the availability of clean land and water. •Farmers will adopt new production methods if the methods are proven to work and will enhance the farmers' profitability. •Sustainable forests, land and water benefit Michigan's economy and quality of life. •Funding will remain constant or decrease.

2. Ultimate goal(s) of this Program

•Identify the trends, causes, and consequences of urban sprawl and provide recommendations to state government to minimize the negative effects of current land use patterns on Michigan's environment and economy. •Determine the best way to remove pollutants from soil and water and turn over these areas into safe, productive sites. •Provide farmers with techniques to maintain the health and productivity of their soils. •Offer growers a more thorough understanding of the relationships among crops, nutrients and water and how crops can be grown efficiently and productively with the fewest inputs possible. •Understand how the warming trend in Michigan's climate will affect agricultural crops, weeds, insects and diseases. •Determine how agriculture can hold carbon in the soil, which would help reduce the amount of carbon dioxide in the atmosphere, as well as how carbon markets may benefit Michigan farmers. •Keep Michigan's surface and groundwater clean and make all citizens aware of why this is a critical issue. •Ensure that a safe, secure and plentiful water supply is available for the state's citizens, industries, wildlife and natural areas. •Develop tools and technology to help Michigan's natural resources-based tourism industry grow by meeting consumer demands. •Determine how wildlife, fisheries, and natural resources areas respond to habitat management to encourage management for sustainable benefits. •Foster positive resource management attitudes and stewardship actions.

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
2010	12.0	0.0	16.0	0.0
2011	12.0	0.0	16.0	0.0
2012	12.0	0.0	17.0	0.0
2013	12.0	0.0	17.0	0.0
2014	12.0	0.0	17.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

•Develop new land use models for Michigan communities. •Offer education to planners, elected officials and citizens on how these new models will reduce sprawl and ensure that the desirable outcomes will become reality. •Create new remediation strategies to clean up polluted soil and water. These strategies will be environmentally friendly, economically feasible and easy to implement with proper training. •Discover new knowledge about the composition, organization and fluctuations of microbial populations in the soils. •Develop a user-friendly computer program for nutrient management for Michigan crop and livestock producers to improve the management of fertilizer and manure nutrients on cropland to protect water resources and boost crop productivity. •Develop greenhouse gas mitigation strategies. •Develop management techniques for potato and vegetable growers that includes cover crops. •Develop new nitrogen application recommendations for turf managers. •Develop a management system for Michigan inland lakes that does not involve sampling the lakes.

•Develop Total Maximum Daily Load (TMDL) assessment tools for evaluation of Michigan watersheds. •Determine how wildlife responds to ecosystem management decisions in forest and agricultural systems. •Quantify the benefits and costs of a sample green roof system installed on campus. •Develop fish population/community computer models for species important to Michigan. These models will be used to evaluate different fishery management strategies. •Develop web-based tools and models for natural resources managers so knowledge can be shared quickly and easily. •Develop computer models to assess how habitat management affects species important to Michigan, including white-tailed deer, salmon, trout and perch.

•Promote and support value-added processing of forest products, including wood products, biofuels, maple syrup and other nontimber products. •Identify, prevent and control exotic invasive pests and diseases of forests. •Conduct educational programs to help farmers improve nutrient management and other practices to maintain and improve quality of groundwater and surface water. •Conduct educational programs with riparians and lake users to enhance their understanding of watershed management and inland lakes water quality issues. •Work with state agencies and local communities to encourage protection of community groundwater supplies through wellhead protection programs. •Educate and train health officials, consultants, engineers and riparians to improve onsite and decentralized wastewater treatment and design.

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

Extension	
Direct Methods	**Indirect Methods**
• One-on-One Intervention • Group Discussion • Workshop • Demonstrations • Education Class	• Public Service Announcement • Other 2 (Annual Report/Magazine) • TV Media Programs • Newsletters • Web sites • Other 1 (News Releases)

3. Description of targeted audience

Michigan farmers, natural resource managers, private citizens, agriculture and natural resources industry representatives, state agencies, riparians and foresters.

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
2010	5250	10500	6700	0
2011	5250	10500	6700	0
2012	5250	10500	6700	0
2013	5250	10500	6700	0
2014	5250	10500	6700	0

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

Expected Patent Applications

2010 : 5 **2011 :** 5 **2012 :** 5 **2013 :** 6 **2014 :** 6

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2010	45	0	0
2011	45	0	0
2012	48	1	0
2013	48	1	0
2014	50	1	0

V(H). State Defined Outputs

1. Output Target

- Number of research programs on soil, water and natural resources.

  2010 : 42 **2011 :** 42 **2012 :** 43 **2013 :** 43 **2014 :** 44

- Number of adult participants trained in soil, plant, water and nutrient relationships.

  2010 : 800 **2011 :** 800 **2012 :** 800 **2013 :** 800 **2014 :** 800

- Number of youth participants trained in soil, plant, water and nutrient relationships.

  2010 : 500 **2011 :** 500 **2012 :** 500 **2013 :** 500 **2014 :** 500

- Number of adult participants trained in conservation and efficient use of water.

  2010 : 300 **2011 :** 300 **2012 :** 300 **2013 :** 300 **2014 :** 300

- Number of youth participants trained in conservation and efficient use of water.

2010 2000 **2011** 2000 **2012** 2000 **2013** 2000 **2014** 2000

- Number of adult participants trained in watershed protection and management.

2010 1000 **2011** 1000 **2012** 1000 **2013** 1000 **2014** 1000

- Number of youth participants trained in watershed protection and management.

2010 2000 **2011** 2000 **2012** 2000 **2013** 2000 **2014** 2000

- Number of adult participants trained in management and sustainability of forest resources.

2010 1000 **2011** 1000 **2012** 1000 **2013** 1000 **2014** 1000

- Number of youth participants trained in management and sustainability of forest resources.

2010 400 **2011** 400 **2012** 400 **2013** 400 **2014** 400

- Number of adult participants trained in alternative uses of land.

2010 1500 **2011** 1500 **2012** 1500 **2013** 1500 **2014** 1500

- Number of youth participants trained in alternative uses of land.

2010 600 **2011** 600 **2012** 600 **2013** 600 **2014** 600

- Number of adult participants trained in pollution prevention and mitigation.

2010 500 **2011** 500 **2012** 500 **2013** 500 **2014** 500

- Number of youth participants trained in pollution prevention and mitigation.

2010 200 **2011** 200 **2012** 200 **2013** 200 **2014** 200

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of research programs to discover new knowledge about the composition, organization and fluctuations of microbial populations in the soils.
2	Number of adult participants with increased knowledge of watershed protection and management.
3	Number of youth participants with increased knowledge of watershed protection and management.
4	Number of adult participants with increased knowledge in management and sustainability of forest resources.
5	Number of research programs to determine how wildlife responds to ecosystem management decisions in natural resource and agricultural systems.
6	Number of youth participants with increased knowledge in management and sustainability of forest resources.
7	Number of adult participants with increased knowledge of alternative uses of land.
8	Number of adult participants with increased knowledge of soil, plant, water and nutrient relationships.
9	Number of youth participants with increased knowledge of alternative uses of land.
10	Number of youth participants with increased knowledge of soil, plant, water and nutrient relationships.
11	Number of adult participants with increased knowledge of pollution prevention and mitigation.
12	Number of adult participants with increased knowledge of conservation and efficient use of water.
13	Number of youth participants with increased knowledge of conservation and efficient use of water.
14	Number of youth participants with increased knowledge of pollution prevention and mitigation.
15	Number of research programs that deal with fish population dynamics and the management of Great Lakes fisheries.
16	Number of research programs that deal with the security, stewardship and management of Michigan's water resources.
17	Number of research programs that analyze key soil characteristics to better assess their agricultural and environmental contribution.
18	Number of research programs that explore the occurrence, transport and fate/effect of organic contaminants, chemicals, pesticides, pharmaceuticals and particulates in soils.
19	Number of research programs to develop new land use models for Michigan communities.

Outcome #1

1. Outcome Target

Number of research programs to discover new knowledge about the composition, organization and fluctuations of microbial populations in the soils.

2. Outcome Type : Change in Condition Outcome Measure

2010 : 6	**2011 :** 6	**2012 :** 7	**2013 :** 7	**2014 :** 8

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 101 - Appraisal of Soil Resources

Outcome #2

1. Outcome Target

Number of adult participants with increased knowledge of watershed protection and management.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 : 978	**2011 :** 850	**2012 :** 850	**2013 :** 850	**2014 :** 850

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management

Outcome #3

1. Outcome Target

Number of youth participants with increased knowledge of watershed protection and management.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 : 1700	**2011 :** 1700	**2012 :** 1700	**2013 :** 1700	**2014 :** 1700

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management
- 806 - Youth Development

Outcome #4

1. Outcome Target

Number of adult participants with increased knowledge in management and sustainability of forest resources.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 : 850	**2011 :** 850	**2012 :** 850	**2013 :** 850	**2014 :** 850

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 123 - Management and Sustainability of Forest Resources

Outcome #5

1. Outcome Target

Number of research programs to determine how wildlife responds to ecosystem management decisions in natural resource and agricultural systems.

2. Outcome Type : Change in Condition Outcome Measure

2010 :2	**2011 :** 2	**2012 :** 2	**2013** :3	**2014 :**3

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 123 - Management and Sustainability of Forest Resources
- 135 - Aquatic and Terrestrial Wildlife

Outcome #6

1. Outcome Target

Number of youth participants with increased knowledge in management and sustainability of forest resources.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :340	**2011 :** 340	**2012 :** 340	**2013** :340	**2014 :**340

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 123 - Management and Sustainability of Forest Resources
- 806 - Youth Development

Outcome #7

1. Outcome Target

Number of adult participants with increased knowledge of alternative uses of land.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :1275	**2011 :** 1275	**2012 :** 1275	**2013** :1275	**2014 :**1275

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 131 - Alternative Uses of Land

Outcome #8

1. Outcome Target

Number of adult participants with increased knowledge of soil, plant, water and nutrient relationships.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :681	**2011 :** 600	**2012 :** 600	**2013** :600	**2014 :**600

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships

Outcome #9

1. Outcome Target

Number of youth participants with increased knowledge of alternative uses of land.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 : 500	**2011 :** 500	**2012 :** 500	**2013 :** 500	**2014 :** 500

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 131 - Alternative Uses of Land
- 806 - Youth Development

Outcome #10

1. Outcome Target

Number of youth participants with increased knowledge of soil, plant, water and nutrient relationships.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 : 400	**2011 :** 400	**2012 :** 400	**2013 :** 400	**2014 :** 400

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 806 - Youth Development

Outcome #11

1. Outcome Target

Number of adult participants with increased knowledge of pollution prevention and mitigation.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 : 400	**2011 :** 400	**2012 :** 400	**2013 :** 400	**2014 :** 400

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 133 - Pollution Prevention and Mitigation

Outcome #12

1. Outcome Target

Number of adult participants with increased knowledge of conservation and efficient use of water.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 : 425	**2011 :** 425	**2012 :** 425	**2013 :** 425	**2014 :** 425

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water

Outcome #13

1. Outcome Target

Number of youth participants with increased knowledge of conservation and efficient use of water.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :	**2011 :**	**2012 :**	**2013 :**	**2014 :**
1700	1700	1700	1700	1700

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water
- 806 - Youth Development

Outcome #14

1. Outcome Target

Number of youth participants with increased knowledge of pollution prevention and mitigation.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :	**2011 :**	**2012 :**	**2013 :**	**2014 :**
170	170	170	170	170

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 133 - Pollution Prevention and Mitigation
- 806 - Youth Development

Outcome #15

1. Outcome Target

Number of research programs that deal with fish population dynamics and the management of Great Lakes fisheries.

2. Outcome Type : Change in Action Outcome Measure

2010 :	**2011 :**	**2012 :**	**2013 :**	**2014 :**
5	5	6	6	7

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 112 - Watershed Protection and Management
- 135 - Aquatic and Terrestrial Wildlife

Outcome #16

1. Outcome Target

Number of research programs that deal with the security, stewardship and management of Michigan's water resources.

2. Outcome Type : Change in Action Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
5	5	5	5	6

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 111 - Conservation and Efficient Use of Water
- 112 - Watershed Protection and Management
- 133 - Pollution Prevention and Mitigation

Outcome #17

1. Outcome Target

Number of research programs that analyze key soil characteristics to better assess their agricultural and environmental contribution.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
6	6	7	7	8

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 101 - Appraisal of Soil Resources
- 133 - Pollution Prevention and Mitigation

Outcome #18

1. Outcome Target

Number of research programs that explore the occurrence, transport and fate/effect of organic contaminants, chemicals, pesticides, pharmaceuticals and particulates in soils.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
5	5	6	6	7

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

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

Outcome #19

1. Outcome Target

Number of research programs to develop new land use models for Michigan communities.

2. Outcome Type : Change in Action Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
5	5	5	5	5

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 131 - Alternative Uses of Land
- 132 - Weather and Climate

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Michigan's soil, water and other natural resources are all in a delicate balance. If one part of the equation changes, through a new public policy change or a drought, it will affect all the other natural resources in the state.

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

1. Evaluation Studies Planned

- Before-After (before and after program)
- Case Study
- Comparison between locales where the program operates and sites without program intervention
- Retrospective (post program)
- During (during program)
- Comparisons between program participants (individuals,group,organizations) and non-participants
- After Only (post program)

Description

The research and education will be evaluated in a variety of ways. To determine whether knowledge/behavior has changed, we will query participants. To determine if the environment/natural resources management has improved, we will use agreed upon parameters to evaluate any benefits/risks.

2. Data Collection Methods

- Structured
- Whole population
- Observation
- Mail
- Journals
- Telephone
- Case Study
- Unstructured
- Tests
- Sampling
- On-Site
- Portfolio Reviews

Description

When collecting data, we will consider the relative merit of each method of data collection. The method we choose will be influenced by the type of information we desire to analyze, the time available, and cost. While there are many data we could collect about each project, we will choose those that provide the most useful information and are within our budget. Most importantly, we want to ensure that the data collected are credible, accurate and useful to our organizations.

V(A). Planned Program (Summary)

Program #3

1. Name of the Planned Program

Plant Sciences

2. Brief summary about Planned Program

Michigan has the second most diverse agricultural system next to California. Michigan growers continue to need new varieties, cultural techniques and pest management strategies whether they are growing corn, apples, cherries, blueberries, turfgrass, petunias, or ornamental crabapple trees.

Michigan is one of the country's top producers of specialty crops. Because the acreage of these crops is lesser than that of corn, wheat, rice and soybeans, it isn't economically attractive for chemical companies to make developing pesticides for them a priority. So the state's growers of these smaller-acreage commodities look to the Michigan Agricultural Experiment Station and MSU Extension to provide the research and education on pesticides and management techniques.

Since 1915, Michigan State University plant breeders have released more than 300 varieties of plants, from corn, wheat and alfalfa to zinnias, strawberries and spruce trees. Each breeder works closely with Michigan growers to improve the desirable traits in each crop while keeping yields high. At the same time, MAES researchers and MSUE educators work continuously with growers to develop and test new management techniques to provide protection from insects, weeds, diseases and undesirable weather. As the demand for organic food increases, researchers and educators work to provide producers with cultural and pest management techniques that meet USDA organic standards.

Michigan State University Extension proposes to create a new Federally-Recognized Tribes Extension Program (FRTEP) servicing four federally-recognized tribes in the Eastern Upper Peninsula and Northern Lower Peninsula of Michigan. The proposed program will represent the first FRTEP servicing any tribal government in the Northeastern United States. The tribes partnering on the project are the Bay Mills Indian Community, the Hannahville Indian Community, the Little Traverse Bay Bands of Odawa Indians and the Sault Ste. Marie Tribe of Chippewa Indians. The project seeks to improve the health, well-being, energy independence and financial independence of these four Michigan Indian tribes through the creation of two full-time Extension Educator positions that will assist the tribes in advancing their agricultural and renewable resource programs. Agricultural and horticultural program activities will focus on enhancing the production and profitability of small-scale tribal agriculture projects and improving tribal member wellness. Renewable resource and sustainable development program activities will use educational processes to facilitate the incorporation of renewable energies into tribal households, tribal governmental offices and tribal businesses and increase tribal capacity to develop forest and agricultural-based renewable resources in ecologically and economically sustainable ways.

3. Program existence : Mature (More then 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
201	Plant Genome, Genetics, and Genetic Mechanisms	5%		16%	
202	Plant Genetic Resources and Biodiversity	6%		5%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	7%		7%	
204	Plant Product Quality and Utility (Preharvest)	5%		5%	
205	Plant Management Systems	30%		17%	
206	Basic Plant Biology	3%		6%	
211	Insects, Mites, and Other Arthropods Affecting Plants	3%		12%	
212	Pathogens and Nematodes Affecting Plants	15%		12%	
215	Biological Control of Pests Affecting Plants	3%		5%	
216	Integrated Pest Management Systems	20%		15%	
806	Youth Development	3%		0%	
	Total	100%		100%	

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

1. Situation and priorities

Michigan growers continue to need new varieties, cultural techniques and pest management strategies to remain competitive and thrive in a global economy. MAES scientists and MSUE educators aim to meet the following priorities:
•Develop new varieties that meet Michigan growers' needs (this includes fruit, vegetable, forestry, horticulture and field crop varieties). •Identify and isolate novel genes, markers and genetic pathways that can benefit crops important to Michigan agriculture through higher yields, improved quality, better insect and disease resistance and greater tolerance to environmental stresses. •Identify and isolate novel genes, enzymes and other phytochemicals that may benefit human health and determine how these beneficial compounds can be made available to people. •Develop new nutrient management strategies for crops that improve yield and quality, while minimizing environmental effects, such as leaching and run-off. •Develop cultural, management and insect and disease control strategies for crops that meet USDA certified organic standards so Michigan

growers can take advantage of this growing market, if they choose to do so. •Develop biological controls for pest insects and diseases to minimize effects on the environment. •Develop integrated management systems for Michigan crops that recognize that what is done in one area, say control aphids on soybeans, has an affect on the whole farm environment, including soil, air, water, and beneficial insects and microbes. •Evaluate new crop varieties and make the results widely available so growers have the most up-to-date information before planting. •Develop a deeper understanding of the role specific genes and mutations play in crop quality, insect and disease resistance and environmental stress tolerance. •Determine whether genes that impart desirable characteristics can safely and efficiently be incorporated into other species. •Programs for underserved ethnic and racial groups – IPM scouts for Hispanic farmers & farm workers. •Build tribal capacity in the area of small scale sustainable agriculture.

These priorities have been identified as important by Michigan citizens, farmers, state government representatives, private industry and commodity groups.

2. Scope of the Program

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

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

1. Assumptions made for the Program

•New varieties will keep Michigan growers competitive and thriving in a global agricultural economy. •New varieties also will help provide an adequate, safe food supply for the people of Michigan. •Developing a deeper understanding of the genetic and metabolic processes in plants will allow the creation of higher-yielding, higher-quality plants with improved resistance to pests, diseases and environmental stress. Unlocking the genetic secrets of plants also will allow scientists to identify and isolate plant compounds that may benefit human health; new techniques to manufacture and dispense these beneficial compounds and vaccines may result. Integrated management and cultural practices will ensure that agriculture is sustainable and productive because fertile soil, water and air will continue to be available to support it. •Integrated management strategies also ensure that the environment will be a safe and secure place to support human, animal and plant life. •Funding will remain constant or decrease.

2. Ultimate goal(s) of this Program

•Develop improved varieties of dry beans, tart and sweet cherries, potatoes, wheat, rice, soybeans, oats, barley, canola, turfgrass, apples, strawberries, blueberries, floriculture crops, chestnuts, vegetable crops, and conifers for Michigan growers. •Continue to identify genes and genetic pathways that control plant response to environmental stresses and develop techniques to insert these pathways into at-risk plants. •Identify and isolate novel genes, markers and genetic pathways that can benefit crops important to Michigan agriculture through higher yields, improved quality, and better insect and disease resistance. •Identify and isolate novel genes, enzymes and other phytochemicals that may have benefits for human health and determine how these beneficial compounds can be made available to people. •Develop integrated management strategies and educational programs for fruit, field, vegetable, floriculture, Christmas tree and forestry crops that maximize the efficiency of resource inputs and improve yield and quality, while minimizing environmental effects, such as leaching and run-off. •Develop cultural, management and insect and disease control strategies for crops that meet USDA certified organic standards so Michigan growers can take advantage of this growing market, if they choose to do so. •Continue to develop biological controls for pest insects and diseases to minimize any effects on the environment. Continue variety trials for crops important to Michigan, including wheat, corn, soybeans and forages. •Provide green industry professionals and homeowners with scientifically sound information to enable them to safely and effectively manage their turf, landscapes and gardens, improving efficiency of resources and controlling pests, while reducing pesticide and fertilizer use.

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
2010	37.0	0.0	27.0	0.0
2011	37.0	0.0	27.0	0.0
2012	37.0	0.0	28.0	0.0
2013	37.0	0.0	28.0	0.0
2014	37.0	0.0	28.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

•Develop improved varieties of dry beans, tart and sweet cherries, potatoes, wheat, rice, soybeans, oats, barley, canola, turfgrass, apples, strawberries, blueberries, floriculture crops, chestnuts, vegetable crops, and conifers for Michigan growers.

•Continue to identify genes and genetic pathways that control plant response to environmental stresses and develop techniques to insert these pathways into at-risk plants. •Identify and isolate novel genes, markers and genetic pathways that can benefit crops important to Michigan agriculture through higher yields, improved quality, and better insect and disease resistance. •Identify and isolate novel genes, enzymes and other phytochemicals that may have benefits for human health and determine how these beneficial compounds can be made available to people. •Develop integrated management strategies and provide education programs for producers of fruit, field, vegetable, floriculture, Christmas tree and forestry crops that use the lowest possible inputs of resources and improve yield and quality, while minimizing environmental effects, such as leaching and run-off. •Develop cultural, management and insect and disease control strategies for crops that meet USDA certified organic standards so Michigan growers can take advantage of this growing market, if they choose to do so.

•Continue to develop biological controls for pest insects and diseases to minimize effects on the environment. •Continue variety trials for crops important to Michigan, including wheat, corn, soybeans and forages. •Conduct educational programs to help farm producers control weeds and more effectively manage high-cost fertilizer inputs while optimizing crop production.

•Develop plant disease prediction models. •Conduct educational programs to help plant producers control disease caused by pathogens and nematodes and teach integrated pest management methods. •Provide green industry professionals and homeowners with scientifically sound information to enable them to safely and effectively manage their turf, landscapes and gardens, improving efficiency of resources and controlling pests, while reducing pesticide and fertilizer use. •Train native american adults in sustainable agriculture.

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

Extension	
Direct Methods	**Indirect Methods**
• Demonstrations • Education Class • Workshop • Group Discussion • One-on-One Intervention	• Other 1 (News Releases) • Newsletters • Web sites • Other 2 (Annual Report/Publications) • TV Media Programs

3. Description of targeted audience

Michigan growers, private citizens, agriculture and natural resources industry representatives, biotechnology company representatives, and state agencies.Native american growers.

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
2010	7000	14000	5000	0
2011	7000	14000	5000	0
2012	7000	14000	5000	0
2013	7000	14000	5000	0
2014	7000	14000	5000	0

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

Expected Patent Applications

2010 : 12 **2011 :** 13 **2012 :** 13 **2013 :** 13 **2014 :** 13

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2010	75	0	0
2011	75	0	0
2012	75	1	0
2013	75	1	0
2014	75	1	0

V(H). State Defined Outputs

1. Output Target

- Number of research projects on plant sciences.

  2010 : 75 **2011 :** 78 **2012 :** 80 **2013 :** 82 **2014 :** 82

- Number of adult participants trained in plant management systems.

  2010 : 5000 **2011 :** 5000 **2012 :** 5000 **2013 :** 5000 **2014 :** 5000

- Number of youth participants trained in plant management systems.

  2010 : 5000 **2011 :** 5000 **2012 :** 5000 **2013 :** 5000 **2014 :** 5000

- Number of adult participants trained in pathogens and nematodes affecting plants.

  2010 : 1000 **2011 :** 1000 **2012 :** 1000 **2013 :** 1000 **2014 :** 1000

- Number of adult participants trained in integrated pest management (IPM).

  2010 : 1500 **2011 :** 1500 **2012 :** 1500 **2013 :** 1500 **2014 :** 1500

- Number of native american adults trained in small scale sustainable agriculture.

  2010 : 30 **2011 :** 30 **2012 :** 30 **2013 :** 30 **2014 :** 30

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of youth participants with increased knowledge of plant management systems.
2	Number of adult participants with increased knowledge of pathogens and nematodes affecting plants.
3	Number of adult participants with increased knowledge of integrated pest management (IPM).
4	Number of research programs to develop insect and disease control and/or cultural and management strategies for organic crops.
5	Number of research programs to develop biological controls for pest insects and diseases to minimize any effects on the environment.
6	Number of research programs to develop integrated management strategies for fruit, field, vegetable, floriculture and forestry crops that use the lowest amounts of nutrients possible and improve yield and quality.
7	Number of research programs to identify and isolate novel genes, markers and genetic pathways that can benefit crops important to Michigan agriculture through higher yields, improved quality, and better insect and disease resistance.
8	Number of research programs to identify genes and genetic pathways that control plant response to environmental stresses and develop techniques to insert these pathways into at-risk plants.
9	Number of research programs to develop improved varieties of economically important crops for Michigan and the region.
10	Number of adult participants with increased knowledge of plant management systems.
11	Number of native american adults with increased knowledge in sustainable agriculture.
12	Number of research programs to develop weed control methodologies, protocols and practices.
13	Number of research programs to develop controls for pathogens and nematodes affecting plants.
14	Number of research programs to develop production protocols and environmental and cultural strategies for the floriculture/nursery industry.
15	Number of research programs to develop more effective post-harvest protocols and practices to minimize loss and enhance quality.

Outcome #1

1. Outcome Target

Number of youth participants with increased knowledge of plant management systems.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 : 4250	**2011 :** 4250	**2012 :** 4250	**2013 :** 4250	**2014 :** 4250

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 806 - Youth Development

Outcome #2

1. Outcome Target

Number of adult participants with increased knowledge of pathogens and nematodes affecting plants.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 : 850	**2011 :** 850	**2012 :** 850	**2013 :** 850	**2014 :** 850

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 212 - Pathogens and Nematodes Affecting Plants

Outcome #3

1. Outcome Target

Number of adult participants with increased knowledge of integrated pest management (IPM).

2. Outcome Type : Change in Knowledge Outcome Measure

2010 : 1275	**2011 :** 1275	**2012 :** 1275	**2013 :** 1275	**2014 :** 1275

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems

Outcome #4

1. Outcome Target

Number of research programs to develop insect and disease control and/or cultural and management strategies for organic crops.

2. Outcome Type : Change in Condition Outcome Measure

2010 : 2	**2011 :** 3	**2012 :** 3	**2013 :** 3	**2014 :** 3

3. Associated Institute Type(s)

•1862 Extension
•1862 Research

4. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 212 - Pathogens and Nematodes Affecting Plants
- 215 - Biological Control of Pests Affecting Plants
- 216 - Integrated Pest Management Systems

Outcome #5

1. Outcome Target

Number of research programs to develop biological controls for pest insects and diseases to minimize any effects on the environment.

2. Outcome Type : Change in Condition Outcome Measure

2010 : 7 **2011 :** 7 **2012 :** 8 **2013 :** 8 **2014 :** 8

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

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

Outcome #6

1. Outcome Target

Number of research programs to develop integrated management strategies for fruit, field, vegetable, floriculture and forestry crops that use the lowest amounts of nutrients possible and improve yield and quality.

2. Outcome Type : Change in Condition Outcome Measure

2010 : 5 **2011 :** 5 **2012 :** 6 **2013 :** 6 **2014 :** 6

3. Associated Institute Type(s)

•1862 Extension
•1862 Research

4. Associated Knowledge Area(s)

- 203 - Plant Biological Efficiency and Abiotic Stresses Affecting Plants
- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems

Outcome #7

1. Outcome Target

Number of research programs to identify and isolate novel genes, markers and genetic pathways that can benefit crops important to Michigan agriculture through higher yields, improved quality, and better insect and disease resistance.

2. Outcome Type : Change in Condition Outcome Measure

2010 :21	**2011 :** 21	**2012 :** 22	**2013** :22	**2014 :**22

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
- 205 - Plant Management Systems
- 206 - Basic Plant Biology

Outcome #8

1. Outcome Target

Number of research programs to identify genes and genetic pathways that control plant response to environmental stresses and develop techniques to insert these pathways into at-risk plants.

2. Outcome Type : Change in Condition Outcome Measure

2010 :3	**2011 :** 4	**2012 :** 4	**2013** :4	**2014 :**5

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
- 206 - Basic Plant Biology

Outcome #9

1. Outcome Target

Number of research programs to develop improved varieties of economically important crops for Michigan and the region.

2. Outcome Type : Change in Condition Outcome Measure

2010 :14	**2011 :** 14	**2012 :** 15	**2013** :15	**2014 :**15

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
- 204 - Plant Product Quality and Utility (Preharvest)
- 206 - Basic Plant Biology

Outcome #10

1. Outcome Target

Number of adult participants with increased knowledge of plant management systems.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 : 4275	**2011 :** 4275	**2012 :** 4275	**2013 :** 4275	**2014 :** 4275

3. Associated Institute Type(s)

- 1862 Extension

4. Associated Knowledge Area(s)

- 205 - Plant Management Systems

Outcome #11

1. Outcome Target

Number of native american adults with increased knowledge in sustainable agriculture.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 : 25	**2011 :** 25	**2012 :** 25	**2013 :** 25	**2014 :** 25

3. Associated Institute Type(s)

- 1862 Extension

4. Associated Knowledge Area(s)

- 205 - Plant Management Systems

Outcome #12

1. Outcome Target

Number of research programs to develop weed control methodologies, protocols and practices.

2. Outcome Type : Change in Action Outcome Measure

2010 : 4	**2011 :** 5	**2012 :** 5	**2013 :** 5	**2014 :** 7

3. Associated Institute Type(s)

- 1862 Research

4. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 216 - Integrated Pest Management Systems

Outcome #13

1. Outcome Target

Number of research programs to develop controls for pathogens and nematodes affecting plants.

2. Outcome Type : Change in Action Outcome Measure

2010 : 5	**2011 :** 5	**2012 :** 6	**2013 :** 6	**2014 :** 6

3. Associated Institute Type(s)

- 1862 Research

4. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 206 - Basic Plant Biology

- 212 - Pathogens and Nematodes Affecting Plants
- 215 - Biological Control of Pests Affecting Plants

Outcome #14

1. Outcome Target

Number of research programs to develop production protocols and environmental and cultural strategies for the floriculture/nursery industry.

2. Outcome Type : Change in Action Outcome Measure

2010 6 **2011 :** 6 **2012 :** 7 **2013** 7 **2014 :** 7

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 204 - Plant Product Quality and Utility (Preharvest)
- 205 - Plant Management Systems

Outcome #15

1. Outcome Target

Number of research programs to develop more effective post-harvest protocols and practices to minimize loss and enhance quality.

2. Outcome Type : Change in Action Outcome Measure

2010 2 **2011 :** 2 **2012 :** 3 **2013** 3 **2014 :** 3

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 205 - Plant Management Systems
- 211 - Insects, Mites, and Other Arthropods Affecting Plants
- 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
- Government Regulations
- Competing Programmatic Challenges
- Public Policy changes
- Natural Disasters (drought,weather extremes,etc.)
- Competing Public priorities
- Populations changes (immigration,new cultural groupings,etc.)

Description

Public reaction to biotechnology affects the breeding and plant genetic work of MAES scientists. In order to meet grower demands and satisfy the public's demand for safe food, breeders must use a variety of technologies. Also, weather plays a large

role in the prevalence of weeds, pest insects and diseases. New priorities may emerge as the environment changes.

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
- Comparison between locales where the program operates and sites without program intervention
- After Only (post program)
- Retrospective (post program)
- Case Study

Description

The research and education will be evaluated in a variety of ways. To determine whether knowledge/behavior has changed, we will query participants. To determine if new management strategies have benefited growers and the environment, we will survey growers as well as independently sample environmental parameters. New varieties will be evaluated by yield, pest and environmental stress resistance and grower adoption.

2. Data Collection Methods

- Structured
- Whole population
- Unstructured
- Observation
- Tests
- Sampling
- Mail
- Journals
- Case Study
- Portfolio Reviews
- On-Site

Description

When collecting data, we will consider the relative merit of each method of data collection. The method we choose will be influenced by the type of information we desire to analyze, the time available, and cost. While there are many data we could collect about each project, we will choose those that provide the most useful information and are within our budget. Most important, we want to ensure that the data collected are credible, accurate and useful to our organizations.

V(A). Planned Program (Summary)

Program #4

1. Name of the Planned Program

Food and Non-Food Quality, Nutrition, Engineering and Processing

2. Brief summary about Planned Program

MSU expertise in biosystems engineering, food processing and nutritional immunology is paving the way for the creation of new products that offer Michigan residents food choices with greater health benefits. Engineering and processing advances will lead to greater cost efficiencies and enhanced food safety and security.

Michigan State University Extension proposes to create a new Federally-Recognized Tribes Extension Program (FRTEP) servicing four federally-recognized tribes in the Eastern Upper Peninsula and Northern Lower Peninsula of Michigan. The proposed program will represent the first FRTEP servicing any tribal government in the Northeastern United States. The tribes partnering on the project are the Bay Mills Indian Community, the Hannahville Indian Community, the Little Traverse Bay Bands of Odawa Indians and the Sault Ste. Marie Tribe of Chippewa Indians. The project seeks to improve the health, well-being, energy independence and financial independence of these four Michigan Indian tribes through the creation of two full-time Extension Educator positions that will assist the tribes in advancing their agricultural and renewable resource programs. Agricultural and horticultural program activities will focus on enhancing the production and profitability of small-scale tribal agriculture projects and improving tribal member wellness. Renewable resource and sustainable development program activities will use educational processes to facilitate the incorporation of renewable energies into tribal households, tribal governmental offices and tribal businesses and increase tribal capacity to develop forest and agricultural-based renewable resources in ecologically and economically sustainable ways.

3. Program existence : Mature (More then 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
401	Structures, Facilities, and General Purpose Farm Supplies	3%		3%	
402	Engineering Systems and Equipment	6%		6%	
403	Waste Disposal, Recycling, and Reuse	6%		14%	
404	Instrumentation and Control Systems	11%		9%	
501	New and Improved Food Processing Technologies	18%		14%	
502	New and Improved Food Products	17%		15%	
503	Quality Maintenance in Storing and Marketing Food Products	18%		18%	
511	New and Improved Non-Food Products and Processes	16%		16%	
512	Quality Maintenance in Storing and Marketing Non-Food Products	5%		5%	
	Total	100%		100%	

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

1. Situation and priorities

Agriculture is one of Michigan's top three industries. The state's agricultural/food system -- including leather, food, floriculture/ornamentals/turfgrass and biomass energy industries -- accounts for $71.3 billion in total economic activity (direct and indirect) and more than 1 million jobs. Agriculture generates more than $42.6 billion in direct economic activity. In total, the agricultural/food system employs nearly a quarter of all people working in Michigan. The system is likely second only to the auto industry in importance to the state's economy.

Michigan also has one of the most diverse agricultural industries in the United States. The state is second only to California in variety of crops grown. From field crops such as corn, wheat and soybeans to fruits such as cherries, apples, grapes and blueberries; to horticultural crops such as ornamental trees and flowering plants; and livestock, honey and fish, Michigan grows just about anything one can think of except citrus. It's no secret that the past several years have been very difficult for the Michigan economy. The slumping auto industry has deeply affected the state's finances, and downturns in other manufacturing sectors and record-high gasoline prices have pushed the situation from bad to worse. Researchers and educators from all disciplines are pondering how to reverse the state's economic decline. One solution is to build a new biobased economic sector on the existing foundation of agriculture, forestry and natural resources, and industrial and manufacturing sectors. The result will be the advancement of a new, sustainable biobased sector that provides a competitive advantage in meeting the growing global demand for renewable sources of materials, chemicals and energy in products, processes and packaging, as well as traditional food products and functional foods.

Priorities are to:

Connect Michigan industries with the research, education and entrepreneurial activity needed in the basic sciences, engineering, plant science and agriculture to provide the state with a foundation for vigorous development of a new biobased economic sector.

Identify and isolate beneficial plant compounds that can be used to make new functional foods.

Develop the processes and technologies to manufacture functional foods.

Develop new biosensors and DNA chips that can rapidly and accurately detect a broad spectrum of harmful organisms in food and water, such as *E. coli*, *Salmonella*, *Listeria*, *Campylobacter, Cryptosporidium* and *Giardia*.

Identify breeding and genetic improvement related to food quality, nutrition and processing.

Develop packaging systems to enhance food quality and shelf life.

Build tribal capacity in the area sustainable utilization of renewable resources.

2. Scope of the Program

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

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

1. Assumptions made for the Program

Preliminary technology, processes and protocols are available to accomplish many of the priorities, however, they need to become more cost effective and efficient in order to ensure industry sustainability, environmental stewardship and human health. Funding will remain constant or increase.

2. Ultimate goal(s) of this Program

To support and build on Michigan's economic sector using the existing foundation of agriculture, forestry and natural resources, and industrial and manufacturing sectors. This will advance enhanced, sustainable sectors that provide a competitive advantage in meeting the growing global demand for renewable sources of materials, chemicals and energy in products, processes and packaging, as well as new food products and functional foods that are both safe and nutritious.

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
2010	0.0	0.0	9.0	0.0
2011	1.0	0.0	9.0	0.0
2012	1.0	0.0	10.0	0.0
2013	1.0	0.0	10.0	0.0
2014	1.0	0.0	10.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

•Connect Michigan industries with the research, education and entrepreneurial activity needed in the basic sciences, engineering, plant science and agriculture to provide the state with a foundation for vigorous development of a new biobased

economic sector. •Identify and isolate beneficial plant compounds that can be used to make new functional foods. •Develop the processes and technologies to manufacture functional foods. •Develop new biosensors and DNA chips that can rapidly and accurately detect a broad spectrum of harmful organisms in food and water, such as *E. coli*, *Salmonella,Listeria*, *Campylobacter*, *Cryptosporidium* and *Giardia*. •Identify breeding and genetic improvements related to food quality, nutrition and processing. •Develop packaging systems to enhance food quality and shelf life. •Train native american adults on energy crops and renewable resources.

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

Extension	
Direct Methods	**Indirect Methods**
• Group Discussion • Workshop • Demonstrations	• Web sites • Newsletters • Other 2 (Annual Report/Magazine) • Other 1 (News Releases)

3. Description of targeted audience

Agriculture and natural resources industry representatives, biotechnology company representatives, state agency representatives, private citizens, entrepreneurs.Native American growers.

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
2010	30	50	0	0
2011	30	50	0	0
2012	30	50	0	0
2013	60	100	0	0
2014	60	100	0	0

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

Expected Patent Applications

2010 :7 **2011 :**7 **2012 :**7 **2013 :**8 **2014 :**8

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2010	30	0	0
2011	30	0	0
2012	32	0	0
2013	32	0	0
2014	32	1	0

V(H). State Defined Outputs

1. Output Target

- Number of research projects focusing on food quality, nutrition, engineering and processing.

2010	2011	2012	2013	2014
25	25	27	29	31

- Number of adults trained on new and improved non-food and bioeconomy related products and processes.

2010	2011	2012	2013	2014
30	30	30	30	30

- Number of native american adults trained in energy crops and renewable resources.

2010	2011	2012	2013	2014
0	0	0	30	30

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of research programs to develop the processes and technologies to manufacture functional foods.
2	Number of research programs to develop new biosensors and DNA chips that can rapidly and accurately detect a broad spectrum of harmful organisms in food and water, such as E. coli, Salmonella, Listeria, Campylobacter, Cryptosporidium and
3	Number of adults with new and improved knowledge on non-food and bioeconomy related products and processes.
4	Number of native american adults with improved knowledge on energy crops and renewable resrouces.
5	Number of research programs to identify breeding and genetic improvement related to food quality, nutrition and processing.
6	Number of research programs to develop packaging systems to enhance food quality and shelf life.
7	Number of research programs to connect Michigan industries with research, education and entrepreneurial activity needed in the basic sciences, engineering and plant science and agriculture to provide the state with a foundation for vigorous development of a new biobased economic sector.

Outcome #1

1. Outcome Target

Number of research programs to develop the processes and technologies to manufacture functional foods.

2. Outcome Type : Change in Condition Outcome Measure

2010 :5	**2011 :** 6	**2012 :** 6	**2013** :7	**2014 :**7

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 501 - New and Improved Food Processing Technologies
- 502 - New and Improved Food Products
- 503 - Quality Maintenance in Storing and Marketing Food Products

Outcome #2

1. Outcome Target

Number of research programs to develop new biosensors and DNA chips that can rapidly and accurately detect a broad spectrum of harmful organisms in food and water, such as E. coli, Salmonella, Listeria, Campylobacter, Cryptosporidium and

2. Outcome Type : Change in Action Outcome Measure

2010 :4	**2011 :** 4	**2012 :** 5	**2013** :5	**2014 :**5

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 404 - Instrumentation and Control Systems
- 503 - Quality Maintenance in Storing and Marketing Food Products

Outcome #3

1. Outcome Target

Number of adults with new and improved knowledge on non-food and bioeconomy related products and processes.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :25	**2011 :** 25	**2012 :** 25	**2013** :25	**2014 :**25

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 511 - New and Improved Non-Food Products and Processes

Outcome #4

1. Outcome Target

Number of native american adults with improved knowledge on energy crops and renewable resrouces.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
0	0	0	25	25

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 403 - Waste Disposal, Recycling, and Reuse
- 511 - New and Improved Non-Food Products and Processes

Outcome #5

1. Outcome Target

Number of research programs to identify breeding and genetic improvement related to food quality, nutrition and processing.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
6	6	7	7	8

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 501 - New and Improved Food Processing Technologies
- 502 - New and Improved Food Products

Outcome #6

1. Outcome Target

Number of research programs to develop packaging systems to enhance food quality and shelf life.

2. Outcome Type : Change in Condition Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
3	3	4	4	5

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 402 - Engineering Systems and Equipment
- 503 - Quality Maintenance in Storing and Marketing Food Products

Outcome #7

1. Outcome Target

Number of research programs to connect Michigan industries with research, education and entrepreneurial activity needed in the basic sciences, engineering and plant science and agriculture to provide the state with a foundation for vigorous development of a new biobased economic sector.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
4	4	5	5	6

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 402 - Engineering Systems and Equipment

- 501 - New and Improved Food Processing Technologies
- 503 - Quality Maintenance in Storing and Marketing Food Products
- 511 - New and Improved Non-Food Products and Processes
- 512 - Quality Maintenance in Storing and Marketing Non-Food Products

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

These programs are based on priorities set in the 2005-2006 issues identification process, as well as ongoing refinement and modification of these priorities and related programs moving forward. Public policy changes may affect priorities. Obesity, good nutrition and career-ready graduates are high priorities for Michigan's elected officials. IF priorities change, funds may be reallocated among programs. If funding is reduced, programming will be reduced. A drastic change in population could necessitate a change in priorities to meet the needs of target audiences. Public reactions to and perceptions of food safety and quality will influence the research and its outcomes.

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

1. Evaluation Studies Planned

- During (during program)
- After Only (post program)
- Comparison between locales where the program operates and sites without program intervention
- Case Study
- Retrospective (post program)
- Comparisons between program participants (individuals,group,organizations) and non-participants
- Before-After (before and after program)

Description

The profitability, acceptance of, marketability, and functionality of new functional food and non-food products will be evaluated.

2. Data Collection Methods

- Sampling
- Structured
- Case Study
- Observation
- Journals
- Mail
- Unstructured
- Telephone
- Tests
- On-Site
- Portfolio Reviews
- Whole population

Description

When collecting data, we will consider the relative merit of each method of data collection. The method we choose will be influenced by the type of information we desire to analyze, the time available, and cost. While there are many data we could collect about each project, we will choose those that provide the most useful information and are within our budget. Most importantly, we want to ensure that the data collected are credible, accurate and useful to our organizations.

V(A). Planned Program (Summary)

Program #5

1. Name of the Planned Program

Economics, Marketing and Policy

2. Brief summary about Planned Program

All Michigan agricultural producers benefit from improving their business and financial management skills, whether they raise dairy cows or grow blueberries. Marketing, distribution and other economic variables also play a critical role in the success and profitability of the state's agriculture and natural resources industries. The most perfect product in the world won't be deemed successful unless it gets into the hands of consumers who desire it.

Surrounded by the Great Lakes, Michigan also plays a key role in domestic and international shipping. In 2007, about $1.2 billion worth of agricultural products were shipped out of the United States. Michigan ranked 20th in agricultural exports for fiscal year 2007. Soybeans, feed grains, fruits and vegetables and related products accounted for approximately 79 percent of the state's agricultural exports.

Research and education on international trade and development, economic policy, domestic and foreign policy, and community resource planning and development will help Michigan growers and producers navigate governmental regulations both here and abroad, as well as connect them with foreign buyers and markets.

3. Program existence : Mature (More then 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
601	Economics of Agricultural Production and Farm Management	20%		16%	
602	Business Management, Finance, and Taxation	12%		10%	
603	Market Economics	3%		3%	
604	Marketing and Distribution Practices	5%		5%	
605	Natural Resource and Environmental Economics	22%		18%	
606	International Trade and Development	3%		9%	
608	Community Resource Planning and Development	26%		16%	
609	Economic Theory and Methods	3%		9%	
610	Domestic Policy Analysis	5%		11%	
611	Foreign Policy and Programs	1%		3%	
	Total	100%		100%	

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

1. Situation and priorities

Agriculture production in Michigan has always been a business of narrow margins. Spring freezes, fluctuating prices and demand, drought, diseases and insects, production costs, land prices, development, and the availability of farm labor coupled with public policy changes make more than getting by a challenge under the best of conditions. Michigan's growers, consumers and agencies have identified the following priorities:

•Identify current and emerging key public policy issues on trade, environmental, agricultural and food issues important to Michigan and analyze responses. •Conduct research and education to improve the operations, business and financial management skills of Michigan producers so they can make decisions that are more sound financially and environmentally.

•Evaluate the competitiveness and marketing strategies of Michigan farm markets, greenhouses and other green industry retailers. •Identify and evaluate human resources management practices in Michigan agricultural and green industries.

•Develop a framework to understand and analyze domestic and international trade policies and assess their impact on Michigan. •Determine rationale for farmland preservation choices and how changes will affect the Michigan tax base.

•Develop models to estimate the demand for and value of recreational fisheries and wildlife resources. •Identify and

evaluate the policy, technology and marketing issues faced by Michigan organic growers and develop responses. Market data show that citizens prefer small, mixed-use communities in which they can meet their basic needs within a five-minute walk.

2. Scope of the Program

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

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

1. Assumptions made for the Program

Michigan agricultural and natural resources producers have asked for research on economics, management, policy and marketing to keep their operations growing and profitable. Meeting these needs will also ensure that Michigan citizens have access to a plentiful, secure, high-quality food supply and a clean, sustainable environment. Funding will remain constant or decrease.

2. Ultimate goal(s) of this Program

To provide Michigan producers and policymakers with research and education to keep the agriculture and natural resources sector thriving and profitable and to provide Michigan citizens with a healthy environment and a secure, plentiful food supply. Help communities use planning and zoning effectively to meet community goals.

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
2010	36.0	0.0	11.0	0.0
2011	36.0	0.0	11.0	0.0
2012	36.0	0.0	12.0	0.0
2013	36.0	0.0	12.0	0.0
2014	36.0	0.0	12.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

•Identify current and emerging key public policy issues on trade, environmental, agricultural and food issues important to Michigan and analyze responses. •Conduct research and education to improve the operations, business and financial management skills of Michigan producers so they can make decisions that are more sound financially and environmentally. •Evaluate the competitiveness and marketing strategies of Michigan farm markets, greenhouses and other green industry retailers. •Identify and evaluate human resources management practices in Michigan agricultural and green industries. •Develop a framework to understand and analyze domestic and international trade policies and assess their impact on Michigan. •Evaluate how Michigan citizens use the Internet when searching for information about a vacation destination or planning a vacation. •Determine rationale for farmland preservation choices and how changes will affect the Michigan tax base. •Develop models to estimate the demand for and value of recreational fisheries and wildlife resources. •Identify and evaluate the policy, technology and marketing issues faced by Michigan organic growers and develop responses. •Teach financial management skills, business organization, estate planning, management information systems, strategic management, alternative sustainable production and marketing systems to agriculture and natural resources producers and businesses. •Assist agencies, organizations, local governmental units and individuals in pursuing a cultural economic development strategy. •Offer business retention and expansion support. •Help people recognize, understand and appreciate multicultural differences. •Provide entrepreneurship education to a broad audience, including individuals, business owners, youth and communities. •Offer communities consultative, diagnostic and educational assistance in planning and zoning to meet community land-use goals.

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

Extension	
Direct Methods	**Indirect Methods**
• Demonstrations • Workshop • Education Class • One-on-One Intervention • Group Discussion	• Other 1 (News Releases) • Web sites • Other 2 (Annual Report/Magazine) • TV Media Programs • Newsletters

3. Description of targeted audience

Agriculture and natural resources producers and industry representatives; tourism industry representatives; state agency representatives; private citizens; local, state and federal elected 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
2010	5410	10800	0	0
2011	5410	10800	0	0
2012	5410	10800	0	0
2013	5410	10800	0	0
2014	5410	10800	0	0

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

Expected Patent Applications

2010 : 1 **2011 :** 1 **2012 :** 1 **2013 :** 1 **2014 :** 1

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2010	30	0	0
2011	30	0	0
2012	30	0	0
2013	30	1	0
2014	30	1	0

V(H). State Defined Outputs

1. Output Target

- Number of research programs on economics, marketing and policy.

2010 29 **2011** 30 **2012** :32 **2013** 32 **2014** 34

- Number of adult participants trained in economics of agricultural production and farm management.

2010 :800 **2011** :800 **2012** :800 **2013** :800 **2014** :800

- Number of adult participants trained in business management, finance and taxation.

2010 :1500 **2011** :1500 **2012** :1500 **2013** :1500 **2014** :1500

- Number of adult participants trained in natural resource and environmental economics.

2010 :1500 **2011** :1500 **2012** :1500 **2013** :1500 **2014** :1500

- Number of adult participants trained in community resource planning and development.

2010 :1610 **2011** :1610 **2012** :1610 **2013** :1610 **2014** :1610

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of adult participants trained in economics of agricultural production and farm management.
2	Number of adult participants trained in business management, finance and taxation.
3	Number of adult participants trained in natural resource and environmental economics.
4	Number of adult participants trained in community resource planning and development.
5	Number of research programs to identify current and emerging key public policy issues on trade, environmental, agricultural and food issues important to Michigan and analyze responses.
6	Number of research programs to improve the operations, business and financial management skills for Michigan producers so they can make decisions that are more sound financially and environmentally.
7	Number of research programs to evaluate the competitiveness and marketing strategies and human resources management practices of Michigan farm markets, greenhouses and other green industry retailers.
8	Number of research programs to develop a framework to understand and analyze domestic and international trade policies and assess their impact on Michigan.
9	Number of research programs to develop models to estimate the demand for and value of recreational fisheries and wildlife resources.
10	Number of research programs to identify and evaluate the policy, technology and marketing issues faced by Michigan organic growers and develop responses.

Outcome #1

1. Outcome Target

Number of adult participants trained in economics of agricultural production and farm management.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :	**2011 :**	**2012 :**	**2013 :**	**2014 :**
700	700	700	700	700

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 602 - Business Management, Finance, and Taxation

Outcome #2

1. Outcome Target

Number of adult participants trained in business management, finance and taxation.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :	**2011 :**	**2012 :**	**2013 :**	**2014 :**
1275	1275	1275	1275	1275

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 602 - Business Management, Finance, and Taxation

Outcome #3

1. Outcome Target

Number of adult participants trained in natural resource and environmental economics.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :	**2011 :**	**2012 :**	**2013 :**	**2014 :**
1275	1275	1275	1275	1275

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 605 - Natural Resource and Environmental Economics

Outcome #4

1. Outcome Target

Number of adult participants trained in community resource planning and development.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 :	**2011 :**	**2012 :**	**2013 :**	**2014 :**
1368	1368	1368	1368	1368

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 608 - Community Resource Planning and Development

Outcome #5

1. Outcome Target

Number of research programs to identify current and emerging key public policy issues on trade, environmental, agricultural and food issues important to Michigan and analyze responses.

2. Outcome Type : Change in Action Outcome Measure

2010 : 6	**2011 :** 6	**2012 :** 6	**2013 :** 7	**2014 :** 7

3. Associated Institute Type(s)

•1862 Extension
•1862 Research

4. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 605 - Natural Resource and Environmental Economics
- 608 - Community Resource Planning and Development
- 610 - Domestic Policy Analysis

Outcome #6

1. Outcome Target

Number of research programs to improve the operations, business and financial management skills for Michigan producers so they can make decisions that are more sound financially and environmentally.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 : 7	**2011 :** 8	**2012 :** 8	**2013 :** 9	**2014 :** 9

3. Associated Institute Type(s)

•1862 Extension
•1862 Research

4. Associated Knowledge Area(s)

- 601 - Economics of Agricultural Production and Farm Management
- 602 - Business Management, Finance, and Taxation
- 604 - Marketing and Distribution Practices

Outcome #7

1. Outcome Target

Number of research programs to evaluate the competitiveness and marketing strategies and human resources management practices of Michigan farm markets, greenhouses and other green industry retailers.

2. Outcome Type : Change in Action Outcome Measure

2010 : 3	**2011 :** 4	**2012 :** 4	**2013 :** 5	**2014 :** 5

3. Associated Institute Type(s)

•1862 Extension
•1862 Research

4. Associated Knowledge Area(s)

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

- 604 - Marketing and Distribution Practices
- 608 - Community Resource Planning and Development
- 609 - Economic Theory and Methods

Outcome #8

1. Outcome Target

Number of research programs to develop a framework to understand and analyze domestic and international trade policies and assess their impact on Michigan.

2. Outcome Type : Change in Action Outcome Measure

2010 :5	2011 : 5	2012 : 5	2013 :5	2014 :6

3. Associated Institute Type(s)

•1862 Extension
•1862 Research

4. Associated Knowledge Area(s)

- 605 - Natural Resource and Environmental Economics
- 606 - International Trade and Development
- 610 - Domestic Policy Analysis
- 611 - Foreign Policy and Programs

Outcome #9

1. Outcome Target

Number of research programs to develop models to estimate the demand for and value of recreational fisheries and wildlife resources.

2. Outcome Type : Change in Action Outcome Measure

2010 :2	2011 : 3	2012 : 3	2013 :3	2014 :3

3. Associated Institute Type(s)

•1862 Extension
•1862 Research

4. Associated Knowledge Area(s)

- 603 - Market Economics
- 605 - Natural Resource and Environmental Economics

Outcome #10

1. Outcome Target

Number of research programs to identify and evaluate the policy, technology and marketing issues faced by Michigan organic growers and develop responses.

2. Outcome Type : Change in Action Outcome Measure

2010 :2	2011 : 3	2012 : 3	2013 :4	2014 :4

3. Associated Institute Type(s)

•1862 Extension
•1862 Research

4. Associated Knowledge Area(s)

- 604 - Marketing and Distribution Practices

- 605 - Natural Resource and Environmental Economics
- 610 - Domestic Policy Analysis

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

Agricultural and natural resources markets and economies are affected by a variety of natural factors and public policy changes. Changes in population will affect farm labor.

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

1. Evaluation Studies Planned

- Before-After (before and after program)
- Comparison between locales where the program operates and sites without program intervention
- During (during program)
- Comparisons between program participants (individuals,group,organizations) and non-participants
- Case Study
- Retrospective (post program)
- After Only (post program)

Description

All research and education programs on policy, management and economics will be evaluated to see how well they work, as well as how many people adopt them and the changes that result.

2. Data Collection Methods

- Telephone
- Tests
- Unstructured
- Portfolio Reviews
- On-Site
- Journals
- Sampling
- Whole population
- Observation
- Mail
- Case Study
- Structured

Description

When collecting data, we will consider the relative merit of each method of data collection. The method we choose will be influenced by the type of information we desire to analyze, the time available, and cost. While there are many data we could collect about each project, we will choose those that provide the most useful information and are within our budget. Most importantly, we want to ensure that the data collected are credible, accurate and useful to our organizations.

V(A). Planned Program (Summary)

Program #6

1. Name of the Planned Program

Animal Production and Protection

2. Brief summary about Planned Program

Animal agriculture and its associated products -- milk, meat, wool, eggs, cheese and butter -- make up a significant portion of Michigan's economy. The state is seventh in the country in milk production, 14th in hog production and 30th in cattle production. Michigan cattle and calves were valued at$1.42 billion, up 19 percent from 2007; and poultry production, including eggs, turkeys and chickens was worth almost $239.4 million, up 54 percent from a year earlier. Besides food animals, Michigan also has prosperous horse racing, pleasure and sport riding industries.

Enhancing profitability and quality in animal agriculture means research on new methods to combat diseases and parasites, as well as work on selecting animals with desirable traits and studies on nutrition and animal management systems. Because almost all animal production involves large up-front investments, research on improving animals' reproductive performance and reducing environmental stress is also critically important. The MSU Center for Animal Functional Genomics offers researchers the opportunity to use technology that allows them to track animals' response to stress from disease, giving birth, shipping and other environmental factors at the cellular and molecular levels. The center is allowing MSU researchers and educators to become national leaders in understanding immune system response at the genetic level in additional to other critical research efforts in animal production and protection.

3. Program existence : Mature (More then 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	3%		10%	
302	Nutrient Utilization in Animals	5%		10%	
303	Genetic Improvement of Animals	2%		8%	
304	Animal Genome	4%		4%	
305	Animal Physiological Processes	5%		5%	
307	Animal Production Management Systems	41%		25%	
308	Improved Animal Products (Before Harvest)	1%		2%	
311	Animal Diseases	28%		24%	
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals	4%		2%	
315	Animal Welfare, Well-Being and Protection	3%		8%	
605	Natural Resource and Environmental Economics	1%		2%	
806	Youth Development	3%		0%	
	Total	100%		100%	

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

1. Situation and priorities

Michigan animal industries face different, and, one could argue, more numerous challenges than their crop-producing counterparts. While both groups have to deal with weather, insects and diseases, animal producers also have to worry about their animals' reproductive health and efficiency, nutrient management, feeding/milking schedules, as well as the stress of shipping, weaning, crowding and giving birth.

Michigan animal producers have identified several research and educational priorities for the coming years:

•Continue to develop and update the Michigan Agriculture Environmental Assurance Program guidelines and offer more education and outreach on the program. •Develop new management strategies to increase profitability for animal producers. •Develop tracking mechanism to quickly and accurately control populations when outbreaks of infectious diseases occur. •Develop new systems and strategies to keep animals healthy and to identify and treat diseases before they spread through herds. •Develop systems and strategies to ensure the welfare of animals from birth to rendering. •Develop new technologies to identify animals with superior reproduction capability to increase profitability. •Develop new systems (pre- and post-harvest) to improve the quality of animal products.

2. Scope of the Program

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

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

1. Assumptions made for the Program

Michigan animal producers have asked for research and education to keep their operations profitable and growing, their animals healthy and their products high quality. Research on reproduction, nutrient utilization, genetics, environmental stresses, management systems, diseases and disease tracking, and animal welfare will meet these needs of producers, as well as ensure that Michigan residents have access to high-quality, plentiful animal products. Funding will remain constant or decrease.

2. Ultimate goal(s) of this Program

To provide new strategies and technologies to keep Michigan animal producers thriving and profitable and to provide a safe, high-quality supply of animal products to Michigan residents.

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
2010	15.0	0.0	17.0	0.0
2011	15.0	0.0	17.0	0.0
2012	15.0	0.0	18.0	0.0
2013	15.0	0.0	18.0	0.0
2014	15.0	0.0	18.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

•Understanding of the processes that control/influence reproduction at the molecular and genetic level. •Develop and test new cropping, grazing and feeding strategies for cattle, sheep and other ruminants for maximum profitability and animal health and minimal environmental impact. •Develop and evaluate new nutritional management strategies for non-ruminant animals for maximum animal health and minimal environmental impact. •Develop and evaluate management tools and strategies for animal manure management that is cost-effective, easy to implement and exceeds stringent environmental standards set by the state. •Develop and evaluate management/training strategies for race horses to reduce injuries. •Develop an understanding of the molecular processes that influence growth and meat quality in food animals. •Add to the understanding of various food animal genomes by improving and integrating genetic maps. •Understanding of the genetic and molecular processes that control/influence the immune system in food animals to create new disease detection and tracking technologies. •Develop and evaluate new tools and strategies to detect, prevent and control emerging and reemerging livestock and poultry diseases, including bovine viral diarrhea virus, leptospirosis, bovine tuberculosis, *Campylocacter jejuni*, West Nile virus, and bovine spongiform encephalitis. •Understanding of the environmental fate and biological effects of vaccines, steroids and other drugs fed to animals. •Assist beef producers with implementing the mandatory electronic identification system and demonstrate

methods to use the system to sharpen management skills. •Provide livestock producers with knowledge and skills to develop and maintain herd-health systems. •Provide animal industry with up-to-date animal health information. •Improve farm-specific environmental stewardship related to manure management, including developing whole-farm nutrient management plans, manure value, land use and neighbor relations.

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

Extension	
Direct Methods	**Indirect Methods**
• One-on-One Intervention • Group Discussion • Demonstrations • Workshop • Education Class	• TV Media Programs • Web sites • Other 1 (News Releases) • Other 2 (Annual Report/Magazine) • Newsletters • Public Service Announcement

3. Description of targeted audience

Michigan animal producers, agriculture and natural resources industry representatives, biotechnology company representatives, and state agency representatives.

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
2010	1825	3600	11000	0
2011	1825	3600	11000	0
2012	1825	3600	11000	0
2013	1825	3600	11000	0
2014	1825	3600	11000	0

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

Expected Patent Applications

2010 :7 **2011 :**7 **2012 :**7 **2013 :**7 **2014 :**7

3. Expected Peer Review Publications

Year	Research Target	Extension Target	Total
2010	50	1	0
2011	50	1	0
2012	50	1	0
2013	50	1	0
2014	50	0	0

V(H). State Defined Outputs

1. Output Target

- Number of research programs on animal production and protection.

  2010 :40 **2011 :**41 **2012 :**41 **2013 :**42 **2014 :**42

- Number of adult participants trained in animal management systems.

  2010 :1500 **2011 :**1500 **2012 :**1500 **2013 :**1500 **2014 :**1500

- Number of youth participants trained in animal management systems.

  2010 :11000 **2011 :**11000 **2012 :**11000 **2013 :**11000 **2014 :**11000

- Number of adult participants trained in animal diseases.

  2010 :1000 **2011 :**1000 **2012 :**1000 **2013 :**1000 **2014 :**1000

V(I). State Defined Outcome

O. No	Outcome Name
1	Number of adult participants with increased knowledge about animal management systems.
2	Number of youth participants with increased knowledge about animal management systems.
3	Number of adult participants with increased knowledge of animal diseases.
4	Number of research programs to understand the processes that control/influence reproduction at the molecular and genetic level.
5	Number of research programs to develop and test new cropping, grazing and feeding strategies for cattle, sheep and other ruminants.
6	Number of research programs to develop and evaluate new nutritional management strategies for non-ruminant animals.
7	Number of research programs to understand the molecular processes that influence growth and meat quality in food animals.
8	Number of research programs to add to the understanding of various food animal genomes by improving and integrating genetic maps.
9	Number of research programs to develop and evaluate new tools and strategies to detect, prevent and control emerging and reemerging livestock and poultry diseases.
10	Number of research programs to understand the environmental fate and biological effects of vaccines, steroids and other substances fed to animals.
11	Number of research programs to develop and evaluate management/training strategies for horses to reduce injuries.

Outcome #1

1. Outcome Target

Number of adult participants with increased knowledge about animal management systems.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 : 1260	**2011 :** 1260	**2012 :** 1260	**2013 :** 1260	**2014 :** 1260

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 307 - Animal Production Management Systems
- 311 - Animal Diseases

Outcome #2

1. Outcome Target

Number of youth participants with increased knowledge about animal management systems.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 : 9350	**2011 :** 9350	**2012 :** 9350	**2013 :** 9350	**2014 :** 9350

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 307 - Animal Production Management Systems
- 311 - Animal Diseases
- 806 - Youth Development

Outcome #3

1. Outcome Target

Number of adult participants with increased knowledge of animal diseases.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 : 850	**2011 :** 850	**2012 :** 850	**2013 :** 850	**2014 :** 850

3. Associated Institute Type(s)

•1862 Extension

4. Associated Knowledge Area(s)

- 307 - Animal Production Management Systems
- 311 - Animal Diseases

Outcome #4

1. Outcome Target

Number of research programs to understand the processes that control/influence reproduction at the molecular and genetic level.

2. Outcome Type : Change in Condition Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
5	5	6	6	6

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 301 - Reproductive Performance of Animals
- 303 - Genetic Improvement of Animals
- 304 - Animal Genome
- 305 - Animal Physiological Processes

Outcome #5

1. Outcome Target

Number of research programs to develop and test new cropping, grazing and feeding strategies for cattle, sheep and other ruminants.

2. Outcome Type : Change in Condition Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
4	4	4	5	5

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 302 - Nutrient Utilization in Animals
- 307 - Animal Production Management Systems

Outcome #6

1. Outcome Target

Number of research programs to develop and evaluate new nutritional management strategies for non-ruminant animals.

2. Outcome Type : Change in Action Outcome Measure

2010 :	2011 :	2012 :	2013 :	2014 :
3	3	4	4	4

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 302 - Nutrient Utilization in Animals
- 307 - Animal Production Management Systems
- 308 - Improved Animal Products (Before Harvest)

Outcome #7

1. Outcome Target

Number of research programs to understand the molecular processes that influence growth and meat quality in food animals.

2. Outcome Type : Change in Condition Outcome Measure

2010 : 2 **2011 :** 2 **2012 :** 2 **2013 :** 3 **2014 :** 3

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 303 - Genetic Improvement of Animals
- 305 - Animal Physiological Processes
- 308 - Improved Animal Products (Before Harvest)

Outcome #8

1. Outcome Target

Number of research programs to add to the understanding of various food animal genomes by improving and integrating genetic maps.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 : 5 **2011 :** 5 **2012 :** 6 **2013 :** 6 **2014 :** 6

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 304 - Animal Genome
- 305 - Animal Physiological Processes

Outcome #9

1. Outcome Target

Number of research programs to develop and evaluate new tools and strategies to detect, prevent and control emerging and reemerging livestock and poultry diseases.

2. Outcome Type : Change in Action Outcome Measure

2010 : 7 **2011 :** 7 **2012 :** 8 **2013 :** 8 **2014 :** 9

3. Associated Institute Type(s)

•1862 Extension
•1862 Research

4. Associated Knowledge Area(s)

- 303 - Genetic Improvement of Animals
- 305 - Animal Physiological Processes
- 311 - Animal Diseases
- 315 - Animal Welfare, Well-Being and Protection

Outcome #10

1. Outcome Target

Number of research programs to understand the environmental fate and biological effects of vaccines, steroids and other substances fed to animals.

2. Outcome Type : Change in Condition Outcome Measure

2010 : 5	2011 : 5	2012 : 6	2013 : 6	2014 : 7

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 314 - Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals
- 315 - Animal Welfare, Well-Being and Protection

Outcome #11

1. Outcome Target

Number of research programs to develop and evaluate management/training strategies for horses to reduce injuries.

2. Outcome Type : Change in Knowledge Outcome Measure

2010 : 2	2011 : 2	2012 : 2	2013 : 2	2014 : 2

3. Associated Institute Type(s)

•1862 Research

4. Associated Knowledge Area(s)

- 307 - Animal Production Management Systems
- 315 - Animal Welfare, Well-Being and Protection

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

Description

If funding is reduced or moved to another program, there will be less work in this area.

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

1. Evaluation Studies Planned

- After Only (post program)
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Comparison between locales where the program operates and sites without program intervention
- Case Study
- Comparisons between program participants (individuals,group,organizations) and non-participants
- Before-After (before and after program)

Description

As new management strategies are introduced, producers will be surveyed before and after education and training to see how many change their practices.

2. Data Collection Methods

- Telephone
- Structured
- Unstructured
- Observation
- Mail
- Journals
- Case Study
- Whole population
- Tests
- On-Site
- Sampling
- Portfolio Reviews

Description

When collecting data, we will consider the relative merit of each method of data collection. The method we choose will be influenced by the type of information we desire to analyze, the time available, and cost. While there are many data we could collect about each project, we will choose those that provide the most useful information and are within our budget. Most importantly, we want to ensure that the data collected are credible, accurate and useful to our organizations.