2011 University of Minnesota Combined Research and Extension Annual Report of Accomplishments and Results

Status: Accepted

Date Accepted: 06/13/2012

I. Report Overview

1. Executive Summary

This report highlights accomplishments of the University of Minnesota's Agricultural Experiment Station (MAES) and Extension for 2011. Seventeen NIFA programs provide the organizing structure to report both MAES and Extension outcomes and address NIFA priorities. In Extension, two of these (Sustainable Energy and Climate Change) are multi-disciplinary initiatives that engage educators and specialists from a number of Extension's program areas. The rest describe Extension programs that are staffed with educators and specialists (including MAES researchers), and work throughout the state for and with stakeholders that partner with the University of Minnesota to make a difference. In MAES the research reported under all of the programs, including the NIFA priorities, describe research conducted within the five U of M colleges that receive MAES funding. In many cases the research iinterdisciplinary and integrated with Extension outreach efforts. Increasingly, this research involves partners from other states and stakeholder groups.

Though this is a joint report of Extension and MAES, two programs--4H and Youth Work Institute-- do not have designated joint research and extension components.

MAES Summary of Activities:

Administrative changes: In October of 2011, the directorship of the MAES was moved to the Dean of the College of Food, Agricultural and Natural Resource Sciences (CFANS), the college that receives the majority of MAES funding. The shift allows for closer coordination between the MAES and the statewide network of Research and Outreach Centers, which are also administered through CFANS. The administrative change has facilitated greater involvement in MAES strategic planning by the CFANS Associate Dean for Research. The MAES Deans Council structure and responsibilities remain the same.

Research Summary: This report summarizes the effort and results of 374 MAES-funded research projects in five U of M colleges: Food, Agricultural and Natural Resource Sciences, Veterinary Medicine, Biological Sciences, Human Development and Education, and Design. Though the research is reported under 17 programs areas, in many cases the scope of research has impact in multiple programs. For example, some forestry research has impact on the understanding of climate change, and/or implications for sustainable energy. In those cases, the research results are reported under the planned program that is most applicable for this reporting year.

UMN Extension Summary of 2011 Activities

Service Levels. In 2011, Extension program teams report delivery of programming to over 501,000 Minnesotans. This includes federal and state funded programs, nutrition education (EFNEP and SNAP-ED) and Farmer Lender Mediation.

More Extension programs are now making use of technology to efficiently and consistently reach

constituents. Extension programs and initiatives now host at least 27 active social media sites. The web site www.extension.umn.edu received about 550,000 visits in 2011 and, using Google's criterion, is placed just under NIFA sites with a search for "Extension Service." Standout efforts described in this report include the use of blogs, interactive media and online courses to engage dairy farmers, youth-serving practitioners, and forest owners. (See Global Foods, Youth Work Institute and Forestry Planned Programs.) Another effort is helping Minnesotans and constituents of other states diagnose plant problems online. (See Horticulture.)

Extension mobilized the equivalent of 510.9 full-time equivalent staff in 2011 to serve Minnesota as volunteers. Extension strengthened the capacity of volunteers to protect and serve Minnesota's land, water, children, families and communities. In 2011, Extension volunteers provided 1,062,672 hours of service. According to the Independent Sector, this service should be valued at $22,209,845.

Extension has elected to define "Indirect Contacts" as the total number of publications sold and the total number of individuals who visited the primary web sites hosted by that program area. Three exceptions are the Childhood Obesity, Youth Work Institute and Forestry programs, which monitor indirect contacts made through specific outreach efforts.

Outreach to Underserved Populations: The Minnesota State Demographer's Office estimates Minnesota's non-white population to be 16.8 percent (mncompass.org). However, minorities were at or greater than 16.8% for three of our planned programs due to targeted outreach.

- Family Relations: 27 percent of participants were non-white
- Family Resource Management: 31 percent of participants were non-white
- Childhood Obesity: 35 percent of participants were non-white

In addition, targeted initiatives such as the Reach for the Skies Program (See Environmental Science) had 100 percent participation by Native American youth, and youth development programs are targeting non-white youth through efforts such as Promise Fellows grants. Two ongoing work groups -- the American Indian Task Force and the Latino Community of Practice -- are engaging Extension staff and community leaders to discuss barriers and opportunities for reaching Minnesota's Native American and Latino communities. Program adaptations in the Family Financial Literacy and 4-H Youth Development programs are a direct result of those discussions. (See Stakeholder Input.)

Multi-state Engagement. All of Minnesota's planned programs are engaged in projects, initiatives, program evaluations or gatherings with other land grant institutions. The U of M Extension's on-line store delivered over 100,000 educational materials to all 50 states, three territories and 20 foreign countries. Standout efforts are described in the "activities" section of planned program reports. As noted in Merit Review Processes, Extension's rigorous promotion system includes review of promotional dossiers by Extension peers in other states.

Other performance measures, including integrated service.

- **Strategic Plan.** Extension's strategic plan, developed in 2011 and presented in 2012, is guiding U of M Extension to respond to external forces while building on its organizational strengths of research, education and engagement. The plan calls on Extension's leaders to strengthen partnerships across units and disciplines, to more strongly describe the value of Extension through communications, and to support its existing and new workforce. (See Stakeholder Input.)
- **Staff Expertise.** Regional offices offer 131 highly specialized Extension educators who deliver the programs described in this report. In county offices, 69 educators work with 208 program coordinators to deliver programs.
- **Merit Review.** Since 2008, an academic promotion process has been in place to monitor and reward

regional educator performance. In 2011, five educators were promoted after rigorous peer review of their scholarship, teaching and program leadership, as described in "Merit Review Processes".

• **Academic Ties.** Partnerships with five colleges fund 75 faculty members who represent 34.6 FTEs in academic departments.

• **County Positions.** Extension continues to manage yearly contracts with counties so that local educators can be hired to deliver programming adapted to local concerns. The degree to which counties invest in these positions demonstrates local endorsement for the value of Extension's work, especially as county governments are making difficult budget decisions. In the most recent budget negotiations with Minnesota's 87 counties, Extension budget allocations increased by .63 percent. Forty-six counties increased their commitment (52.8 percent); 32 decreased their investment (36.7 percent). Nine counties held Extension budgets at the previous year's level. Extension has made it easier for counties to maintain their commitment by not increasing county costs for local positions, even though per employee costs have risen due to benefits and salary increases. This points to the need for NIFA funding to leverage and support local investment.

• **Revenue.** Program fees, grants and gifts accounted for 27 percent of Extension's annual budget in 2011. Revenue from fees, grants and gifts increased by 17.2 percent from 2010 to 2011. This success is due of the U of M Extension's efforts to diversify revenue resources. Smith-Lever funds are essential to our ability to accomplish our mission and to leverage these investments.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	322.5	0.0	389.7	0.0
Actual	315.8	0.0	488.8	0.0

II. Merit Review Process

1. The Merit Review Process that was Employed for this year

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

2. Brief Explanation

For MAES, the merit review process for researchers is managed through the five collegiate partners that receive MAES funding. These are the Colleges of Food, Agricultural and Natural Resource Sciences, Veterinary Medicine, Biological Sciences, Education and Human Development, and Design. The deans and associate deans for research of these colleges are members of the MAES Executive Council. The merit review process is governed by University of Minnestoa standards for all faculty. Within those standards, MAES partner colleges establish their own research peer review process managed by department heads and reviewed for approval by the associate deans for research of each of the colleges.

Extension. In 2011, U of M Extension continued to manage its academic promotion process for educators. Five reional faculty advanced in rank after a rigorous peer review process. a county-based

promotion process was initiated in 2011. Promotion candidates will complete the process in 2012.

There are seven criteria reviewed for promotion: 1) program leadership, 2) extension teaching, 3) program management, 4) scholarship, 5) technical assistance, 6) engagement, and 7) service. These seven criteria are weighted differently for Extension educators with rank (regional educators) and Extension educators without rank (county educators.) Candidates choose which criteria will be the primary emphasis of their promotion dossier. The dossier is reviewed by peers in Minnesota and in other states.

Promotion is neither automatic nor routine, and the decision is made without regard to race, color, creed, religion, national origin, sex, age, marital status, disability, public assistance status, veteran status, or sexual orientation. Promotion is awarded to recognize the level of the academic professional's contributions to the missions of Extension and the University as well as to their professional field. Although tenure is not granted in University of Minnesota Extension, there are clear expectations that academic professionals will move forward in rank and will be recognized for attaining a higher academic rank. Responsibility for the Extension promotion decision rests with the Dean of Extension, based on recommendations from a promotion review committee, Center Associate Dean, and Extension's Senior Associate Dean.

III. Stakeholder Input

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

- Targeted invitation to traditional stakeholder groups
- Targeted invitation to non-traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to non-traditional stakeholder individuals

Brief explanation.

MAES. The research that MAES supports is defined by the five colleges that receive MAES unding. Those decisions are guided by stakeholders' input gathered through each college's research advisory committees. Feedback is also gathered from stakeholder groups on specific research areas. Besides the formal processes in place to identify stakeholders and gather input, there are other strategies in place to elicit input for research decisions, including the requirements for stakeholder input into each proposal for Rapid Agricultural Reponse research project funding, and Small Grains Initiative research project funds. Both those funds are managed by MAES. Other research-related committees bring stakeholders to the table for input and decision-making, such as the Agronomic and Horticultural Variety Review Committee and the Plant Licensing Task Force, which, under the leadership of the MAES director, serve the colleges on intellectual property issues.

Extension.

1. **Listening Sessions.** In 2010, the University of Minnesota asked all colleges to develop a plan for academic priorities and cost effciency for the next 3 - 5 years. Colleges were encouraged to engage stakeholders, faculty, staff and students through Blue Ribbon Committees prior to completing strategic plans. In 2011, Extension completed Blue Ribbon Listening Sessions in response to this request. These sessions invited stakeholders with solid knowledge of Extension's organization and mission to think critically about its future.

2. **American Indian Task Force and Latino Community of Practice.** Two Extension

initiatives encourage engagement of minority populations. In 2006, the dean established the American Indian Task Force to invigorate work in American Indian communities. In 2011, two Task Force activities encouraged greater stakeholder participation among Native American Communities. 1) Presidents and administrators of three tribal colleges were invited to attend strategic planning sessions with key members of the Task Force. 2) Public meetings were held in Leech Lake and Red Lake as a prelude to delivering waste water education and consultation projects to these tribes.

The Latino Community of Practice brings together Extension educators who work with Latino communities in seven different program areas. The Community of Practice is currently gathering responses to questions about the barriers and opportunities to work with Latino communities. Through these educators, Extension will engage Latino stakeholders before designing educational programs for their communities.

2(A). A brief statement of the process that was 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
- Open Listening Sessions

Brief explanation.

MAES. Developing strong and supportive relationships with agricultural stakeholders is an important priority and the focusing of ongoing work for MAES. The critical nature of this effort was especially clear in 2011 with continuing economic pressures on the University budget. MAES maintains good relationships with agricultural groups such as the Minnesota Corn Growers and Minnesota Soybean Producers, the Minnesota Pork Producers and the Minnesota Dairy Association, as well as other agricultural organizations such as the Minnesota Organic Farmers Association. Specific stakeholder groups were identified to help define the needs of Minnesota's biofuels and renewable energy industry, for example. Other research priorities, including best management of the physical resources of the Research and Outreach Centers, required identification of local and regional stakeholders.

Extension.

1. **Listening sessions.** Because Extension has advisory and consultative committees in place, leadership held listening sessions with each of these committees to accomplish the task requested by the University. In January of 2011, Extension leadership hosted Blue Ribbon Listening Sessions with five internal and external advisory committees to inform future strategic planning. These committees were:

• The Citizen's Advisory Committee, representing key constituents who provide input about the breadth of programming offered by Extension.
• The Extension Committee of the Association of Minnesota Counties, representing county leaders who advise the ongoing relationship between Extension and Minnesota's 87 counties.
• The Extension Faculty Consultative Committee, representing faculty who provide research and

consultation to Extension from within collaborating colleges and centers.
• The Extension Civil Service Consultative Committee, representing civil servant employees within Extension.
• The Minnesota Association of Extension Educators, representing educators from the four centers and program areas within Extension.

2. **American Indian Task Force and Latino Community of Practice.** These two groups use (or intend to use) public meetings as well as key informants in informal and formal settings to learn before responding with program delivery. In 2011, groups identified included: 1) the president, superintendent, college director and board members of Fond du Lac Tribal College; and 2) community leaders from two small Native American communities -- the Leech Lake and Red Lake communities. Extension is listening, gathering data, planning with and learning from these planning and listening sessions as a prelude to delivering programming.

2(B). A brief statement of the process that was 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

- Meeting with traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Meeting specifically with non-traditional groups
- Meeting specifically with non-traditional individuals

Brief explanation.

Extension.
1. **Listening Sessions.** More than 40 people participated in the listening sessions with members of Extension's executive committee. Sessions were managed by a professional facilitator, and began with a dean's overview of progress Extension has made since the 2003 Extension restructuring, especially for its programs, people and funding. Participants were asked to comment on seven key questions. 1) Share one thing you are proud Extension has accomplished over the past five years. 2) Share one idea you have for what Extension can do in the next three years. 3) How can Extension continue to secure sustainable funding? 4) How can Extension prioritize and target audiences and partners? 5) How can Extension increase its value to key stakeholders? 6) Given Extension's workforce composition and changing demographic trends, how should it prepare the workforce for the future? 7) What are the main opportunities that could result in real gain or progress for the organzation?

2. **American Indian Task Force and Latino Community of Practice.** The primary methods for collecting input from Latino and Native American communities is listening sessions, tours and examinations of barriers and opportunities with specific tribes and tribal leaders. Currently, the Latino Community of Practice gathers Extension staff who share learnings. This will likely expand its focus over time.

3. A statement of how the input will be considered

- In the Budget Process
- To Identify Emerging Issues
- Redirect Extension Programs
- Redirect Research Programs
- In the Staff Hiring Process

- In the Action Plans
- To Set Priorities

Brief explanation.

Extension.

1. **Listening Sessions and the Strategic Plan.** Following Extension's Blue Ribbon Listening Sessions in Spring 2011, the dean of Extension charged an ad hoc committee with drafting a strategic plan that would serve as a blueprint to guide organizational decision-making for the next three to five years. The content of the report of the Listening Sessions provided important guidance to the committee. The Strategic Planning Ad Hoc Committee completed its work in fall of 2011, and the final strategic plan report was published in December of 2011.

The plan is not intended to identify program priorities, but rather to provide a framework for becoming a stronger, more integrated and sustainable organization. Tenets of the strategic plan were used immediately in 2011 as Extension's dean considered the criteria by which she would make staffing decisions after more than 45 Extension faculty and staff accepted retirement incentives in 2011. The plan called for Extension to optimize funding and partnership opportunities, and to create stronger alliances between and among centers and programs, especially where bringing more than one discipline to a critical Minnesota problem can make a better difference. A re-hiring plan was developed with the strategic plan in mind. These will be described in Extension's 2012 report.

2. The American Indian Task Force and Latino Community of Practice. These groups are using what is learned to improve and increase services to minority populations in Minnesota. The Journal of Extension published an article in October, 2011 that shared learning of the Task Force with Extension nationwide. In that article, they noted outcomes of the stakeholder engagement undertaken by the group. 1) Extension has hired six professionals, four of whom are American Indian, to focus their work in Indian country. 2) Extension filled a financial resource management educators' position with an applicant from the Leech Lake Tribal College. This led to curriculum transformation and greater inreach. 3) A tribal partnership liaison has been hired to help all of Extension navigate relationships in Indian country. 4) Deeper engagement has has doubled Native American participation in one targeted 4-H activitity in the last four years.

Brief Explanation of what you learned from your Stakeholders

Extension. Key findings related to critical success factors are below:

1. Extension can secure sustainable funding by:
-continuing to seek grants, gifts and program fees,
-thinking outside the box and innovating,
-prioritizing and narrowly defining Extension's programmatic focus, and
-relationship-building, reporting and marketing to build financial sustainability.
2. Extension can prioritize and target audiences and partners by:
-maintaining and growing its network of partners,
-identifying what audiences and needs Extension will address,
-prioritizing programs, and
-taking advantage of its unique opportunity to convene and bridge forces that come into conflict in Minnesota (rural vs. urban; traditional vs. new agriculture).
3. Extension can increase its value to stakeholders by:
-enhancing evaluation,
-targeting communications about Extension's value, and
-supporting clear, consistent and responsible reporting.

4. Extension can prepare for the workforce of the future by:
-using technology,
-focusing on audiences and their priorities, and
-tending to present staffing while preparing for future staff.

5. The key opportunities for Extension in the coming years lie in collaboration, marketing, technology and our audiences' needs.

6. Key challenges lie in:
-Extension's reputation with the University and partners,
-a lack of nimbleness in responding to new concerns,
-staff morale and human resources in times of change, and
-resources and funding.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
8695485	0	6277236	0

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	9433535	0	5031416	0
Actual Matching	25916611	0	35974909	0
Actual All Other	27774260	0	43169697	0
Total Actual Expended	63124406	0	84176022	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	0	0	0	0

V. Planned Program Table of Content

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Global Food Security and Hunger

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%		10%	
204	Plant Product Quality and Utility (Preharvest)	10%		5%	
205	Plant Management Systems	10%		10%	
206	Basic Plant Biology	5%		5%	
211	Insects, Mites, and Other Arthropods Affecting Plants	5%		5%	
212	Pathogens and Nematodes Affecting Plants	5%		5%	
213	Weeds Affecting Plants	5%		5%	
216	Integrated Pest Management Systems	5%		5%	
301	Reproductive Performance of Animals	5%		5%	
302	Nutrient Utilization in Animals	8%		5%	
304	Animal Genome	2%		5%	
305	Animal Physiological Processes	5%		5%	
306	Environmental Stress in Animals	2%		5%	
307	Animal Management Systems	15%		10%	
311	Animal Diseases	10%		10%	
315	Animal Welfare/Well-Being and Protection	3%		5%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	19.9	0.0	121.7	0.0
Actual Paid Professional	19.1	0.0	169.3	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
910462	0	2074274	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
2261258	0	15688664	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
761022	0	15963630	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

MAES. Soaring food prices around the world--the highest they've been in the last 20 years--makes it clear that global food demand will require a massive increase in agricultural productivity by mid-century, according to experts. MAES research in 2011 continued to support Minnesota's crop and livestock producers as they face this challenge. Both crop and livestock research is conducted with strong regional collaboration, and local partnerships between the U of M and agricultural producers and industry. Some examples of 2011 progress in research include:

- A long-term research project studying the effects of adding lime to soils for sugarbeet production has shown significant suppression of Aphanomyces root rot and increased sucrose yields where lime was soil-incorporated eight years earlier.
- In 2011, 888 2-to-4 day-old heifer calves from 3 commercial dairy farms were custom raised at the U of M Southern Research and Outreach Center. Information about their growth and health was added to a data base of over 6,000 calves, which was developed to provide farmers with information about the relationships between lactation performance, nutrition management, growth and health from birth to six months.
- A collaborative project to sequence the turkey genome, which originally involved U of M, Virginia Tech and Michigan State University animal geneticists, was expanded by joining forces with researchers at the USDA's ARS and the University of Maryland. As a result the genome is now 90 percent sequenced at several-fold higher coverage than anticipated.
- Ongoing research on PRRS virus in swine has increased the scientific knowledge and methods to control and eliminate the disease. Because of this knowledge veterinarians and producers have changed behaviors and actions to implement new measures of biosecurity that include air filtration.
- In other swine disease research, this year researchers developed a new method for Brachyspira species identification.
- Final reports were completed on long-term research on systems for controlling air pollutant emissions and indoor environments of poultry, swine and dairy facilities. Results were forwarded to the EPA to inform regulatory guidelines for the animal production industry.
- Two new conventional soybean cultivars were released in 2011. Food type soybean cultivars were also released and licensed in 2011. It is estimated that recently released general purpose and special purpose cultivars from the University of Minnesota has contributed about $1,000,000 of extra income for

soybean producers compared with yield and other traits of older cultivars.

• Research using remotely sensed imagery to assess soybean aphid population densities in soybean fields is showing promise to improve the scouting efficiency, economics and adoption of scouting for soybean aphids and improve insect control.

• A study showed that improvement of soil fertility with application of manure to soybean fields is a useful strategy to alleviate damage due to soybean cyst nematode.

• A study on a relatively new Midwest corn pest, western bean cutworm, identified the ecological and agronomic factors that may be responsible for the current distribution of the pest.

• Research into best management practices in corn soybean rotations has shown that applying the correct P rate in corn soybean rotations is critical to maintain profitability. The findings suggest a potential profit increase of $500 per acre over a three year period if low testing soils are fertilized accordingly.

• In 2011 greenhouse and field tests were completed at multiple sites in Minnesota for screening of wheat and barley breeding germplasm for resistance to Fusarium Head Blight and bacterial leaf streak. In addition, germplasm was evaluated for esistance to net blotch of barley and loose smut of oat. For each disease researchers were able to identify lines with effective resistance.

• Research on the cellular and molecular regulation of muscle growth has measured the in vitro effects of anabolic esteroids on protein synthesis. The findings further understanding of the mechanisms of steroid-enhanced muscle growth. Because the impact of anabolic steroid usage in the beef industry is so significant, understanding the biological mechanisms underlying muscle growth will help provide the foundation for developing alternatives to steroid use.

• Animal welfare research validated fear tests used in swine, poultry and goats, with the goal to recommend a reliable protocol for on-farm assessment of fear. Animal welfare evaluation and auditing is becoming more common in the livestock industry and an accurate assessment of fear can be an important indicator of welfare.

Note that KA 201 Plant Genome, Genetics and Genetic Mechanisms, and KA 206 Basic Plant Biology, are used to report mainly MAES research activities and outcomes in this joint report, while other KAs are used to discuss both Extension and Experiment Station results and impact. Within this planned program, both basic and applied research activities focus on a broad range of efforts to support the viability and success of Minnesota's crop and livestock producers, including emerging opportunities in alternative crops and response to new pests and pathogens.

Extension. Crops and livestock program teams contribute to the Global Food Security and Hunger program. Last year, we reported that Extension's Livestock team was preparing Minnesota's farmers to maintain somatic cell counts low enough to maintain market access if the European Union (EU) imposed new standards. In 2011, the USDA Agriculture Marketing Service announced a 400,000 somatic cell count limit for each farm where milk products are sold to the EU. Every processor in Minnesota is affected by this. Work in 2011 prepared all educational materials and offerings so that producers understand how to maintain market access.

The Pork Quality Assurance project continues to certify pork quality advisers and pork producers so that the industry can proactively ensure that U.S. pork products are of the highest quality and safe, and that the animals raised for food are cared for in a way that ensures their well-being.

2. Brief description of the target audience

Extension. Extension's crops and livestock teams work with partners and farmers to address current issues that affect the entire market that assures healthy and safe food for the world. Their primary efforts address market access, technology adoption and business strategies that keep producers nimble and in business.

MAES. MAES research is used by the same audiences. MAES target audiences also include other animal research scientists, other scientists in genetics, public health, medicine and agriculture in Minnesota, the U.S. and internationally, public policy makers at the state and local levels, Extension educators and industry professionals including agricultural consultants.

3. How was eXtension used?

While some individual educators make contributions to eXtension, it is not a formal part of this program area's effort.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	17135	716742	1858	0

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

Patent Applications Submitted

Year: 2011

Actual: 5

Patents listed

Two new hard red spring wheat varieties: Rollag and Prosper; new soybean varieties: MN0095, MN06506CN, MN1610CN

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	89	89

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Conduct educational events and consultations to provide producers with latest applied research for improved crop management and livestock production. (Target expressed as number of

events)

Year	Actual
2011	322

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Participants of Extension livestock and crop program workshops/classes and conferences will achieve significant learning gains regarding research-based knowledge and skills. (Target expressed as the percentage of participants who achieved significant learning gains as a result of attending Extension program workshops/classes and conferences.)
2	Participants of workshops/classes and conference sessions related to livestock and crop production intended to improve participant production practices will significantly improve their production practices as a result of attending the program. (Target expressed as a percentage of participants that significantly changed one or more of their practices as a result of attending workshops/classes and conference sessions intended to improve participant practices.)
3	Interventions will result in changes in conditions related to profitability, crop and livestock health or environmental conditions. (Target expressed as number of changes in condition reported each year.)
4	Through the Quality Count$ program, bulk tank somatic cell counts in Minnesota dairy operations will be maintained at a low level, and move downward over time. (Target is the average 2011 Somatic Cell Count for the state of Minnesota.)
5	Pork producers will instill confidence in its markets by assuring that animals are raised in humane and healthy environments in order to maintain a viable market for pork products. (Target expressed as the number of Pork Quality Assurance advisers trained.)
6	Research will provide animal producers with information to manage the health and productivity of their animals
7	Research will provide information to support niche and alternative agriculture
8	Basic research will provide information to allow improvements in agricultural crop development
9	Research will help demonstrate the value of U.S. crops
10	Research will provide new crop varieties to improve farmers income
11	Research will provide new strategies to strengthen crops? resistance to disease.
12	Research on animal breeding will provide animal producers information to manage their herds for health and productivity.
13	Research will provide information to support animal health.

Outcome #1

1. Outcome Measures

Participants of Extension livestock and crop program workshops/classes and conferences will achieve significant learning gains regarding research-based knowledge and skills. (Target expressed as the percentage of participants who achieved significant learning gains as a result of attending Extension program workshops/classes and conferences.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	92

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
In a highly competitive market, farmers need to understand current issues, adopt new technologies, maintain their access to markets, and make informed business decisions in order to continue to feed the world.

What has been done
Through conferences, consultations and sponsored workshops, as well as on-line educational materials and press releases, Extension delivers current and relevant information to Minnesota's producers.

Results
Of those program recipients who took pre-post evaluations, 92% responded that they had gained valuable learning from Extension offerings.

4. Associated Knowledge Areas

KA Code	Knowledge Area
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
206	Basic Plant Biology
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants

216	Integrated Pest Management Systems
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
304	Animal Genome
305	Animal Physiological Processes
306	Environmental Stress in Animals
307	Animal Management Systems
311	Animal Diseases
315	Animal Welfare/Well-Being and Protection

Outcome #2

1. Outcome Measures

Participants of workshops/classes and conference sessions related to livestock and crop production intended to improve participant production practices will significantly improve their production practices as a result of attending the program. (Target expressed as a percentage of participants that significantly changed one or more of their practices as a result of attending workshops/classes and conference sessions intended to improve participant practices.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	92

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
One example of educational programming to change the practices of Minnesota's crops growers involved events that encourage the adoption of strip tillage to prevent erosion.

What has been done
At educational events, equipment manufacturers described their equipment and Extension educators described the benefits of strip-till systems on crop management.

Results
As a result of presentations describing the environmental benefits of strip-till equipment, farmers purchased equipment. In just one case, use of this equipment will result in a reduction of soil erosion on 2,000 acres of farm land by two tons per acre annually. (Quantitative result above is

an average of all educational events.)

4. Associated Knowledge Areas

KA Code	Knowledge Area
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
206	Basic Plant Biology
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
216	Integrated Pest Management Systems
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
305	Animal Physiological Processes
306	Environmental Stress in Animals
307	Animal Management Systems
311	Animal Diseases
315	Animal Welfare/Well-Being and Protection

Outcome #3

1. Outcome Measures

Interventions will result in changes in conditions related to profitability, crop and livestock health or environmental conditions. (Target expressed as number of changes in condition reported each year.)

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Through the Quality Count$ program, bulk tank somatic cell counts in Minnesota dairy operations will be maintained at a low level, and move downward over time. (Target is the average 2011 Somatic Cell Count for the state of Minnesota.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	290000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
In 2011, the USDA Agricultural Marketing Service announced that a 400,000 somatic cell count limit is in place for each farm that seeks to sell milk products to the European Union. Every processor in Minnesota is affected by this. Many producers have already lowered the somatic cell counts by working with the Quality Count$ statewide effort to use practices that assure cow health and quality milk product. However, others risk losing market access to the entire European Union unless they begin to adopt best practices.

What has been done
In 2011, the Livestock team prepared for this policy change by updating and repackaging Quality Count$ materials, with new and improved fact sheets, worksheets, Excel Spreadsheets, PowerPoint Presentations, videos and more. The team has also taken advantage of technological updates by arming every Extension educator with all of the information on a searchable disk that can give farmers and their consultants quick access to specific topical information.

Results
In 2011, the average somatic cell count has dropped from well over 400,000 in 2005, to 290,000 in 2011. (The 2010 SCC average was 297,188.) As the focus moves from averages to testing individual farms' products, new baselines may be used to explore the effects of the Quality Count$ initiative.

4. Associated Knowledge Areas

KA Code	Knowledge Area
305	Animal Physiological Processes
306	Environmental Stress in Animals
307	Animal Management Systems
311	Animal Diseases
315	Animal Welfare/Well-Being and Protection

Outcome #5

1. Outcome Measures

Pork producers will instill confidence in its markets by assuring that animals are raised in humane and healthy environments in order to maintain a viable market for pork products. (Target expressed as the number of Pork Quality Assurance advisers trained.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The Pork Quality Assurance Plus Program (PQA+) developed by the National Pork Board is designed to improve the quality of pork and the viability of markets that are sensitive to animal well-being. Certification assures consumers that meat was produced on farms where animals are treated humanely. U of M Extension staff is certified as one of 60 trainers nationwide that can train other industry professionals to be PQA+ Advisers. After three years, advisers must complete a re-certification course.

What has been done
To satisfy re-certification training needs, U of M Extension faculty developed an on-line training module for existing PQA+ Advisers. It provided a convenient format that advisers can use to be certified on their own schedule and without distance travel.

Results
In 2011, Extension certified 419 Advisers and 23 pork producers in the PQA+ program. Over the past three years (the period over which certifications are valid), we certified 546 individuals.

4. Associated Knowledge Areas

KA Code	Knowledge Area
306	Environmental Stress in Animals
307	Animal Management Systems
315	Animal Welfare/Well-Being and Protection

Outcome #6

1. Outcome Measures

Research will provide animal producers with information to manage the health and productivity of their animals

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Turkey reproductive cycles are affected by light, so they produce the most eggs when photoperiods last for at least 14 hours. That doesn't work in modern year-round turkey production.

What has been done
Researchers have found that turkeys "see" light for reproduction through their brains rather than through their eyes, and they seem to have a specific gene that allows them to sense the passing of another night/day cycle. Researchers are now exploring how different parts of the light spectrum affect the birds--how they know when it's time to start and stop laying eggs, as well as which parts of their brains trigger which activities. The researchers have previously discovered that broodiness is caused by a specific brain chemical and could be prevented with a vaccine.

Results
The research could have major implications for producers. Assume that each fertile egg costs about 68 cents, and hens average 75 to 120 eggs in a season; multiply that by the typical 5,000 to 20,000 hens in a flock and a producer could lose many thousands of dollars in a single season if a whole flock of hens wasn't able to lay eggs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
305	Animal Physiological Processes
307	Animal Management Systems

Outcome #7

1. Outcome Measures

Research will provide information to support niche and alternative agriculture

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
There is growing interest in consumers for both local and organically grown food. To increase their productivity and profitability, organic food producers need management strategies to help them control weeds without chemical inputs.

What has been done
The University of Minnesota is a leader among land grant universities in the number of certified organic research acres. One recent research project evaluated fall seeded radish as a cover crop, and the effect on weed development in organically managed corn crop under different tillage practices. The research showed that fall seeded radish cover crops improve weed management in organic cropping systems when used in combination with delayed planting, false seedbeds, and mechanical cultivation.

Results
The USDA currently ranks Minnesota fifth nationally in organic acres harvested. Organic production is gorwing in Minnesota with a 95 percent increase in certified organic acres in the last five years. Minnesota organic producers reported nearly $40 million in sales of organic crops, livestock, poultry and related products. The infromation developed in this specific project was incorporated into a cover crop decision tool developed by the Midwest Cover Crops Council, which helps farmers make cover crop selections at the county level across the Midwest.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
213	Weeds Affecting Plants

Outcome #8

1. Outcome Measures

Basic research will provide information to allow improvements in agricultural crop development

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
To keep agriculture sustainable, plants need to do a better job using naturally occurring nutrients like nitrogen and phosphorus. Farmers spend a lot of money on synthetic fertilizers, which also have environmental problems.

What has been done
Researchers have sequenced the genome of a model, alfalfa-like legume. The sequencing revealed that the ancestor of legumes at some point acquired an extra copy of every gene. The findings may help researchers genetically engineer legumes to do a better job of meeting the world's rising demand for nitrogen, the backbone of all protein and a major nutrient in fertilizers.

Results
Legume symbiosis with nitrogen-fixing bacteria is the largest source of natural, nonsynthetic nitrogen fertilizer in agriculture. Understanding and leveraging symbiosis is the only possible way anybody can think of to expand the amount of natural fertilizer that gets into crops. This work will help scientists help legumes produce more nitrogen and phosphorus fertilizer.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
206	Basic Plant Biology

Outcome #9

1. Outcome Measures

Research will help demonstrate the value of U.S. crops

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
In 2010, U.S. soybean farmers exported more than half of all U.S. soybeans. This makes soybeans the top-valued U.S. agricultural export at $21 billion. Current year exports are expected to be even larger.

What has been done
Results of an annual survey of the quality of U.S. commodity and food soybean crops completed by U of M soybean agronomists were completed and shared with purchasers in Taipei, Taiwan and Tokyo.

Results
International purchasers use the soybean quality survey reports to make their buying decisions.

4. Associated Knowledge Areas

KA Code	Knowledge Area
204	Plant Product Quality and Utility (Preharvest)

Outcome #10

1. Outcome Measures

Research will provide new crop varieties to improve farmers income

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Minnesota crop producers need new crop varieties to increase their income.

What has been done
Rollag, a new wheat variety, was released in 2011. Rollag has a unique combination of the highest available resistance to Fusarium head blight and excellent lodging resistance. Wheat varieties with improved disease resistance should reduce the use of fungicides, thus reducing production costs and improving return per acre for wheat producers.

Results
Rollag joins a long line of wheat varieties developed by U of M wheat breeders. Varieties released by MAES were grown on approximately 425,000 acres, representing more than 27 percent of Minnesota?s wheat acreage in 2011. One Minnesota-released variety, RB07, was grown on 22 percent of Minnesota's wheat acreage and was the fourth leading variety in North Dakota and second leading variety in South Dakota. In total, RB07 was grown on more than one million acres in 2011.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms

Outcome #11

1. Outcome Measures

Research will provide new strategies to strengthen crops? resistance to disease.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
deadly new rust disease of wheat?called UG99 because it was first noticed in Uganda in 1999?has scientists around the world and on the St. Paul campus racing to find the right combination of genes and traits that plant breeders can use to create new rust-resistant wheat varieties. Seventy percent of the world?s wheat supply has no resistance to UG99, and the disease is spreading. If it follows the expected migration path, it soon will be into southwest Asia and could eventually migrate to North America.

What has been done
UG99 worries pathologists and breeders so much because it has the unique ability to break through the ?pyramid? of rust-resistant genes that has been used in wheat in North America and much of the wheat in developing countries?rather than a single resistant gene?that have protected wheat crops since the 1950s. Even worse, it?s already mutating again. Most wheat grown here is spring wheat, which is among the least resistant to UG99. One new approach to fighting Ug99 is offered from discovery of the concerted action of two avirulent spore effectors in the activation of Rpg1-mediated stem rust resistance in barley.

Results
This major breakthrough may have wider application in controlling African stem rust races like Uf99 in wheat.

4. Associated Knowledge Areas

KA Code	Knowledge Area
212	Pathogens and Nematodes Affecting Plants

Outcome #12

1. Outcome Measures

Research on animal breeding will provide animal producers information to manage their herds for health and productivity.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Losses from poor fertility, health disorders and short herd life of dairy cows are the most mentioned disappointment s of dairy producers. In recent history the vast majority of dairy cattle are from only the Holstein breed.

What has been done
Hybrid vigor has been used successfully by all other livestock species to improve reproductive capability, health and survival for commercial production. Research has documented potential gains from crossbreeding dairy cattle. Research has shown that Montbeliarde x Holstein crossbred cows were similar to pure Holsteins for production but had major advantages for fertility and survival. A recently completed field study with six cooperating dairies in California documented little loss of production for Scandinavian Red x Holstein crossbreds and Montbeliarde x Holstein crossbreds compared to pure Holsteins. And the crossbreds had large advantages for all traits related to functionality, including fertility and survival.

Results
Lifetime profit was 44 percent higher for Scandinavian Red x Holstein crossbreds compared to pure Holsteins and was 50 percent higher for Montbeliarde x Holstein crossbreds compared to pure Holsteins. Many dairy producers domestically and internationally have initiated crossbreeding programs in their dairy herds based on the scientific recommendations from results of this research project.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
304	Animal Genome

Outcome #13

1. Outcome Measures

Research will provide information to support animal health.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Porcine reproductive and respiratory syndrome virus (PRRSV) is an economically significant swine disease. Economic analyses have documented losses averaging $239 per sow over a one year period due to elevated mortality rates, reduced growth, and excessive medication and vaccination costs

What has been done
Results of research on the mechanisms of airborne transmission of PRRS virus, has developed biosecurity measures that include air filtration which have been demonstrated to help prevent disease transmission. Veterinarians and producers have changed behaviors and actions to implement the new measures.

Results
The demonstration that PRRS disease can be prevented without use of vaccines provides new hope to the swine industry for control of this difficult disease.

4. Associated Knowledge Areas

KA Code	Knowledge Area
311	Animal Diseases

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

The livestock team has shifted programming to address public policy changes that require improved quality control among dairy farmers if they are to maintain European markets. Shifting public priorities have increased scrutiny of consumers related to pork products, which has shifted the attention of livestock producers over the past several years.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

While some post-program evaluation is done, a formal logic model for Global Foods programs is yet to be developed. As the research and education arm of a number of collaborative efforts, the crops and livestock teams at Extension are demonstrating their value in securing markets, adopting technology and increasing productivity.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Sustainable Energy

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
131	Alternative Uses of Land	30%		30%	
601	Economics of Agricultural Production and Farm Management	30%		30%	
605	Natural Resource and Environmental Economics	30%		30%	
610	Domestic Policy Analysis	10%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	1.7	0.0	39.7	0.0
Actual Paid Professional	0.0	0.0	49.5	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
0	0	523669	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	2543618	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	4015863	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The College of Food, Agricultural and Natural Resource Sciences (CFANS) and the Initiative on Renewable Energy and the Environment (IREE) have established the University of Minnesota as a National Center for Biofuels Research, Renewable Energy, and Bio-based products. The overall goals are to: 1) conduct fundamental research on plants and microbes to develop genomics-based solution for renewable energy sources and 2) develop economically feasible and ecologically sustainable solutions for producing biofuels from cellulosic biomass and other biological sources, especially as it pertains to the development of new feedstock genotypes.

MAES. Researchers engaged in a wide range of research activities supporting these University goals in sustainable energy. These included laboratory studies, experiments, field testing, prototype development, comparison studies, and economic analysis. Collaborative efforts included cross-disciplinary studies and the involvement of private industries and other private and public stakeholders.

Research in 2011 focused on:

- Research on new uses for ethanol bioproducts, liquid fuels from biomass, and other energy crops for Minnesota.
- Research on ways to recover liquid fuel, gas, and other products from agricultural wastes.
- Research to develop farm scale prototypes for energy recovery and use.
- Research on altering lignin composition for bioprocessing of lignocellulosic feed stocks to biofuels and other products.
- Studies on the economic and environmental impacts of the emerging biofuels economy.

MAES research on sustainable energy opportunities is providing a foundation for stakeholders and policy makers to support sustainable energy development. Researchers are investigating the biomass potential of a variety of plants, micro-organisms, waste products and bioprocesses. MAES supported research is also examining the constraints, tradeoffs and consequences of sustainable energy decisions. Some results in 2011:

- An assessment concluded that timber harvesting residues, specifically the unusable tree tops and limbs associated with a commercial roundwood harvest, have the capacity to supply substantial feedstock for energy production.
- An analysis found that a significant number of Minnesota farmers, 48 percent to 72 percent, are ready to plant some of their land to perennial crops for use in energy production.
- Research on best management practices for biodiverse agriculture has supported more sustainable biofuel production by identifying landscape designs that enable farmers to produce bioenergy feedstocks .
- Several years of research into the processing and properties of porous bio-based materials such as paper and wood plastic composites has led to a thermoplasticization process to develop a plant-based composite without the need of synthetic plastics.
- Last year we reported on impacts from research on algae strains that performed well on concentrated wastewater streams from municipal wastewater treatments plants and animal production facilities. The algae could be used to produce bio-oil while removing nitrogen and phosphorus from the waste stream. Continued work on the potential of algae in biofuel production has shown that bio-oil from dried algae is superior to cellulosic feedstock derived bio-oil in terms of fuel properties such as heat value and viscosity, and can be mixed directly with gasoline for engine use.
- An evaluation of state and federal biomass policies has led to a rethinking of the elements necessary to establish utilization enterprises around public lands. As a result, states and policy advocates are beginning to model their biomass policies along the production supply chain to identify and target policy gaps for biomass utilization.
- Cell-wall lignin makes it difficult to degrade cellulosic plant materials into simple sugars for the production of biofuels. A study of lignin biosynthesis has identified a lignin-degrading system that will

allow the bioprocessing of lignocelluloses under much more mild and less costly conditions than standard chemical processes. As a result of this research hardwoods and softwoods are more viable as sources of lignocellulosic raw materials.

• A study of swine housing systems found four design variations that reduced energy use. All versions are expected to save energy in the winter due to better insulation and environmental control. Other benefits include better pig health and worker environment.

• Research on the potential of pre-treating biomass with white and brown rot fungi for biofuels production has shown the potential of alternative sources of biomass. In addition to the advantages of using non-edible plant biomass instead of food crops as feedstock for fuels, this work broadens the pool of organisms for use in biotechnological research.

• An analysis of the breakeven carbon prices required to make anaerobic digesters profitable on U.S. dairy farms of different sizes was completed. The digester-carbon price analysis found that while all of the farms with 2,500-plus cows would install digesters at prices of less than $6 per metric ton, prices of $39-$55 would be required to justify digesters on the 100-199-cow farms.

• A study of potential biomass crops showed that a native grass monoculture of switchgrass or a grass-legume mixture provided the highest biomass yields.

Extension. Extension is be the outreach arm of the University in disseminating renewable energy technology, research, education, and energy feedstock information to the public in the years to come. Several program areas contribute to this work, including agricultural education programs, housing technology, 4-H STEM projects, forestry and more. As an example of the outcomes of this work 2011, a county-based collaborative initiative continued to measure the outcomes of an energy-related project that created a use for by-products of biomass burners. In addition, Extension made educational materials available through its web site, sharing research about solutions for sustainability, woody biomass harvesting, consumer decisions about alternative fuel vehicles, trends in energy use and more. For more information, visit http://www.extension.umn.edu/environment/00005.html.

2. Brief description of the target audience

Audiences include agriculture and natural resources industry representatives, biotechnology company representatives, policymakers, state and federal agency representatives, private citizens, and entrepreneurs.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	1092	0	0	0

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

Year: 2011
Actual: 1

Patents listed
Patent issued: #7,931,811--Dialectric Barrier Reactor Having Concentrated Electric Field

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	3	43	46

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Graduate student research assistants

Year	Actual
2011	24

Output #2

Output Measure

- Workshops and consultation will provide unbiased information to the target audiences.

Year	Actual
2011	52

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Research will provide information on new uses for ethanol byproducts.
2	Research will provide information on technologies for use of on-farm energy sources.
3	Research will provide better understanding of the economic impact and environmental trade-offs of renewable energy sources.
4	Recipients of workshops and users of developed decision-making reports will report that they were able to make informed decisions about sustainable energy production and use. (Target reported as percentage of those educated who agree.)
5	Communities will make use of research that informs sustainable energy production and use of by-product. (Outcome expressed is tons of wood ash distributed from bio-mass burners for use in crop production.)

Outcome #1

1. Outcome Measures

Research will provide information on new uses for ethanol byproducts.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
A survey has shown that 88 percent of Minnesota cattle producers are using distillers grain, a byproduct of ethanol production, in feedlot rations. However, there is growing concern about the sulfur content of the feed additive.

What has been done
Research has found significant reduced intake, average daily gain and feed efficiency with high sulfur distillers dried grain in cattle feed.

Results
Researchers have found that in diets that contain 20 percent or less of distillers grain, adding urea to the feed improves performance. They also found high sulfur distillers grain may be improved with increased dietary roughage. Other research has shown that distillers grains does not contribute to Mulberry Heart Disease in pigs, which is valuable information being applied in the feed industry and by veterinarians.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management

Outcome #2

1. Outcome Measures

Research will provide information on technologies for use of on-farm energy sources.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Farmers need new strategies to produce on farm energy and reduce their reliance on petroleum energy sources.

What has been done
Bioengineering research to generate clean electricity using mixed wastewater feedstocks has developed a carbon fiber electrode for enhanced electrochemical performance using swine manure and molasses.

Results
The significance of this project lies in that two agricultural waste streams--swine manure and sugar processing wastewater--can be brought together in one treatment and used to produce bioenergy. This work demonstrates that it is possible to generate clean energy solely from waste streams from agricultural production without needing expensive chemicals.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management

Outcome #3

1. Outcome Measures

Research will provide better understanding of the economic impact and environmental trade-offs of renewable energy sources.

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Recipients of workshops and users of developed decision-making reports will report that they were able to make informed decisions about sustainable energy production and use. (Target reported as percentage of those educated who agree.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	77

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Sustainable energy influences the content of a number of program areas.

What has been done
Information about sustainable energy resources has been integrated into the work of a number of program teams, including crops and forestry.

Results
Of the 52 workshops that included information about sustainable energy, survey data showed that 77% of participants reported knowledge gains, according to post-workshop surveys.

4. Associated Knowledge Areas

KA Code	Knowledge Area
131	Alternative Uses of Land
601	Economics of Agricultural Production and Farm Management

605	Natural Resource and Environmental Economics
610	Domestic Policy Analysis

Outcome #5

1. Outcome Measures

Communities will make use of research that informs sustainable energy production and use of by-product. (Outcome expressed is tons of wood ash distributed from bio-mass burners for use in crop production.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	20000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
In northeast Minnesota, soil is acidic and lime is needed to improve the quality of forage. Wood ash is a resource that can improve the fertility of crop production if properly managed for lime.

What has been done
St. Louis County Extension developed a land application program for the beneficial use of wood ash, a by-product of biofuel production, for liming and agronomic crop production. Distribution of the ash to area farmers began in 2006. Since then, more than 20,000 tons of wood ash have been distributed to more than 50 producers, where it has been spread on 1,000-plus acres of forage land. Farmers in the program were surveyed in 2009 and 2010 to determine whether the ash increased production and was financially beneficial.

Results
The project is saving participating farmers $200 per acre to manage soil quality. Yield per acre has more than doubled to three+ tons of forage per acre. Farmers have not had to purchase fertilizer for two or three years because of the mineral content of the wood ash, saving them $82 per acre per year. In a top dress application, existing clover, trefoil and alfalfa come back, improving the quality of the forage and saving about $150 per acre because farmers do not have to plow and reseed. This project annually saves 4,000 cubic yards of space in area landfills. Laurentian Energy covers the cost of hauling, which is an added financial benefit to the area's agriculture. This project provides a model of how to re-shape energy systems for sustainability and benefit to all.

4. Associated Knowledge Areas

KA Code	Knowledge Area
131	Alternative Uses of Land
601	Economics of Agricultural Production and Farm Management
605	Natural Resource and Environmental Economics

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Evaluation of Extension programs will be done according to the program planning conducted by the team that is incorporating sustainable energy information. In 2011, a project management team in a county Extension office monitored the impact of creating a more sustainable use of biofuels production.

Key Items of Evaluation

Sustainable energy research incorporated into programs in one Extension county provided a model that reshaped how energy systems used by-products. The results saved producers money while strongly managing soil quality and supporting a biofuel production system.

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Climate Change

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	0%		20%	
104	Protect Soil from Harmful Effects of Natural Elements	25%		20%	
123	Management and Sustainability of Forest Resources	25%		20%	
132	Weather and Climate	25%		20%	
605	Natural Resource and Environmental Economics	25%		20%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	0.5	0.0	38.9	0.0
Actual Paid Professional	0.0	0.0	25.8	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
0	0	173399	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	1205291	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	2544812	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

MAES research in 2011 provided insights into the implications of climate change, tracked the effects on Minnesota landscape including its forests, and provided context for evaluating best practices for responding to climate change. Some results of that research:

- Researchers have been able to predict patterns of aquatic insect emergence correlated to stream water temperatures. They are now able to rank trout streams and identify those streams that are most likely to be vulnerable to increasing heat which will decrease productivity of trout. These results have been provided to the agencies with responsibility for conservation and management of aquatic habitats in Minnesota.
- Work was completed on a study quantifying tradeoffs between managing red pine forests for carbon storage versus climate change adaptation. Results indicate that significant tradeoffs exist in red pine forests managed for high levels of carbon storage.
- Research into whether large-scale forest plantations are a viable solution for sequestering atmospheric carbon dioxide has shown that placement and management of those plantings is important. Sensible forest management practices can be adopted for a given location to maximize forest sequestration and minimize biophysical impact that will actually contribute to raising the global temperature.
- Weather monitoring networks using new measurement technologies that more precisely trackevariability in climate, carbon, nitrogen and water cycling processes have been established at the network of University agricultural field research sites across the state. In the past year climate research has made significant contributions to understanding the greenhouse gas budget of agricultural ecosystems typical of the upper Midwest.
- Researchers use a simulation model to predict changes in climate that will affect corn and wheat crops here and in various parts of the world. They found that predicted yields were significantly affected by the input climate dataset, but that precipitation appears to be the main driver of future yields in the Midwest.

Extension. In 2011, three seminars were done to increase climate literacy among a multi-disciplinary group of Extension specialists and educators. The goal of these educational events and conversations is to increase literacy of Extension professionals regarding climate change research and to attract them to conduct curriculum revisions that integrate climate change content. As we reported last year, a survey of Extension staff revealed that they hold diverse views regarding whether climate change is happening, and there is a strong need for reliable information that staff trust. In 2011, the number of practitioners participating in seminars increased. Moreover, we report here on the work of one team -- Forestry -- that integrated climate change information into web content and community initiatives.

2. Brief description of the target audience

Audiences will be targeted by the program areas that are adopting climate change content and integrating it into programs. In 2011, we are reporting on efforts by the Extension Forestry team to integrate climate change information into materials and initiatives. Their audience is primarily private landowners of Minnesota's forested land.

Additional traget audiences for MAES research include scientists in the fields of forest ecology and

tree physiology and forestry professionals in industry; state and county agencies responsible for natural resources management; public policy makers; climate, carbon and water cycle scientists, farmers, landowners and citizens.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	3896	0	0	0

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

Patent Applications Submitted

Year: 2011
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	2	35	37

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- A multi-disciplinary Community of Practice among researchers and Extension educators will effectively gather and interpret science-based knowledge about the implications of climate variability for production systems, natural resource systems and others. (Target expressed as number of Extension educators and specialist engaged in the Community of Practice.)

Year	Actual
2011	32

Output #2

Output Measure

- Presentations will reach practitioners who need to integrate information about climate change into their program content. (Target expressed as the number of presentations each year.)

Year	Actual
2011	200

Output #3

Output Measure

- Recommendations and guidelines for climate change adaptation will be developed, maintained and integrated into Extension's educational programs. (Target expressed as number of Extension educational offerings that have integrated climate adaptation plans into curriculum or program plans.)

Year	Actual
2011	4

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Outcome target measures will be developed as a result of consultation with stakeholders, educators, researchers, literature review and program best practices. (Target expressed as number of action and condition goals to be articulated throughout program development.)
2	Research will provide information on the effects of climate change on plant growth

Outcome #1

1. Outcome Measures

Outcome target measures will be developed as a result of consultation with stakeholders, educators, researchers, literature review and program best practices. (Target expressed as number of action and condition goals to be articulated throughout program development.)

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	4

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Programming that addresses the future of Minnesota's forests has the opportunity to educate landowners about the potential effects of climate change. For example, as they make choices of what to plant and where, they can consider shifts in planting recommendations.

What has been done
The Forestry team in Minnesota has integrated Extension education about climate change into four content offerings, including two citizen action initiatives and two online offerings.

Results
The Lost Forest Sugarloaf project, described in the Forestry program report (Outcome Number 2), used a scenario-planning process to mobilize landowners to act to resurrect the Sugar Loaf forest. This process of imagining what the forest will look like in 2060 integrated information about climate change into the scenario-planning exercise. The Emerald Ash Bore detection campaign (described in 2010 outcomes) integrated climate change content into online information about forest pest detection out of concern that climate change can open new corridors for emerald ash borers in forests. Similarly, two online initiatives -- My Minnesota Woods (See Forestry Outcome Number 1) and the Horticulture team's online plant management tool (See Horticulture, outcome number 3) integrated information about climate change.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships

132 Weather and Climate

Outcome #2

1. Outcome Measures

Research will provide information on the effects of climate change on plant growth

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Current climate models assume that vegetation will soak up much of the extra carbon dioxide we put into the air from fossil fuel burning.

What has been done
A joint research project with the University of Wisconsin and Minnesota studied 13 plant species common in U.S. Midwestern states. The researchers added extra carbon dioxide to the plants' environment to discover how--in the higher carbon dioxide world of global warming--the plants would response. The results suggest that plants' capacity to absorb extra carbon from the atmosphere as carbon dioxide levels rise may be less than expected.

Results
This research has major implications for models of future climate. Today's carbon cycle models are likely underpredicting the pace of increse of future carbon dioxide levels, and therefore the pace of climate change.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
132	Weather and Climate

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Competing Public priorities
- Competing Programmatic Challenges
- Other (Degree of climate change)

Brief Explanation

While not a formal Extension program, the climate change initiative is making progress in gathering a community of practice and integrating content into programming. Success in one program area is likely to create contagion among other program leaders and educators.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The evaluation of climate change content will be evaluated within the evaluation plans of each program area that is integrating information.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Childhood Obesity

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
501	New and Improved Food Processing Technologies	0%		20%	
701	Nutrient Composition of Food	0%		50%	
703	Nutrition Education and Behavior	90%		20%	
704	Nutrition and Hunger in the Population	10%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	2.6	0.0	44.0	0.0
Actual Paid Professional	17.4	0.0	29.0	0.0
Actual Volunteer	4.6	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
322979	0	311661	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1197531	0	1658608	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
9153796	0	2702082	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Children's health is supported within the context of a healthy family. **MAES** continued to support research into the nutritional benefits of foods on human health at all ages, including children. Some research progress of note in 2011:

- Studies on the health benefits of soy protein identified the protein with pronounced bioactivity. Researchers succeeded in modifying the protein to enhance its potential wider use such as in beverages.
- Research determined the best combination of pre-treating wheat bran to increase its soluble fiber while preserving the maximum total dietary fiber content in the bran. Laboratory research results have shown processed wheat bran has the potential to reduce cholesterol.
- Continuing research on fiber and satiety found that many isolated fibers have no effect on satiety, particularly fibers that are easily incorporated into tasty foods. The results suggest that it is food form, rather than fiber content, that is more important in satiety response.
- Calcium intake among early adolescent children is below recommendations, thereby increasing risk of osteoporosis as older adults. A multi-state cooperative research project identified parenting practices among different ethnic groups to encourage increased calcium intake in their children.
- A University of Minnesota and Iowa State University joint study on local food choices, eating patterns and population health increased knowledge of how residents cope with living in areas thought to be food deserts, that is, areas that have limited access to food choices and variety. They found food access may be improved in communities where civic engagement is strong, and by creating informal alternatives, such as community gardens and informal transportation networks. The study deepened understanding of how households access the food system.
- Prevention of weight gain at midlife is an important public health strategy. Research identified three barriers for women in maintaining healthy eating strategies, including lack of time, lack of money and the need to cater to preferences of family members. This information led to developing suggested intervention strategies.
- A study of the economics of school lunch programs in Minnesota has shown that the number of students receiving subsidized lunches has increased dramatically. The increases have occurred not just in inner city schools but in suburban school districts. In one inner-ring St. Paul suburb, for example, the researchers found the proportion of subsidized lunch students rose to 44 percent in 2011 from 29 percent in 2007.

Extension. The Nutrition Education program area conducts EFNEP and SNAP-Ed programming. In 2011, it also leveraged the opportunity to host initiatives that deliver health and nutrition education in a myriad of ways to a variety of audiences. Among these are the following:

- The Great Trays initiative brings more nutritious, kid-friendly foods into Minnesota school cafeterias. Extension provides training and tools to help schools improve their menus and help kids eat healthier meals. Great Trays is funded by the U.S. Centers for Disease Control and Prevention.
- The Farm to School initiative. With more than 750,000 meals served to Minnesota students on an average day, there is enormous opportunity to provide a steady market for Minnesota farmers and ensure the health and wellbeing of future generations. According to a March 2011 survey conducted by the Institute for Agriculture and Trade Policy, the number of Minnesota school districts engaged in Farm to School rose from ten in 2006 to 123 districts in 2010. Schools engaged in Farm to School have reported a 3-16% increase in school meal participation. Additionally, studies have shown that Farm to School programs increase consumption of fruits and vegetables both at school and at home.
- Cooking Matters. This program empowers families at risk of hunger with the skills, knowledge and confidence to cook helthy and affordable meals. With the help of volunteer culinary and nutrition experts, course participants learn how to select nutritious and low-cost ingredients and prepare them in ways that

provide nourishment. This program expanded in 2011, and the results of evaluation studies about the effort are included in the outcomes section.

MAES. MAES research will be conducted to develop better understanding of the nutritional content and health benefits of various foods, as well as developing methods to help the food processing industry provide healthy food.

2. Brief description of the target audience

Programs reach low-income adults and families. As noted in the Report Overview, 35 percent of participants are non-white. In addition, Extension's childhood obesity initaitives are reaching schools, and community initiatives that might bring farms and schools together to provide nutritional school meals that support the local economy.

MAES research in childhood obesity and human health is addressed to human health and nutrition professionals, the food industry, students and faculty in health and nutrition, applied economics, and family development, state and local policy makers and governments, directors of school lunch programs, the food and food service industries, and consumer.

3. How was eXtension used?

The Nutrition Education team includes members of eXtension communities of practice related to food and nutrition. These relationships help the team stay aware of current research and practice opportunities in the field. Extension also provides a good deal of content to the community of practice and to eXtension. eXtension is helpful in addressing the requirements of dissemination that are necessary to leverage funding to expand and research nutrition education programming for Minnesota.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	25534	359251	50039	193382

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	9	27	36

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Classes will be provided in individual and group settings that teach about diet quality, food safety, food resource management and food security. (Target expressed as number of workshops/classes taught.)

Year	Actual
2011	4344

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Program participants will increase human nutrition knowledge. (Target expressed as percentage of participants who report knowledge change.)
2	Program participants will increase their skills in selecting and buying food that satisfies nutritional needs, managing food budgets and preparing affordable foods within the food groups. (Target expressed as percentage of participants who reported learning those skills.)
3	An increased number of program participants will use research-based information from Extension to improve their intake of healthful foods and engagement in physical activity. (Target expressed as a percentage of participants who self-report change.)
4	Graduates of Cooking Matters Minnesota, a hands-on program that uses volunteer chefs to teach cooking skills, will result in better eating behaviors than the national average of Cooking Matters programs across the nation. (Target expressed is the average improvement across six nutrition behaviors.)

Outcome #1

1. Outcome Measures

Program participants will increase human nutrition knowledge. (Target expressed as percentage of participants who report knowledge change.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	80

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Childhood obesity and its negative effects threaten low-income families disproportionately because of the cost structures of food, the availability of healthy foods and poor choices that result from lack of information or a history of poor nutrition in the family.

What has been done
Classes, workshops and hands-on demonstrations are offered to people on limited incomes with nutrition and food budgeting challenges.

Results
Retrospective pre-post end-of-session evaluations demonstrated that 79.8 percent of individuals reported increased knowledge of human nutrition.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population

Outcome #2

1. Outcome Measures

Program participants will increase their skills in selecting and buying food that satisfies nutritional needs, managing food budgets and preparing affordable foods within the food groups. (Target expressed as percentage of participants who reported learning those skills.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	76

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Household budget managers can make a significant difference in household diets by selecting and buying food that satisfies nutritional needs. This is difficult when budgets are tight, limited food is available and there is a familial history of poor diet choices.

What has been done
Nutrition education programs of all kinds blend nutrition education and family resource management education to help household food buyers manage their food-buying budgets.

Results
Among participants who attended nutrition education sessions, 75.75% of adults said they had learned skills in food budget management in a post-series evaluation.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population

Outcome #3

1. Outcome Measures

An increased number of program participants will use research-based information from Extension to improve their intake of healthful foods and engagement in physical activity. (Target expressed as a percentage of participants who self-report change.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	60

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Childhood obesity and its negative effects threaten low-income families disproportionately because of the cost structures of food, the availability of healthy foods and poor choices that result from lack of information. One type of intervention at the Head Start in Mankato, Minnesota.

What has been done
Classes, workshops and hands-on demonstrations bring people with limited incomes information about nutrition and practical ideas to help with food budgeting challenges. At the Head Start in Mankato, children received nine interactive lessons related to health and nutrition once a month for nine months. Topics included healthy snacks, the food pyramid, dairy, fruits and vegetables and physical activity. The group of youth were diverse in race, sex and language.

Results
Retrospective pre-post end-of-session evaluations of programs across the state found that 60.25 percent of individuals reported change in intake behaviors after program delivery. In Mankato, a more complete study examined height, weight and eating patterns of youth who were engaged in the "Lessons in a Box" program. The study found that the mean intake of snacks, treats and fast foods was lower after the program. Parents reported that children increased their preference for healthy foods and physical activity. Parents said they were less concerned about their child's food intake at post-test. Effects were greater in boys and in youth from diverse ethnic backgrounds. To further examine outcomes, another year of data is being collected.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

704 Nutrition and Hunger in the Population

Outcome #4

1. Outcome Measures

Graduates of Cooking Matters Minnesota, a hands-on program that uses volunteer chefs to teach cooking skills, will result in better eating behaviors than the national average of Cooking Matters programs across the nation. (Target expressed is the average improvement across six nutrition behaviors.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	15

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Assumptions are rampant about the dining habits of low-income Americans, including that they are frequent consumers of fast food, that they do not eat together often as a family, and do not prioritize healthy eating. A recent national study examined these assumptions, and learned that low-income families are cooking dinner at home, mostly from scratch, but are not eating as healthfully as they'd like. Share Our Strength (a partner of the U of M Extension) is connecting these families with the food and skills they need to put healthy meals on the table every day. Families view cost as the primary deterrent to eating healthy. Low-income families who plan meals and make grocery lists eat healthy meals five times more often a week than other families.

What has been done
Cooking Matters Minnesota empowers families at risk of hunger to make healthy and affordable meals. Volunteer culinary and nutrition experts show participants ways to prepare low-cost ingredients that provide the best nutrition possible. Participants were racially and ethnically diverse, and 83 percent of adults had at least one child under the age of five.

Results
Because this is a national program, U of M Extension can compare their evaluation results to similar programs across the nation. A national retrospective pre-post survey documented changes in behavior and attitudes experienced by graduates. By the end of the six-week course, graduates of Cooking Matters Minnesota reported that: 78 percent were eating more vegetables (National average is 68 percent.); 80 percent are eating more fruits (National average is 64 percent.); 68 percent are eating more low-or no-fat milk products (National average is 47 percent.); 78 percent are eating more whole grains (National average is 70 percent.); 70 percent are eating more lean

meat, chicken or fish (National average is 53 percent.) and 100 percent had made a Cooking Matters recipe at home. (National average is 84 percent.)

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

The new federal interest in preventing and addressing childhood obesity gives us the opportunity to leverage past program success to grow new initiatives with additional funding. This has been a primary effort in 2011, and so new outcomes have been studied that focus on those initiatives.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Childhood Obesity programs at the U of M Extension are rigorously studied, both to discover knowledge, attitude and nutritional changes made by participants, and to examine what predicts the best program success. Past studies have been leveraged to win new funding that have expanded the number of childhood obesity available for families and schools across Minnesota.

Key Items of Evaluation

Extension has consistently discovered knowledge, attitude and behavior change among children and families as a result of Nutrition Education programs. In 2011, Minnesota was also able to compare its outcomes to those achieved by similar programs across the country, and achieved better results.

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Food Safety

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
501	New and Improved Food Processing Technologies	10%		60%	
503	Quality Maintenance in Storing and Marketing Food Products	45%		40%	
504	Home and Commercial Food Service	45%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	8.8	0.0	20.4	0.0
Actual Paid Professional	6.5	0.0	20.3	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
525938	0	2137	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1593224	0	944152	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
594161	0	1702809	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

MAES food safety research in 2011 focused on designing new techniques for detecting contaminants and pathogens in foods during production, processing and storage, and evaluating the farm to table movement of food to determine where contamination could occur. Highlights of research results:

- Research on Salmonella in dry cereals showed that the pathogen becomes more resistant to heat in drier foods. Also studies of the growth of pathogenic bacteria in queso fresco, a popular type of Mexican cheese, identified antimicrobial ingredients that can inhibit their growth.
- Researchers have determined the mechanisms by which E. Coli survives desiccation conditions. Understanding the mechanisms of desiccation tolerance can be applied to safe food packaging.
- U of M researchers have discovered and received a patent for a naturally occurring lantibiotic--a peptide produced by a harmless bacteria--that could be added to food to kill harmful bacteria like salmonella, E. coli and listeria. The lantibiotic is the first natural preservative found to kill gram-negative bacteria, typically the harmful kind. The lantibiotic could be used to prevent harmful bacteria in meats, processed cheeses, egg and dairy products, canned foods, seafood, salad dressing, fermented beverages and many other foods.
- Salmonella enterica is a leading cause of food borne illnesses. Researchers have been investigating if animal disease has the potential to increase food-borne pathogen risks to human health through an increase in pathogen loads on carcasses from diseased animals. Results of research so far confirm that certain infectious agents such as Lawsonia intracellularis, which is a swine specific pathogen, can predispose pigs to chronic, higher level infections with the food borne pathogen Salmonella enterica.
- A study to investigate the prevalence of MRSA (a methicillin-resistant staphylococcus) in Minnesota dairy herds found the bacteria present in Minnesota bulk tank milk, although at a very low prevalence. However it poses a potential food intoxication risk to humans. The investigators believe an increased rate of detection may be attributed to a novel enrichment and isolation method developed at the U of M for the purpose of this study.
- Recent reports have suggested that feeding distiller's grains solids (DGS) to cattle increased fecal shedding and prevalence of E. coli. A study completed in 2011, however revealed that DGS feeding has little or no influence increasing the E. coli prevalence. This was the first longitudinal study of E. coli prevalence in Minnesota.
- Researchers successfully developed an in vitro model to study Salmonella colonization using immortalized cell lines. The work increases understanding of avian Salmonella colonization and persistence.
- Research showed that using a new management system called Statistical Process Control for early detection of mastitis in dairy cows proved to be more sensitive and give fewer false-positive alerts than the disease detection system currently used on the farm.
- Researchers have shown that infection with L. intracellularis may increase Salmonella enterica levels in the intestines of pigs, potentially increasing food-borne pathogen risks to human health.
- The new European Union 400,000 somatic cell count (SCC) market access requirement is now affecting Minnesota dairy producers. A means for Minnesota dairy producers to benchmark milk quality performance and more effectively track reasons for less than desirable milk quality performance is needed. Researchers studied Minnesota Dairy Herd Improvement (MNDHI) data for the past 2 years to identify factors affecting milk quality (SCC) to help dairy farmers improve milk quality to meet the standards.

Extension. In 2011, Extension's Food Safety educator team strategically offered food safety training to individuals throughout Minnesota's food distribution system -- especially to those who could pass along education and coaching to frontline workers -- and in environments where there is risk of food contamination because of uninformed and informal settings. Face-to-face and online opportunities improve access to food safety education for food service workers. Trainings were supplemented with information disseminated on-line. For more information, visit http://www1.extension.umn.edu/food-safety/.

2. Brief description of the target audience

MAES. Research supports the food development industry and food processing industry, while the direct audiences of the outreach efforts are food service workers through relationships with the National Restaurant Association, food handlers in community locations, fishermen and farmers, and high-risk audiences through the organizations they trust.

Extension. In 2011, Extension outreach and specialized curriculum found audiences that either held strategic positions within the food distribution chain, or were especially at risk as new markets for local foods are created. Specifically, initiatives were developed for:

- Food Managers needing re-certification
- Persons currently working in or interested in working in the food service industry
- Consumers and producers for locally-grown food and farmers markets
- Home food preservers and master gardeners
- High risk audiences such as seniors, caregivers and daycare providers
- Local producers and school districts engaged in farm-to-school initiatives
- Food service workers affected by the growing concern about food allergens
- Volunteers who cook for a crowd

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	2771	107437	0	0

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

Patent Applications Submitted

Year: 2011
Actual: 1

Patents listed
Lantibiotics and Uses Thereof U.S. Patent No 7,960,505

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	4	16	20

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- On-line and face-to-face classes will be delivered for food service workers in English. (Target expressed as number of courses offered.)

Year	Actual
2011	95

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Participants of the Food Safety program classes will achieve significant learning gains regarding research-based food safety knowledge and skills. (Target expressed as the percentage of participants who achieved significant learning gains as a result of attending Food Safety classes.)
2	Participants of the Food Safety program classes will significantly improve their food safety practices as a result of attending the program. (Target expressed as a percentage of participants that significantly changed one or more of their food safety practices as a result of attending classes intended to improve food safety practices.)
3	The MN Dept. of Health reports an 18-20% decrease in critical inspection violations in establishments that employ a Certified Food Manager. Food Safety Education programs will certify food managers. (Target expressed as % of pass rates.)

Outcome #1

1. Outcome Measures

Participants of the Food Safety program classes will achieve significant learning gains regarding research-based food safety knowledge and skills. (Target expressed as the percentage of participants who achieved significant learning gains as a result of attending Food Safety classes.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	87

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The knowledge change outcome above is an average across all food safety offerings. One example of programming reaches food preparers at community events. Thousands of Minnesotans eat at events where food is prepared and served by volunteers who are not certified food managers and work from facilities not inspected by the MDH or MDA. These meals are served at churches, school fundraisers, community halls, and food stands. Minnesotans should be able to eat at these events confident that food safety practices are in place.

What has been done
From January - December, 2011, Cooking Safely for a Crowd was taught four times. Instructional materials for the course were shared more widely through Extension's web site and through Extension's offices.

Results
Overall 95.83% of participants who responded made positive knowledge gains from pre-program to post-program. Recent changes in the Minnesota Food Code as part of the "Church Ladies bill" has the potential to greatly affect and increase our work in this area. After the legislation was passed, attendance at webinars grew from a capacity of 350 to over 700 people and over 100 streamed it online.

4. Associated Knowledge Areas

KA Code	Knowledge Area
503	Quality Maintenance in Storing and Marketing Food Products
504	Home and Commercial Food Service

Outcome #2

1. Outcome Measures

Participants of the Food Safety program classes will significantly improve their food safety practices as a result of attending the program. (Target expressed as a percentage of participants that significantly changed one or more of their food safety practices as a result of attending classes intended to improve food safety practices.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	65

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The outcome above reflects behavior change across all food safety programs. One example of programming targets those who work in local food markets. The resurgence of interest in locally grown food and farmers markets, along with the economic downturn, has increased interest in home food preservation for a variety of audiences, including businesses, entrepreneurs, farmers market vendors, home food preservers and master gardeners. Improperly canned food can cause foodborne illness.

What has been done
The team widely disseminates educational materials that help Minnesotans assure safety while they grow local food. Educators teach food preservation classes to preservers and sellers of pickles, jams and jellies, and fruits and vegetables. Courses were taught face-to-face and mini modules are available online. Educational outreach also happened through newsletters, news releases, radio programming, Twitter and Extension's web site.

Results
Course participants complete an end of course evaluation that indicate knowledge change. Moreover, after the sessions, participants reported wider use of pH meters to test pH levels of various vegetables, more scrutiny of resource information as they develop their preservation practices, stronger documentation of their processes, and avoidance of pitfalls in food production.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies

503	Quality Maintenance in Storing and Marketing Food Products
504	Home and Commercial Food Service

Outcome #3

1. Outcome Measures

The MN Dept. of Health reports an 18-20% decrease in critical inspection violations in establishments that employ a Certified Food Manager. Food Safety Education programs will certify food managers. (Target expressed as % of pass rates.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	91

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The Minnesota Food Code requires that food service establishments employ a Certified Food Manager (CFM). The CFM must attend food safety training and pass an initial certification exam. Every three years, they must take four clock hours of training to renew certification.

What has been done
Extension educators taught Food Manager Certification Renewal at twelve locations around Minnesota from January - June, 2011, and conducted initial certification courses. In addition, individuals registered for online versions of the course.

Results
Life Skills evaluations completed at the end of the course demonstrated that 85 percent of participants made positive knowledge gains. Approximately a month after the class, 19 percent of participants responded to a survey to elicit ongoing behavior change. There was an increase in hand-washing, reporting by ill employees, use of tongs, gloves or deli tissue to decrease direct hand contact, frequency of washing hard surfaces and use of test strips to sanitize water. Finally, it is evident that certification results in more knowledge transferred among others in the food industry. Those that responded indicated that they had trained 803 individuals on a wide variety of food safety issues.

4. Associated Knowledge Areas

KA Code	Knowledge Area

501	New and Improved Food Processing Technologies
503	Quality Maintenance in Storing and Marketing Food Products
504	Home and Commercial Food Service

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Government Regulations
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

New government regulations increased the demand for programming for volunteers who cook for a crowd. More demand for local foods changed the program priorities of the Food Safety team.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The Food Safety team monitors the success of its program through regular post-workshop evaluations, and through surveys that gather types of behavior changes at intervals after the training. Ongoing evaluation efforts also monitor the success of new offerings that help the team respond to new audiences and keep up with new trends in food distribution markets.

Key Items of Evaluation

Evaluation results have informed the program outcomes described, including both formal and informal behavior change in food service settings. Extension assures that Minnesota has food safety training available at all levels of the food service distribution system.

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

4-H Programs in Minnesota

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
805	Community Institutions, Health, and Social Services	20%		0%	
806	Youth Development	80%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	51.2	0.0	0.0	0.0
Actual Paid Professional	54.7	0.0	0.0	0.0
Actual Volunteer	420.7	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
1502219	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
3199995	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
8692302	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Quality Improvement. As reported last year, 4-H programs in Minnesota have adopted the Youth Program Quality Assessment program to assess the quality of its youth programs. A "Gold Standard" in

implementing the YPQA involves the use of youth themselves to observe whether local programs exhibit the components of program quality. Because the implementation of the youth-driven program quality assessment requires a good deal of training, the number of counties taking advantage of this is growing only incrementally. In 2011, five new counties were trained in this method.

Other quality improvement trainings were more accessible to staff across the state. For example, all 4H regional and county coordinators were trained at the Youth and You conference to increase the quality of judging at local and state fairs by coaches trained in YPQA.

Another quality improvement effort was fueled by a 2009 study of children and families who dropped out of 4-H. In that study, dropouts noted that they had not felt welcome, and that they did not know how to adopt administrative procedures that were instrumental to belonging to the club. In response, online training for volunteers now assure that each 4-H volunteer understands important elements of creating a welcoming 4-H environment. This is reinforced with face-to-face trainings conducted in regions.

Diversity. Targeted efforts are strengthening outreach to diverse Minnesota youth in 2011. The number of Americorps Promise Fellows, for example, increased from 7 to 10 in 2011. Promise Fellows were assigned to specific 4-H offices to engage new audiences. Funds from the Office of Juvenile Justice and Delinquency Prevention have been tapped to consult with all Native American tribes in the state. Each tribe has committed to develop a tribal youth council. With OJJDP funds, 4-H leaders are consulting with tribes about the development of those councils, and will stay involved over time. Finally the Children, Youth and Family at Risk program received federal dollars to develop or strengthen five new clubs that target underserved youth.

Management. Management improvements are increasing efficiencies and quality for the statewide infrastructure of 4-H in Minnesota. Two examples follow: 1) Extension developed template flyers, brochures and campaigns that help local clubs develop inexpensive outreach materials and volunteer recognition campaigns that are worthy of the 4-H name. 2) The Human Resources department at the University of Minnesota is now serving as the screen for every new 4-H volunteer. Potential volunteers now simply apply online (after receiving an on-line orientation training) and waits for final screening and approval to come from University of Minnesota' Human Resources department. This saves a good deal of 4-H staff time while assuring a high-quality screening that protects children and programs. Secondary benefits are that volunteers' privacy is protected and local clubs do not have to struggle with the residual effects of rejecting local volunteers.

Volunteerism. In 2011, the 4-H program in Minnesota mobilized 9,449 adults and 1,532 young people to provide 875,128 hours of service.

2. Brief description of the target audience

4-H programs reach youth in every Minnesota county. Urban 4-H programs have developed programs that reach urban youth, and special initiatives across the state are reaching out to youth in immigrant and other minority communities.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	9449	678726	71616	0

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	3	0	3

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- The overall percentage of youth of color participating in 4-H program activities will match or exceed the percentage of youth of color in Minnesota (2008 estimate is 23%, according to Kids COUNT data). (Targets will change as percentages change.)

Year	Actual
2011	13

Output #2

Output Measure

- Parents of youth participants (fifth grade and lower) will report being satisfied with their child's first year of participating in 4-H programming. (Target is a percentage of first year parents.)

Year	Actual
2011	90

Output #3

Output Measure

- Lead adult volunteers in clubs will be trained to work with Minnesota's young people who

participate in 4-H program activities. (Target is the percentage of adult volunteers who receive training.)

Year	Actual
2011	1044

Output #4

Output Measure

- 4-H program groups (clubs) will use a validated assessment tool to guide quality improvement efforts. (Target is the number of clubs who use the tool that was piloted in 2010.)

Year	Actual
2011	10

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Youth involved in Minnesota's 4-H programs at high participation levels will report mastery of a topic of interest as a result of their 4-H involvement. (Target is a percentage of highly involved youth.)
2	Youth involved in Minnesota 4-H programs at high participation levels will report contributions to their community as a result of their 4-H involvement. (Target is the percentage of highly involved youth who report.)

Outcome #1

1. Outcome Measures

Youth involved in Minnesota's 4-H programs at high participation levels will report mastery of a topic of interest as a result of their 4-H involvement. (Target is a percentage of highly involved youth.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	93

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Youth have diverse interests, some of which school hours are not able to develop as schools must commit themselves to academic development. It is up the field of youth development to offer a rich array of opportunities for youth to understand their own skills, abilities and interests, and to develop those to the fullest extent possible.

What has been done
4-H clubs provide multiple opportunities for participants to master a skill or subject. Youth learn from local volunteers and other young people, and use club time to grow their understanding and hone skills.

Results
Using an online survey of all 11-13 year old 4-H participants who have been enrolled for three or more years in clubs, a 20 percent response rate was reached. Young people responded to the item "During my participation in 4-H, I think I have become really good at something that I've been working on -- like a project or a skill you've been working on." Those who agreed or strongly agreed were 92.9 percent of the responses received.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #2

1. Outcome Measures

Youth involved in Minnesota 4-H programs at high participation levels will report contributions to their community as a result of their 4-H involvement. (Target is the percentage of highly involved youth who report.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	85

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
By giving back to their communities, young people learn the value of helping others, develop skills and a sense of empowerment, apply skills and knowledge to real life, learn to get along with others, succeed in ways they cannot in school settings, and experience the world of work. Communities benefit from youth work when youth get invested in the future of the community, building unity among generations and adding needed volunteer hours to local projects.

What has been done
Through its pledge of "hands to larger service," 4-H has historically given back to the community by encouraging young people and adults to volunteer. In 4-H, service is commonly defined as the voluntary action of an individual or a group of individuals without pay. Service to the community and helping solve community problems helps young people learn caring, leadership and citizenship. (Adapted from http://4h.msue.msu.edu/4h/community_service)

Results
Using an online survey of all 11 - 13 year old 4-H participants who have been enrolled for three or more years in clubs, a 20 percent response rate was reached. Young people responded to this item: "Because of my participation in 4-H, I have done more service in my community. Those who agreed or strongly agreed totaled 84.6 percent of the sample. Of these, 60 percent reported spending one or two hours a week providing service, and 12 percent reported spending three or more hours per week in service. To put this in context, the 2010 Minnesota Student Survey of sixth grade students reported that 21 percent of males and 26 percent of female respondents spent one or two hours in a typical wee providing service in community, and nine percent of males and 11 percent of females spent three or more hours providing service.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

National funding sources for 4-H expect 4-H centers to count all youth served by Extension in reporting. Therefore, past percentages of minority youth served included those youth served by other Extension programs such as nutrition education and financial literacy programs. For the 2011 NIFA report, we are separating 4-H club membership from other youth served by Extension centers. As a result, the number of youth reported decreased this year, and the percentage of minority youth served by 4-H decreased significantly for this 2011 report. We feel this is a truer count and better describes the current presence of 4-H in the lives of Minnesota's youth.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

4-H programs in Minnesota have developed and are implementing a logic model that taps research about what creates quality youth programs. The team conducts trainings throughout the 4-H system to achieve quality standards, and is assessing through program evaluation whether those standards are achieved in the youth experience. Ultimately, the team is eager to understand the effect of these environments on the life choices of youth who are part of 4-H.

In addition, 4-H uses evaluation activities to rigorously evaluate piloted initiatives, helping to determine whether they should be "scaled up" across the state. For example, a study of an Aquatic Robotics project in 2011 demonstrated that the project, used in two communities, resulted in youth valuing science learning, challenges them to use their mind, helped them think about water quality, and stimulated more interest in studying science, technology, engineering or mathematics in future schooling.

Key Items of Evaluation

4-H evaluation has demonstrated effectiveness in 4-H as a vehicle to help youth master topics of interest and increase their volunteer commitments. Studies of pilot initiatives in 4-H showed success in nurturing interest in science, technology, engineering or math in future schooling.

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Youth Work Institute

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
805	Community Institutions, Health, and Social Services	50%		0%	
806	Youth Development	50%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	13.8	0.0	0.5	0.0
Actual Paid Professional	8.7	0.0	0.0	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
430362	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1693132	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
1032153	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

As noted in the executive summary, the Youth Work Institute has contributed standout success toward the goal of using the Internet and social media to make a difference in Minnesota. The Youth Work

Matters and Quality Matters courses were moved online in 2011 for the convenience of youth workers, and will launch in 2012. Process evaluation tools will be used to test blended learning and asynchronous designs. Twelve faculty and five educators are now a team of bloggers that contribute to the Youth Work Institute's blog. One year after launch, the blog is active with 52 posts that has elicited discussion about research and current topics among practitioners and schoars. It has had 82,827 visits. (http://blog.lib.umn.edu/extyouth/insight/) Finally, a new Customer Relations Management (CRM) system launched in January of 2011. The CRM allows segmented marketing of educational resources to audiences, new texting options, and email promotions, as well as the ability for staff to gather rich data from across the field.

The Youth Program Quality Assurance (YPQA) research continues to make a big difference in Minnesota. As described in the outcomes section, new networks have adopted the YPQA assessment tool to examine and improve their youth development programs, and Minnesota's 4-H program is deepening the use of YPQA in 4-H clubs throughout MInnesota. The Institute is reaching diverse organizations in this way. A representative sample of youth workers from whom data was collected showed that 12 percent of workers were persons of color.

Minnesota's youth development scholars and educators are collaborating with partners throughout the nation. For example, a collaborative research project is being conducted with the University of Illinois, and a partnership with the University of Arizona is deepening understanding of how to support military families. The Center hosted the Next Generation Youth Work Coalition, a national group interested in promoting and strengthening the workforce.

2. Brief description of the target audience

The Youth Work Institute serves individuals, organizations and systems working with and on behalf of youth. This includes those who interact with youth through community-based programming as well as decision-makers who can improve the quality and quantity of opportunities for youth to be involved in out-of-school-time activities. Examples include: youth program directors and workers, volunteers, teachers, coaches, parents and elected officials, as well as community collaborative initiatives, state agencies, funders and policy makers.

Earlier studies by the Youth Work Institute examined barriers between youth workers and staff development opportunities. By working through and with organizations and networks, YWI is eliminating barriers to quality assessment and enhancement. By earning the trust of statewide systems, organizational entities and local and regional networks, the time and cost of training is sanctioned or provided by employers at a reasonable cost. Moreover, language and expectations that are described in the training are more frequently reinforced in Minnesota's youth work service setting.

3. How was eXtension used?

While several individuals within the Youth Development program area contribute to eXtension, the site is not a formal part of the program plan.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	2911	10255	0	0

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	3	0	3

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Educational offerings will be delivered for youth-serving organizations. (Target expressed as the number of events, classes, workshops delivered.)

Year	Actual
2011	70

Output #2

Output Measure

- Capacity-building consultation and technical assistance will be delivered. (Target expressed as number of participating organizations.)

Year	Actual
2011	73

Output #3

Output Measure

- Educational offerings will be delivered through distance education methods. (Target expressed as the number of online offerings delivered.)

Year	Actual
2011	9

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Participants in educational offerings will report that they increased their knowledge of current research and effective program practices. (Target expressed as a percentage of participants.)
2	Youth Development organizations participating in consultation and technical assistance will increase program quality. (Target expressed as percentage of organizations that improved one or more dimensions of program quality.)
3	Participants in educational offerings will report that they will be able to apply what they learned to their work. (Target expressed as percentage of those in agreement.)
4	The Youth Program Quality Assessments will be adopted by more Minnesota youth serving organizations. (Quantitative outcome expressed is the number of new organizations now adopting Quality Matters as a training and research-driven assessment within their network.)

Outcome #1

1. Outcome Measures

Participants in educational offerings will report that they increased their knowledge of current research and effective program practices. (Target expressed as a percentage of participants.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	89

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Research is the backbone of effective youth development programs. It is critical that practitioners understand the latest youth development research and related best practices. Earlier research noted disparities in youth worker training and staff development options.

What has been done
The Youth Work Institute's offerings are grounded in the latest research. They bridge research with practical ways to apply it to daily practice.

Results
Evaluation summaries for all Youth Work Institute classes in 2011 demonstrated that 89% of respondents (N=516) agreed that their understanding of the research related to the session topic was enhanced.

4. Associated Knowledge Areas

KA Code	Knowledge Area
805	Community Institutions, Health, and Social Services
806	Youth Development

Outcome #2

1. Outcome Measures

Youth Development organizations participating in consultation and technical assistance will increase program quality. (Target expressed as percentage of organizations that improved one or more dimensions of program quality.)

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Participants in educational offerings will report that they will be able to apply what they learned to their work. (Target expressed as percentage of those in agreement.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Research shows that programs that demonstrate high quality features show positive effects on youth outcomes, whereas programs without quality features show no effect. Quality at the point of service--the specific practices, processes and interactions among adult staff and youth in program settings--are best measured through observation.

What has been done
Program sites from across 87 organizations (a high percentage of which had multiple sites involved in the process) participated in a quality improvement effort that included assessing program quality with the Youth Program Quality Assessment (YPQA). This is a validated observational instrument. There were 1,140 participants in Quality Matters related classes. The Youth Work Institute provided 204 hours of consultation to improve program quality at program sites.

Results
The results inform and empower program staff and their managers to develop action plans that improve point of service quality.

4. Associated Knowledge Areas

KA Code	Knowledge Area
805	Community Institutions, Health, and Social Services
806	Youth Development

Outcome #4

1. Outcome Measures

The Youth Program Quality Assessments will be adopted by more Minnesota youth serving organizations. (Quantitative outcome expressed is the number of new organizations now adopting Quality Matters as a training and research-driven assessment within their network.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	40

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Staff development and quality assessment have not been used consistently across youth organizations in Minnesota. As described in last year's outcomes, the YWI has begun to "hard wire" training and assessment into youth organizations through partnerships with, for example, the United Way, the Department of Education, philanthropic foundations, and 4-H programs.

What has been done
In 2011, the YWI quality improvement work began shifting how it provides teaching and consultation support from individual programs to systems and networks. For example, the Saint Paul after school program network, Sprockets, launched a multi-year contract with the YWI to improve the quality of youth programs in the city. Other systems, such as a professional association of youth intervention programs, also prepared to launch a Quality Matters cohort.

Results
In its first year, the Sprockets group included 40 organizations that are beginning to assess and improve using the Quality Matters services. Other new efforts are beginning in 2012 so that six organizations will test how the project works when service settings are using a case management model. This evolution in strategy will give easier access to individual programs and will create broader regional impact as networks align and unite around improving quality.

4. Associated Knowledge Areas

KA Code	Knowledge Area
805	Community Institutions, Health, and Social Services
806	Youth Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

At this stage in the development of the Youth Program Quality Assessment, the focus is forming new partnerships with youth-serving organizations that can implement the quality improvement process. As the team manages this priority, they are evaluating knowledge and skill gains. Later in the process, a longitudinal evaluation will take place to measure organizational effectiveness among those programs that adopt the tool. This evaluation was not conducted this year.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The Youth Work Institute has developed close partnerships with Minnesota's youth-serving organizations, networks and grantmaking institutions. In earlier years, these partnerships uncovered a need for Minnesota's youth workers to have consistent training available to increase their professionalism and the quality of their offering. In response, the Youth Work Institute has worked hard to address quality, ultimately introducing Quality Matters and the Youth Program Quality Assessment to the state of Minnesota. The current programmatic emphasis is on forming partnerships with system and networks that will integrate these resources. As a next step, the team hopes to do a longitudinal study to examine the effect of those tools on program quality.

Key Items of Evaluation

The Youth Work Institute is changing the way youth programs train workers and assess quality. Major networks are now integrating university research about quality assessment into their organizational make-up. These tools and processes are being evaluated constantly. Ultimately, the Institute will examine the resulting quality of youth programs in Minnesota as a result of Extension programming.

V(A). Planned Program (Summary)

Program # 8

1. Name of the Planned Program

Leadership and Civic Engagement

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
608	Community Resource Planning and Development	60%		60%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	40%		40%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	11.3	0.0	0.0	0.0
Actual Paid Professional	13.3	0.0	1.1	0.0
Actual Volunteer	0.5	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
661233	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1550014	0	111635	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
715981	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

A small amount of MAES supported research is reported under this planned program, but one project has had significant impact in communities across the country. A U social scientist partially supported by MAES funding has established the Center for Restorative Justice and Peacemaking to serve as a resource nationally and internationally for restorative dialogue practice, research and training. The center was the first of its kind in the country. Studies have shown positive effects of the programs, including reducing criminal behavior. The project is having an increasing impact upon practitioners and policy makers in Minnesota, other states, and a number of other countries.

Extension Leadership and Civic Engagement educators and specialists conduct ongoing evaluations that demonstrate that leadership education has the best outcomes in long-term cohorts (six months or more), where common community issues and motivations connect participants. In 2011, twelve such cohorts were conducted.

A major outreach effort in 2011 published and disseminated research conducted by a researcher within the Center for Community Vitality that examined the phenomenon of "brain gain" in rural communities. Examining demographic data, this research confirms that rural areas are attracting adults aged 30 - 45 and their children, even though other demographics are leaving. By disseminating this information through scholarly articles, popular media and workshops, the Center is observing that communities and their leaders are now considering how they welcome newcomers into community life to act as leaders and contributors. One regional economic development commission sponsored a research study to ask newcomers about their reasons for coming and staying in rural communities. (For more information, visit http://www.extension.umn.edu/community/brain-gain/.)

The Leadership and Civic Engagement team also recruited and conducted the first Minnesota-led cohort of the North Central Extension Leadership Development (NELD) program. For the first time, the NELD program integrated an international experience into the program. The cohort traveled to Cuernavaca, Mexico to better understand conditions from which Latino immigrants come. This will inform future Extension efforts to engage the Latino immigrant population that is now a strong and growing population in the north central region of the United States.

2. Brief description of the target audience

Leadership education cohorts in 2011 reached:

- emerging and existing agricultural and rural leaders in Northwest Minnesota and statewide
- citizens engaged in water conservation issues
- emerging and existing leaders in three counties: Nicollet, Brown and McLeod Counties
- immigrant emerging leaders in Worthington, Minnesota
- public health professionals
- Extension volunteers and stakeholders
- county government staff in Otter Tail county
- low-income emerging leaders engaged in Community Action Councils in West Central, Minnesota.
- Extension staff in the North Central region (NELD)

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	2942	17890	41	0

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	3	2	5

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Community cohort groups will meet to develop leadership skills and create civic connections. (Target expressed as number of cohort groups convened.)

Year	Actual
2011	12

Output #2

Output Measure

- Community assessments and research projects will help communities understand their strengths related to civic leadership and social capital. (Target expressed as number of local assessments conducted.)

Year	Actual
2011	0

Output #3

Output Measure

- Workshops and other structured gatherings will provide communities with increased skills, knowledge and behaviors related to leadership and civic engagement. (Target expressed as number of events.)

Year	Actual
2011	99

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Participants in Leadership and Civic Engagement programs will increase their knowledge of relevant leadership and civic engagement topics. (Target expressed as the percentage of participants reporting increased knowledge.)
2	Structured community gatherings are more productive. (Target expressed as percentage of participants who report in follow-up surveys that participation in Leadership and Civic Engagement programming led to improvements in the process and product of structured community gatherings.)
3	Community leadership cohort members will increase the intensity of their leadership. (Target expressed as the percentage of evaluated participants who increase their involvement in at least one of their organizational roles.)
4	Community decision-makers will improve the quality and quantity of engagement with those who have a stake in public decisions. (Target expressed as percentage of participants who report in a follow-up survey that collective decision-making has effectively engaged relevant stakeholders.)

Outcome #1

1. Outcome Measures

Participants in Leadership and Civic Engagement programs will increase their knowledge of relevant leadership and civic engagement topics. (Target expressed as the percentage of participants reporting increased knowledge.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	98

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Successful leaders in rural Minnesota must think about the problems they face in new ways. Today, leaders need skills and problem-solving frameworks to deal with complex problems without easy answers. They must facilitate effective group decision-making processes, and engage citizens in issues that affect them. They also need to know more about themselves, such as their preferred leadership style and how they deal with conflict.

What has been done
Twelve leadership education cohorts as well as single leadership education workshops sought to increase the knowledge and skills of existing and emerging leaders.

Results
During 2011, the leadership and civic engagement team conducted end of workshop evaluations for 63 workshops with 1,258 participants. 97.5 percent of these participants increased their knowledge across all relevant learning objectives in each workshop, as measured by retrospective pre and post survey.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

Outcome #2

1. Outcome Measures

Structured community gatherings are more productive. (Target expressed as percentage of participants who report in follow-up surveys that participation in Leadership and Civic Engagement programming led to improvements in the process and product of structured community gatherings.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	91

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
In order for community gatherings to successfully generate information and move communities to action, the conversations need to create fair and inspired conversation. Negative experiences in community forums can decrease future participation and increase trust between decision-makers and stakeholders.

What has been done
Civic engagement programming at Extension helps local organizations and governments plan for effective community gatherings and processes.

Results
End-of-workshop surveys asked participants about the process and product of the meetings that they attended. 91.5 percent of participants said that they believed there were improvements in the process of the structured community gathering that was facilitated through Extension's team. 91.2 percent of participants said that they believed that there were improvements in the product of the structured community gathering.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

Outcome #3

1. Outcome Measures

Community leadership cohort members will increase the intensity of their leadership. (Target expressed as the percentage of evaluated participants who increase their involvement in at least one of their organizational roles.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	70

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
According to demographic research conducted within Extension, organizations in the most rural counties require an average of one in 34 residents to serve in leadership positions, compared with one leader required for every 143 residents of major metropolitan areas. So, the demand for leadership is up to five times more in rural counties than in urban areas, while the supply of leaders is diminishing.

What has been done
Extension's leadership cohorts provide information, confidence, skills and new networks to existing and emerging community leaders. The goal is to encourage rural residents to accept new leadership positions in Minnesota, and to provide quality leadership within those positions.

Results
During 2011, leadership role change data were collected with 207 participants in 11 leadership cohort programs. Of the participants, 70 percent increased their level of involvement in at least one of their organizational roles (either a new role, an increase from inactive to active, or movement from simply being active to being a leader). Another way to understand the data is by examining changes in the percent of cohort group members who held at least one leadership role. At baseline, 57.9 percent of cohort program participants held a leadership role in at least one organization. At the end, 66 percent held a leadership role.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

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

Outcome #4

1. Outcome Measures

Community decision-makers will improve the quality and quantity of engagement with those who have a stake in public decisions. (Target expressed as percentage of participants who report in a follow-up survey that collective decision-making has effectively engaged relevant stakeholders.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	90

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Quality public forums engage stakeholders in local community decisions, and help to sustain trust between community members and the decision-makers and institutions that work on their behalf.

What has been done
Extension educators consult with local organizations to determine goals of local meetings and manage processes that assure that the goals of those meetings are achieved. Special care is taken to match the process to the goals of the meeting, so that participants continue to trust that their input is respected and used.

Results
Interviews were conducted with ten organizational contacts who sponsored Extension's civic engagement projects. Of these ten sponsors, 90 percent indicated that the community meeting was effective in engaging relevant stakeholders in the discussions and decisions that were the subject of engagement.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Competing Programmatic Challenges

Brief Explanation

Deeper and longer-term leadership education programs and civic engagement processes have demonstrated more program effectiveness than singular workshops, so the leadership and civic engagement teams have decreased the number of participants who receive programming so that they can spend time in programs with long-term engagement. This results in a decrease in program participants.

There was not a demand for social capital assessments this year. More media has been given to the topic of social capital, though, which may create demand for local assessments in the future.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The Leadership and Civic Engagement team uses scholarship about community leadership from the University of Missouri, as well as scholarship about community capitals from Iowa State University (Flora and Flora) to describe the effects of community development programming. Leadership activities are examined before and after cohort leadership programs are conducted. In-depth studies of established leadership programs examine the effects of the program in helping leaders strengthen the capitals in their community -- e.g., human, social, financial, built, natural, political. Further examinations are going to establish which of these types of outcomes increased the perceived public value of leadership programs.

Key Items of Evaluation

In 2011, Leadership and Civic Engagement programs demonstrated an impact in causing more individuals to accept community leadership positions. Past studies have demonstrated that those leaders go on to improve the quality of life in communities by enhancing the community capitals necessary to the vitality of communities of place. Further examination of community vitality programming has and will consider the public value of growing these community capitals.

V(A). Planned Program (Summary)

Program # 9

1. Name of the Planned Program

Community Economics

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
602	Business Management, Finance, and Taxation	50%		50%	
608	Community Resource Planning and Development	50%		50%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	15.6	0.0	6.7	0.0
Actual Paid Professional	12.6	0.0	4.0	0.0
Actual Volunteer	0.6	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
491392	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1846290	0	314033	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
480545	0	419717	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

MAES. Research in 2011 focused on assessing the impact of public policies on community economic

health. Research investigated the impact of change on rural, suburban and urban communities and businesses as well as community and business challenges and opportunities related to demographic changes, housing, and tourism. Some specific research progress:

• The reports from a 10 year study of Minnesota state revenues provided the governor and legislative leaders with a better understanding of the underlying forces affecting state expenditures and revenue. This information has heightened policymaker awareness of the fact that the state's financial problems are long-term, structural problems and that permanent solutions will be necessary.
• The results of a tax-free zone study was presented to the Minneapolis Federal Reserve Bank.
• A study on potential changes in rural labor markets was expanded to look at significant workforce flows by wage level, comparing significant workflows for low, middle and high wage workers in Minnesota.
• A study on the volatility of state revenues and recommendations about the amount of reserves necessary to provide protection for essential services during the next economic down-turn have influenced both legislative and gubernatorial recommendations on how any short term budget surpluses should be used.
• The Minnesota Land Economics, a searchable database maintained by applied economics researchers, provides user with land price, conservation easement and property tax information for any aggregation of Minnesota cities, towns, or counties. Specific Minnesota Land Economics data summaries were requested over 135,000 times in 2011.

Extension. A major initiative of the Community Economics Extension team in 2011 was the Minnesota Intelligent Rural Communities (MIRC) project. Funded by the America Recovery and Reinvestment Act, the MIRC project in Minnesota is using education to promote adoption of high-speed Internet in Greater Minnesota. MIRC is a partnership of sixteen organizations across Minnesota led by the Blandin Foundation. Extension's unique role in the project is to provide rural business communities with education that features the benefits of broadband and supports them in the development of local helping systems that create a culture of use. In 2011, this program reached over 1,500 individuals and almost a thousand businesses. There are resulting examples of immediate adoption of the Internet in targeted communities -- new web sites, use of social media, a stronger presence on GPS-location sites and more.

While MIRC supplanted some other program activities, the team sustained its efforts to deliver applied research that informs communities' decisions about their economic future. Thirty-five communities tapped research-based reports that helped them understand their retail strengths and opportunities, support business retention and expansion, and understand the economic impact of public finance decisions and industries.

2. Brief description of the target audience

Primary audiences for community economics programs include chambers of commerce, the tourism industry, economic development officers, local governments, and nonprofits that can, in turn, support local economic development efforts. In 2011, the MIRC effort targeted 18 greater Minnesota communities. Seven of these are regional centers; eleven are rural communities under 10,000 with poverty rates of over ten percent. The latter were communities formerly engaged in the Horizons poverty alleviation program.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	11654	44858	42	0

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	8	14	22

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Educational workshops will be provided (face-to-face and on-line). (Target expressed as numbers of workshops.)

Year	Actual
2011	356

Output #2

Output Measure

- Community-based applied research will be conducted regarding retail trade, business retention and expansion and tourism development. (Target expressed as numbers of communities engaged.)

Year	Actual
2011	35

Output #3

Output Measure

- Community-based trainers will be trained to continue providing education in communities

through business retention and expansion programming, customer service training and internet literacy programs. (Target expressed as the numbers of trainers trained.)

Year	Actual
2011	110

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Participants in Community Economics programs will increase their knowledge of relevant community economic development topics. (Target expressed as the percentage of participants reporting increased knowledge.)
2	Participants in applied research (e.g., Business Retention and Expansion, Retail Analysis Development, Economic Impact Analysis, Tourism Development) will apply the new research-based knowledge to business and/or community improvements that affect the local economy. (Target expressed as a percentage of participants in applied research programs initiated in prior three years who report that they applied new research-based knowledge.)
3	Communities engaged in applied research programs (e.g., Business Retention and Expansion, Retail Analysis and Development, Economic Impact Analysis, Tourism Development) will strengthen their social and/or political capital, enabling them to better implement economic development plans. (Target expressed as a percentage of community stakeholders in studied communities who observe that groups have stronger ties and/or more political strength.)
4	Communities engaged in long-term business retention and expansion programs (BR&E) will report positive effects on the capitals that are essential to the vitality of communities, including human, social, civic, financial, built, health, cultural and natural. (Outcome expressed as the average number of effects identified by each community.)

Outcome #1

1. Outcome Measures

Participants in Community Economics programs will increase their knowledge of relevant community economic development topics. (Target expressed as the percentage of participants reporting increased knowledge.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	99

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Businesses cannot succeed alone. When businesses are located in communities that are eager to help them succeed, they can benefit from local policies, quality of life, valuable information and attraction of customers to the area.

What has been done
Community economics programs at the University of Minnesota Extension provide information to community groups to help them know and grow their retail sector, help businesses stay and grow, use the Internet effectively and consider the implications of public policy decisions.

Results
Knowledge outcome data were collected from 140 Community Economics workshops during the 2011 calendar year. The vast majority of these were workshops offered as part of the Minnesota Intelligent Rural Communities Initiative. A total of 1,199 participants completed evaluations of these workshops. 99 percent of participants reported learning gains, as measured by comparing average retrospective pre-test scores to average post-test scores across all learning objectives.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
608	Community Resource Planning and Development

Outcome #2

1. Outcome Measures

Participants in applied research (e.g., Business Retention and Expansion, Retail Analysis Development, Economic Impact Analysis, Tourism Development) will apply the new research-based knowledge to business and/or community improvements that affect the local economy. (Target expressed as a percentage of participants in applied research programs initiated in prior three years who report that they applied new research-based knowledge.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	80

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
As communities and businesses think strategically about the future economic development of their community, assumptions about the situation can limit the analysis of the situation at hand, and can limit the effectiveness of local action.

What has been done
Extension conducts applied research that provides community groups with information that can test assumptions, deepen understanding, support critical thinking, and break open new opportunities for local action. Business Retention and Expansion programs investigate the current conditions and opinions of local business. Retail Analysis Development programs provide local sales and marketing data in easy-to-understand formats that help towns see their retail strengths and weakness, as well as how they compare to other communities. Economic impact analysis programs use ImPlan analysis to consider the economic impact of specific industries, initiatives or external events. Finally, tourism development programs provide an analysis of the tourism potential in communities.

Results
A telephone and online survey with participants in applied research programs during calendar year 2011 collected information from 20 participants who had used data from four applied research projects. On a scale of 1 (not at all) to six (to a great extent), 90 percent said that Extension programs strengthened their communities' collaborative efforts to solve community economic issues (mean = 4.26); 80 percent said that the program led to more informed decisions about economic development among community leaders (mean = 4.21); 90 percent said that they personally had applied knowledge from the Extension program to business and/or community

improvements that affect the local economy (mean = 4.37).

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
608	Community Resource Planning and Development

Outcome #3

1. Outcome Measures

Communities engaged in applied research programs (e.g., Business Retention and Expansion, Retail Analysis and Development, Economic Impact Analysis, Tourism Development) will strengthen their social and/or political capital, enabling them to better implement economic development plans. (Target expressed as a percentage of community stakeholders in studied communities who observe that groups have stronger ties and/or more political strength.)

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Communities engaged in long-term business retention and expansion programs (BR&E) will report positive effects on the capitals that are essential to the vitality of communities, including human, social, civic, financial, built, health, cultural and natural. (Outcome expressed as the average number of effects identified by each community.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	40

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Because communities care about businesses in the local economy, they need to know them well, always asking the right questions and providing the right leadership to address business concerns. The last thing a community needs is an unexpected drop in jobs, or a business loss that could have been prevented. Businesses contribute to a community's quality of life as well as

its economic base. Still, leaders and community residents may not always appreciate the goods, services, jobs and tax base that businesses provide, and may not connect community decisions to consequences for business owners and managers.

What has been done
Extension's Business Retention and Expansion (BR&E) programs bring community owners and managers and citizens together with business leaders to understand how they can work together to help businesses succeed. Volunteers are trained to conduct surveys, spot "red flags" and identify projects that support business success.

Results
A Ripple Effect Mapping study asked BR&E volunteers in three communities to identify "ripple effects" that could be attributed, at least in part, to the BR&E program. Coders examined these effects, connecting them to the eight community capitals. The average number of effects identified for each community was 40. Most (65.2 percent) benefited human capital, followed by social capital (36.9 percent) and civic (34.8 percent). Communities attributed significant economic development successes to the program, including new or expanded retail businesses, promotional campaigns, traffic studies, beautification campaigns, workforce training programs and more. Most often, communities described stronger trust between businesses and local government and citizens.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
608	Community Resource Planning and Development

V(H). Planned Program (External Factors)

External factors which affected outcomes
- Competing Programmatic Challenges
- Other (Changes in evaluation strategies)

Brief Explanation

The new Ripple Effect Mapping evaluation process (See Evaluation Results) replaced past studies that would have been described in outcome number three. Outcome number four describes the findings of the new study.

The grant activities of the Minnesota Intelligent Rural Communities supplanted staff time that would otherwise have been spent developing and delivering applied research reports, and so the number of applied research studies was half of the 2010 number. Future reports will describe evaluated impacts of the MIRC initiative.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

In 2011, the Center for Community Vitality piloted a new impact evaluation method known as Ripple Effect Mapping (REM), to identify the intended and unintended effects of its more intensive community-based programming. Findings of REM studies are categorized using the community capitals framework developed by Flora and Flora. The

community capitals describe the breadth of assets that help communities thrive. The use of REM to examine three Business Retention and Expansion initiatives in 2011 discovered the strongest immediate program effects are in changing individuals skills, knowledge and behavior (human capital), increasing the ability of communities to access and mobilize public resources (politcal capital), expanding connections among people, groups and organizations (social capital) and increasing private and public wealth (financial capital).

Community economics programs have begun to evaluate how the demonstrated effects in generating community capitals relate to the public value of that program. This evaluation began with an examination of an economic impact analysis program. The initial discovery when examining value of programming from the perspective of participants is that public value rises and falls depending on 1) who is reached; 2) the quality of the product delivered; 3) the direct outcomes achieved; and 4) the ultimate impact of the program as seen in communities.

Key Items of Evaluation

Use of Ripple Effect Mapping studies of community initiatives measured whether and how community economics programs increase community capitals available for leveraging in a community. Programs have demonstrated effectiveness in increasing human, social and political capital available to a community and, to a lesser degree, financial and built capital.

Further, evaluations of the economic impact analysis program are starting to examine the link between growing community capitals and perceived public value of Extension programs. The initial discovery when examining value of economic impact analysis programming from the perspective of participants is that public value rises and falls depending on 1) who is reached; 2) the quality of the product delivered; 3) the direct outcomes achieved; and 4) the ultimate impact of the program as seen in communities.

V(A). Planned Program (Summary)

Program # 10

1. Name of the Planned Program

Family Relations

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
802	Human Development and Family Well-Being	100%		100%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	8.1	0.0	5.1	0.0
Actual Paid Professional	7.1	0.0	8.7	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
741344	0	174008	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
966821	0	813212	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
916969	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

MAES. Family relations research addressed positive family development and effective community social services to support that development. Specific research has looked at needs of individuals and families at different life cycle stages, including youth and frail elders. It has also focused on the particular

needs of minority groups in Minnesota such as Latino/a, Hmong, Vietnamese, Native American and Somalian, and community behaviors and services that could support them. Some examples of research results in 2011:

- New findings in a study of a methods to strengthen families in supportive housing has shown that parent cohort groups improve parenting and child adjustment among formerly homeless families.
- Research on the best ways to involve parents to reduce student alcohol use and binge drinking has confirmed that providing parents with critical information in a student's freshman year can alter a potentially dangerous drinking trajectory.
- A study has found that out-of-school suspensions of African-American school children have unreported consequences for caregivers and the community. The principal investigator developed a training model for public child welfare professionals based on the findings.
- Last year we reported on the development of Vital Involvement Practice as a method for promoting vitality in frail elders. The Vital Involvement measurement has become increasingly popular in the growing movement toward maximizing individual strength and wellness (rather than simply mitigating weakness and disease) as part of health care and social services for older adults.
- A study of parents with disabilities involved in the child welfare system revealed that roughly one-third of all younger parents who had their parental rights terminated had a diagnosed disability when they were a child. This is the first time this rate has been studied.

Extension. The success of past evaluation studies leveraged new funding from early childhood and health initiatives, providing the opportunity to bring programs and program evaluation studies to scale in other organizations after being piloted and tested within Extension. New grants were received from NIFA's Children, Youth and Family programs, the National Institute of Health, Rural Health and Safety and the Department of Human Services.

With these and other funds, the team has (for example) moved the content of Parents Forever online. The Parents Forever program is a parent education program for divorcing parents that is court-mandated for parents in conflict. An online version will be piloted in 2012 and will be brought to the Minnesota State Court for possible approval as a court resource.

2. Brief description of the target audience

The program serves professionals in collaborating agencies such as mental health professionals, parent educators, schools, courts, family service agencies, health care settings and more. The program also conducte programming directly for parents who are divorcing, parents of adolescents and parents of pre-school and school-aged children.

Other audiences for MAES supported family relations research include nursing home staff, professionals in the field of aging, social work professionals and researchers, parents with disabilities, and state and local public policy makers.

3. How was eXtension used?

eExtension is a recommended resource for all Family Relations educators and specialists, providing them with opportunities to publish educational materials or create multi-state partnerships.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	3802	116493	82	0

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	4	20	24

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Publications will be distributed.

Year	Actual
2011	14723

Output #2

Output Measure

- Professionals will be trained.

Year	Actual
2011	1067

Output #3

Output Measure

- Parents will participate in Extension trainings.

Year	Actual

2011 2735

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Professionals who work with parents and families will improve their skills in working with parents and families (e.g., utilizing best practices for improving parenting skills). (Target expressed as a percentage of participants who report improving skills.)
2	Parents will improve their parenting practices. (Target expressed as percentage reporting improvement.)
3	Parents who are mandated to participate in Parents Forever because of contentious divorce situations will reduce conflict in front of their children following divorce. (Target expressed as percentage of parents who report reducing conflict.)
4	Parents mandated to participate in Parents Forever will increase access to both parents as a result of the program. (Target expressed as the percentage of parents reporting change.)
5	Research will provide information to support children and families.

Outcome #1

1. Outcome Measures

Professionals who work with parents and families will improve their skills in working with parents and families (e.g., utilizing best practices for improving parenting skills). (Target expressed as a percentage of participants who report improving skills.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	79

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The quality of family resource staff in nonprofit organizations, school settings and other community-based settings makes a difference in how welcome parents feel when they seek information and support and how well that information and support makes a difference.

What has been done
Family Resource educators are the backbone of the Minnesota Family Education Network (MFEN). MFEN hosts over 1,700 family professionals across Minnesota. They receive updates, information on class offerings, and other critical information from educators.

Results
Using randomized control trials to examine the impact of MFEN, 79% of participants reported improved skills in family education.

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

Outcome #2

1. Outcome Measures

Parents will improve their parenting practices. (Target expressed as percentage reporting improvement.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	82

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
One example of family education program to improve parenting practices is a program targeted at immigrant Latino parents. This program was designed for cultural relevance (as described in past reports) to the issues of immigrant Latino families. The average Hispanic child grows up in a neighborhood where nearly 20 percent of neighbors are poor and nearly half are in extreme poverty. As immigrant parents navigate difficult lives, parenting teens well is critical to preventing a continuing cycle of poverty.

What has been done
Over 130 recent immigrant Latino parents who are parenting teens in the U.S. participated in eight 16-hour sessions targeted at their parenting education concerns.

Results
Parents were highly satisfied with the sessions, scoring an average of 2.9 on a 3-point scale on every satisfaction item. The parents overwhelmingly agreed that the class content was relevant to their lives. Using randomized control studies as a follow up to the program, 81.6 percent of all parents receiving parenting education reported that their parenting practices had improved.

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

Outcome #3

1. Outcome Measures

Parents who are mandated to participate in Parents Forever because of contentious divorce situations will reduce conflict in front of their children following divorce. (Target expressed as percentage of parents who report reducing conflict.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	81

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Research about children of divorced households has determined that sustained conflict following divorce can produce negative eventual outcomes for children.

What has been done
Parenting couples who are experiencing a contentious divorce in Minnesota are court-mandated to attend Parents Forever classes. This curriculum was developed and evaluated by the University of Minnesota Extension. Extension trains all community trainers so that the program is available across the entire state of Minnesota.

Results
Data from parents, even those who were upset that they were mandated to attend these classes, discovered that parents were learning to get along better with both their children and the other parents. Parents also reported they have noticed that children are happier as a result of the strategies they are now using after learning about them in the class. One parent stated, "Unlike before (the classes), my youngest more openly shows excitement at visiting his dad." A father noted, "They (the kids) seem more relaxed when the two of us (my ex-wife and I) are together now."

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

Outcome #4

1. Outcome Measures

Parents mandated to participate in Parents Forever will increase access to both parents as a result of the program. (Target expressed as the percentage of parents reporting change.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	65

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Following divorce, access to both parents is attributed to positive child outcomes, except in cases where access is not in the best interest of the child. Negotiated access, along with positive communication and problem-solving among parents, reduces family conflict.

What has been done
The Parents Forever program is court-mandated across Minnesota. It teaches parents about the negative consequences of depriving access to parents, and coaches parent to engage conflict reduction strategies.

Results
Parents who completed the class, as well as post-surveys, indicate that parents understand the need for both parents to be involved, and have worked to improve access to the other parent. For example, a mom noted that she had to work with her children to see their dad more: "I have encouraged my children to talk to their father and am happy for them when they visit him." Another mother talked about instituting an open-door policy different than what was established through visitation: "I let my ex-husband see them as much as he wants. I allowed him to take the kids even when it's not his time."

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

Outcome #5

1. Outcome Measures

Research will provide information to support children and families.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
It is well-understood that divorce has emotional and financial impacts on both parents and children.

What has been done
U of M research has found that a surprising number of couples with children who are well along in the process of divorcing are open to reconciling. In a study conducted by family development researchers in collaboration with a Hennepin County District judge, nearly 2,500 divorcing parents were surveyed about reconcilation. Overall, in about 45 percent of couples one or both partners reported holding hopes for the marriage and a possible interest in reconciliation. Many of the participants in the study were toward the end of the divorce process, and further analysis showed that couples earlier in the process were even more open to reconciliation. This was the first time data has been gathered on divorcing parents' interest in reconciliation.

Results
An outgrowth of this research has been the formation of the Family Law Marital Reconcilation Option Project with a group of family lawyers in the Twin Cities area. The group has developed practices to help clients who are in the process of divorci9ng explore whether it is the best course of action.

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Competing Public priorities

Brief Explanation

Numbers of participants reported in 2011 were lower than 2010, largely due to midyear retirements which affected the number of staff available to deliver programs.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The Family Development team uses randomized control trial studies, pre-post and follow-up evaluation designs to examine the effects of the program on parents. These evaluation results have been leveraged to draw more funding to help the studies and the program go to a larger scale in Minnesota. The studies have demonstrated the outcomes described, including improved knowledge of parenting practices, greater confidence in parenting, reduced conflict and better environments for children.

Key Items of Evaluation

Careful evaluation of Minnesota's programs have demonstrated that curriculum and training methods improve the quality of parenting as well as the family environment for children.

V(A). Planned Program (Summary)

Program # 11

1. Name of the Planned Program

Family Resource Management

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
801	Individual and Family Resource Management	90%		100%	
806	Youth Development	10%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	14.1	0.0	6.0	0.0
Actual Paid Professional	13.6	0.0	4.9	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
614184	0	25936	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1560808	0	380831	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
1072303	0	313430	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

MAES supported research in family financial management provides resources and knowledge base to inform Extension programming. It also helps social science professionals, education and policy makers about constraints and challenges to managing family finances in these times of economic difficulty. In 2011, this has included studies on financial strategies for later life, the economic well-being of families in transition, and understanding family resource decisions through multi-cultural lenses. Some specific examples of results from 2011 research:

- Researchers were asked to testify to two committees in the Minnesota Legislature during the 2011 session about the impact of the Family Assets for Independence in Minnesota as a result of their evaluation of that program.
- A video was developed based on results form a study on most effective ways to support agricultural workers from Mexico and their families. The target audience is supervisors and managers of agriculture enterprises that employ workers from Mexico.
- Last year we reported on the results of a study on the financing of long term care and later life financial security, focusing on motivation strategies. Follow-up research examined married couples' consensus of financial long term care intentions and behaviors. Findings reinforced the importance of family practitioners going beyond working with individuals. One outcome of this was the researcher was one of 12 invited technical expert panel members in 2011 for the U.S. Department of Health and Human Services National Clearinghouse for long term care information.

Family Resource Development programs at the University of Minnesota help families plan for their financial future and cope with financial management issues in times of poverty. The economic crisis of the past several years has challenged the team to provide more service and to respond to more demand for programming. For example, the team has increased the offerings of RentWise workshops in order to accommodate the burgeoning number of families that are renting due to foreclosures and inability to purchase homes. Education about planning to pay for college is also increasing in demand.

Another effort in 2011 was a multi-state initiative to develop a financial recovery tool after disaster. A curriculum has been tested and disseminated through Extension's EDAM network. It was tested during the flood in Minot, North Dakota in 2011. A multi-state study caught the eye of FEMA and NIFA, and additional funding will be used to manage a control group study of the management of resources with and without financial literacy training.

2. Brief description of the target audience

Our audiences include the following:

For youth and money: adolescents moving into independent living, teachers k-12, professional staff-credit union representatives, college staff and faculty, college students and youth.

For financial security in later life: community non-profit groups and individuals who utilize on-line website resources and self-study modules.

For resource management for daily life programs: the general public, individuals and families who seek knowledge and skills by choice or mandate, professionals seeking to enhance knowledge, public and private agencies, organizations and businesses seeking training to enhance their delivery of resource management programs.

Family Resource Management programs arduously reach out to Minnesota's diverse population. Customized curriculum adaptations are commonplace for this program. As a result, a third of Minnesotans reached by this program are typically from Minnesota's minority ethnic groups.

Other target audiences of family resource management research include social scientists, policy makers and educators, and the legislative and judicial branches of state and federal government.

3. How was eXtension used?

eXtension is a resource recommended by program leaders to disseminate published material and meet promotional criteria established within Extension. The team's multi-state initaitaives also provide an opportunity for eXtension, especially related to disaster preparation.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	6810	90083	5858	0

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	7	10	17

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Community-based workshops will be held for individuals and families. (Target expressed as the number of events delivered.)

Year	Actual
2011	466

Output #2

Output Measure

- Curricula and guides will be distributed.

Year	Actual
2011	7228

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Individuals, families and employees who participate in Resource Management programming will report they have increased knowledge related to the targeted financial management goals. (Target expressed as a percentage of participants who report increasing knowledge.)
2	Individuals, families and employees who participate in Resource Management programming will report they have increased confidence (increased efficacy) in financial management, decision-making and planning for later life. (Target expressed as a percentage of participants who report increasing efficacy.)
3	Individuals, families and employees who participate in Resource Management programming will report they have used the knowledge/materials gained from the program to change behaviors related to targeted financial management goals. (Target expressed as a percentage of participants who reported making behavior change.)

Outcome #1

1. Outcome Measures

Individuals, families and employees who participate in Resource Management programming will report they have increased knowledge related to the targeted financial management goals. (Target expressed as a percentage of participants who report increasing knowledge.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	87

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Management of resources helps families prevent financial crisis and reduce the effects of financial instability.

What has been done
Financial management training is delivered in community-based settings to address ongoing and current issues in financial management, including increased offerings of programming to address renters' rights and responsibilities.

Results
An online data management system collected pre-post and follow up surveys at six and 12-month intervals, along with follow-up interviews. The average percentage of participants who increased their knowledge was 87.3 percent.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management
806	Youth Development

Outcome #2

1. Outcome Measures

Individuals, families and employees who participate in Resource Management programming will report they have increased confidence (increased efficacy) in financial management, decision-making and planning for later life. (Target expressed as a percentage of participants who report increasing efficacy.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	82

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Because attitudes about money are embedded in culture and life experience, many families in poverty feel hopeless about financial management. Management of resources can lead families to spend and save effectively.

What has been done
Nearly 1,500 participants, including 456 Latino participants, were part of Dollar Works 2 financial literacy education. Dollar Works 2 is a comprehensive personal financial education program. It teaches basic economic concepts to strengthen people's skills in managing their personal finances and making sound decisions with money.

Results
An online follow up survey design, along with 3-6 month follow-up interviews, assesses the longer-term effects of the program on families. The majority indicated they have learned new skills and are utilizing these skills to improve their financial situations. For example, a participant noted: "These were brand new skills for me. Now I know how to make money!"

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #3

1. Outcome Measures

Individuals, families and employees who participate in Resource Management programming will report they have used the knowledge/materials gained from the program to change behaviors related to targeted financial management goals. (Target expressed as a percentage of participants who reported making behavior change.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	63

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The ongoing recession continues to place families in difficulties through prolonged unemployment, underemployment, reduction in wages and lack of resources to meet the basic needs. As these conditions continue, the need for financial literacy programming is increasing.

What has been done
Nearly 1,500 participants, including 456 Latino participants, were part of Dollar Works 2 financial literacy education.

Results
The program conducted pre and post-surveys. Some participants completed 3 - 6 month follow up surveys. Participants (62.5 percent) indicated they have learned new skills and are using these skills to improve their financial situations. For example, a participant noted: "I will know where my money is going to and will be a smarter consumer. This class has been life-changing for me and I will spread the word on having family and friends attend in the fall."

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

The ongoing recession continues to place families in difficulties through prolonged unemployment, underemployment, reduction in wages, and lack of resources to meet basic needs. An environmental scan conducted by educators in Family Development across Minnesota showed that economic worries are one of the greatest concerns for families today and in the future. This is creating demand for family financial literacy education programs, RentWise (because more people rent due to foreclosures and inability to purchase homes) and education about paying for college.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Financial Literacy programs are rigorously evaluated to assure the effectiveness of curriculum materials and the ultimate results of programming.

Key Items of Evaluation

Financial LIteracy programs are serving very low-income populations in Minnesota, and are addressing current conditions, especially during the economic downturn and housing crisis. As noted in the Report Overview, 31 percent of participants are non-white. Evaluation has demonstrated that the program effectively changes the financial management behaviors of participants, providing them with lifeskills that can improve the quality of life for themselves and children.

V(A). Planned Program (Summary)

Program # 12

1. Name of the Planned Program

Environmental Sciences

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
135	Aquatic and Terrestrial Wildlife	20%		50%	
136	Conservation of Biological Diversity	20%		50%	
903	Communication, Education, and Information Delivery	60%		0%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	5.2	0.0	0.0	0.0
Actual Paid Professional	4.9	0.0	16.1	0.0
Actual Volunteer	18.7	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
476381	0	354352	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1588218	0	978293	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
506669	0	1115128	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

MAES research related to environmental sciences covers a range of work, from the ecology of prairie restoration, to wildfire preparedness, to Minnesota wildlife ecosystem analysis as well as urban ecosystems analysis. Some environmental science research is reported under other programs in this report, such as Water Quality and Climate Change, when results seem most applicable. Some projects with environmental science results in 2011 include:

- Long-term grouse study showed opposite results in trend counts reported for state-wide counts by Minnesota DNR. The state-wide counts do not allow an accurate year-to-year depiction of the state's grouse population. This suggests that state-wide counts be used only as a general trend in population trajectory over several years, rather than a forecast of hunting conditions in the fall as they have been used.
- Work with breeding dispersal of owls showed that birds that produce young are more likely to be site faithful to their territories. This information helps design of management strategies that enhance both nest sites and foraging habitat.
- Wildfire preparedness research outcomes have been used to improve national and local communication about how to develop and implement Community Wildfire Planning Projects.
- In 2011, researchers completed a 15 year study of the voluntary retention of restored prairie wetlands in federal and state landowner incentive programs in Iowa, Minnesota and South Dakota. The research showed that a surprisingly high portion of wetlands have been retained (nearly 70 percent) past the end of the contract. Landowners are somewhat more likely to maintain wetlands that are larger or if they restored many wetlands on their property. This study will be useful in designing future landowner incentive programs for the agricultural Midwest.
- Research on characterizing the diversity of microbial communities of native prairie continued, including genomic sequencing of bacterial and fungal communities associated with prairie plants.
- Research has defined the risks to specific native species for negative impacts of herbicide use, allowing land managers to proceed with legally mandated noxious weed control with knowledge to reduce injury to native forbs.

Extension The Environmental Science Education program works with volunteers, teachers and American Indian youth to teach about the natural and cultural history of the three major biomes in Minnesota. The goal is to develop a corps of well-informed citizens dedicated to conservation education and service in their communities.

In 2011, the Master Naturalist program took a next step to strengthen its presence in Minnesota by encouraging local volunteers to convene local associations of Master Naturalists. These groups can encourage more local volunteerism for the environment. Some of these clubs are leading the way in thinking about how local action can improve the quality and quantity of local Master Naturalist programs. The team is going to continue to observe these groups and consider their future for Extension.

Funding made a Reach for the Sky summer program available in 2011, with positive results that are described in the outcomes.

The team also considered the value of continuing to offer Best Practices for Field Days -- a curriculum and workshop that teaches science instructors how to conduct effective field days with youth. The curriculum has been developed, tested, evaluated and widely distributed. At this point, the team may de-emphasize program development and delivery, focusing instead on disseminating the resources and information on the Internet and responding to requests for sponsored workshops.

2. Brief description of the target audience

Environmental science research and education programs reach: 1) concerned citizens and volunteers who are willing to be trained and serve in a variety of roles as citizen teachers and scientists; 2) Minnesota professionals from within Extension, the Minnesota Department of Natural Resources, Soil and Water Conservation Districts, US Fish and Wildlife Services, Health and Human Services Departments and Environmental Sciences; 3) the public schools and others involved in environmental science education programs; and, 4) youth on the White Earth Reservation in Northwest Minnesota, when funding allows.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	867	18752	275	0

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	5	14	19

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Through training and other communications, volunteers, educators and natural resource professionals will be prepared to deliver research-based environmental science education programs. (Measure expressed as number of Minnesota Master Naturalist volunteers trained and supported.)

Year **Actual**

2011	265

Output #2

Output Measure

- White Earth Reservation youth will graduate from a four week summer program that includes environmental science education. (Target expressed as a percentage of students graduating.)

Year	Actual
2011	95

Output #3

Output Measure

- Recruitment strategies for Environmental Science Education programs for adults will reach under-represented audiences. (Target expressed as a percentage of total audiences served.) Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Within a year of environmental science education instructor training (i.e., Master Naturalist and Best Practices for Field Day Trainings), educators and community-based instructors will use the research-based educational methods in environmental science education delivery. (Target expressed as a percentage of participants.)
2	Master Naturalists will become more knowledgeable about natural history. (Measure expressed as a percentage of knowledge gain.)
3	Native American youth will increase their academic performance on standardized achievement tests following the four week ESE program. (Target expressed as a percentage of increase.)

Outcome #1

1. Outcome Measures

Within a year of environmental science education instructor training (i.e., Master Naturalist and Best Practices for Field Day Trainings), educators and community-based instructors will use the research-based educational methods in environmental science education delivery. (Target expressed as a percentage of participants.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	84

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The best protectors of the natural environment are those who live in it every day. As citizens consider the way their efforts both hurt and help natural settings, they can take immediate action that makes a difference.

What has been done
The Master Naturalist program has trained over 1,000 volunteers and instructors; 840 (84 percent) are currently active.

Results
The volunteers have committed 121,144 hours of service over the past five years to protect the environment. According to the Independent Sector, this volunteerism is valued at $2,481,136. Service projects by Minnesota's Master Naturalists have included lake and stream monitoring, eradication of invasive species, lake shore restoration, clearing trails, emerald ash borer monitoring, teaching nature courses, planting trees and leading hikes.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity
903	Communication, Education, and Information Delivery

Outcome #2

1. Outcome Measures

Master Naturalists will become more knowledgeable about natural history. (Measure expressed as a percentage of knowledge gain.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	94

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Citizens and local residents are in the best position to observe and protect their local environment. The Master Naturalist program taps this opportunity by recruiting local volunteers, educating them, and requiring hours of service that protect the land by conducting projects or teaching others.

What has been done
Local classes are held and Master Naturalists volunteer time to the environment.

Results
Of those who took post-workshop assessments, 94% reported strong learning gains from Master Naturalist trainings.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife
136	Conservation of Biological Diversity
903	Communication, Education, and Information Delivery

Outcome #3

1. Outcome Measures

Native American youth will increase their academic performance on standardized achievement tests following the four week ESE program. (Target expressed as a percentage of increase.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
American Indian students commonly score poorly on math and science tests and are often not prepared for secondary education. The purpose of the Reach for the Sky (RFTS) program is to prepare them for post-secondary education options in STEM careers.

What has been done
RFTS is a collaboration of Extension and the Institute of Technology. It engages students in science, math and engineering through hands-on learning and traditional Native stories in summer cohorts. Fun activities, such as using GPS to find hidden food caches and learn about wildlife, help students reduce math and science anxiety, reduce dropouts, and prepare for careers while honoring traditional values. Students were given a survey regarding science and math at the beginning of each summer cohort and directly upon completion to measure annual and longitudinal changes in knowledge and attitudes.

Results
Across the four summer cohorts (2008-2011), the survey found that:
- 100% of the cohorts showed gains in agreement that students enjoy learning science. The average change from pre to post scores was +39%.
- 100% of the cohorts showed significant gains in agreement about being good at science. The average change from pre to post was +61%.
- 72% of the cohorts stated they disagreed or strongly disagreed with the statement that "doing science makes me feel nervous".
- All cohorts on average agreed/strongly agreed that "science challenges them to use their mind" and is "important to everyone's life".

4. Associated Knowledge Areas

KA Code	Knowledge Area
136	Conservation of Biological Diversity
903	Communication, Education, and Information Delivery

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The Environmental Science Education programs at Extension measure knowledge gains and the actions of volunteers to monitor the success of programs. Other evaluation efforts have carefully measured the impact of a curriculum in changing the quality of field days. Data was used to monitor and change program strategies. A comprehensive assessment of Native American youth monitors attitudinal changes.

Key Items of Evaluation

Environmental Science programs at Extension are mobilizing volunteers and youth to protect their environment. Evaluations show improved skills and attitudes in math and science among Native American youth.

V(A). Planned Program (Summary)

Program # 13

1. Name of the Planned Program

Water Resource Management and Policy

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
111	Conservation and Efficient Use of Water	35%		20%	
133	Pollution Prevention and Mitigation	45%		40%	
135	Aquatic and Terrestrial Wildlife	0%		10%	
403	Waste Disposal, Recycling, and Reuse	10%		10%	
605	Natural Resource and Environmental Economics	10%		20%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	8.0	0.0	30.2	0.0
Actual Paid Professional	7.2	0.0	37.8	0.0
Actual Volunteer	0.3	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
545700	0	260454	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1601333	0	2776227	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
595952	0	2983561	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

MAES research reported this year has informed water resource management and policy makers on ways to improve the quality of Minnesota's lakes, rivers and streams. This research includes work on agricultural impacts on water quality, as well as the problems of invasive fish and aquatic plant species on water quality. Some specific examples of research results in 2011:

- Software was developed to compare self-sustaining agricultural ditches and conventional agricultural drainage ditches. Economic analysis of the data suggests that the removal cost of nitrogen for the self-sustaining ditch is competitive with other practices.
- A study of the new U.S. arsenic water quality standard for domestic water supply focused on small Minnesota communities. The study showed that smaller communities have a difficult time meeting the new water quality standard because the benefits from meeting the new standard are much lower than the cost.
- Researchers developed a system to use satellite image data to map and monitor lake clarity for large lakes in Minnesota. On average, a new lake clarity map can be produced within two hours of image acquisition. Monitoring lake clarity is important to help water resource managers quantify the seasonal patterns of eutrophication in Minnesota's lakes.
- A study on the control of invasive water plants showed that Eurasian watermilfoil appears to be controlled by the native milfoil weevil, which has remained abundant during the three summers of study.
- Researchers have isolated a bacterium that is naturally occurring in water that has potential to breakdown a widely-used herbicide. Since the bacterium (P. ananatis) rapidly degraded mesotrione, this strain might be useful for bioremediation purposes.
- Fertilization of agricultural lands with biosolids contributes to phosphorus in surface waters. As part of a long-term study, researchers this year conducted X-ray fluorescence mapping of agricultural research plot to track phosphorus concentrations and travel in soils at a micron scale..
- Sediment and phosphorus transport from the Minnesota River Basin to Lake Pepin on the upper Mississippi River has garnered a lot of attention in recent years. A study to quantify sediment and associated phosphorus losses from river banks in Blue Earth County has proved that bank erosion is a major source of sediments in rivers of the Greater Blue Earth River Basin. As a result of this work, researchers have developed an assessment tool for river banks that are not readily accessible for conventional surveying equipment.
- Applied economics research has identified the tradeoffs of food production and water quality. As global demand for food, meat and energy rises, society increasingly values corn and other crops over clean water.

Other research impacts are reported under Outcomes .

Extension. In 2011, a major effort of the water quality team at the University of Minnesota Extension was focused on important stormwater issues facing Municipal Separate Sewer System operations. Stormwater U workshops are designed to help them meet their stormwater permit minimum control measure requirements. In 2011, the team conducted an evaluation of the stormwater program. The measurable impact of the program was the focus of the evaluation, with specific questions relating to actions taken by participants based on the information provided by the program.

In addition, the team conducted an evaluation of its shoreland education programs. The evaluation surveyed participants of shoreland management programs over the past three and a half years, seeking information about knowledge gains, actions taken to improve property, and ripple effects of sharing done by trainees to others. Some results of this evaluation are shared in the program outcomes.

2. Brief description of the target audience

Extension's target audience for stormwater programming included participants who traveled from Wisconsin and 27 different Minnesota counties to attend classes. Most were from the seven county metro area. Jurisdictions represented included city, county, federal, regional, state, soil and water conservation districts, tribes, villages and watersheds, as well as some professional businesses.

Target audiences for the results of MAES research include the aquatic ecology scientific community, state and local natural resource managers, state conservation district managers, scientists, decision makers and policy makers dealing with water quality, conservation groups and Minnesotans who care about the state's water resources, as well as indivduals and groups across the nation who are invested in creating sustainable water management systems and policies.

3. How was eXtension used?

While some educators in the Water Resource Management team contribute to eXtension, it is not a formal part of the program plan.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	3799	26878	147	0

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	1	45	46

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Provide useful information about shoreland, storm water and septic system management into web links, printed products and media. (Target expressed as numbers of products created per year.)
  Not reporting on this Output for this Annual Report

Output #2

Output Measure

- Workshops, seminars, and presentations will educate community members and professionals about strategies that provide wastewater treatment for their community at a reasonable cost in a way that is consistent with community values. (Target expressed as number of events.)

Year	Actual
2011	33

Output #3

Output Measure

- Provide workshops on water quality, stormwater issues and shoreland management, revegetation and use of plants to maintain shoreland structures. (Target expressed as number of events.)

Year	Actual
2011	33

Output #4

Output Measure

- Coordinate shoreline demonstration projects that provide hands-on learning opportunities and add to educational goals.
  Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Local decision-makers will know: 1) Where stormwater goes; 2) Major stormwater pollutants and their impact and 3) Three things they can personally do to prevent pollution. (Measure expressed as percentage of residents in targeted communities.)
2	Shoreland education workshop participants will practice one or more of five lake/river friendly landscaping behaviors. (Target expressed as a percentage of workshop participants.)
3	Homeowners will modify or change their habits regarding home water and product use to better protect their on-site septic systems. (Measure expressed as a percentage of those evaluated.)
4	Small communities will develop a viable plan for onsite sewage treatment--plans that are affordable and address onsite sewage treatment. (Target expressed as number of communities per year.)
5	Stormwater Education will result in local action to protect and manage water. (Quantitative target expressed as those reporting that they could better implement practices because of information provided in class.)
6	Research will develop ways to track the amount and causes of erosion impairing Minnesota lakes and rivers.
7	Research will develop knowledge and processes to deal with invasive fish species.

Outcome #1

1. Outcome Measures

Local decision-makers will know: 1) Where stormwater goes; 2) Major stormwater pollutants and their impact and 3) Three things they can personally do to prevent pollution. (Measure expressed as percentage of residents in targeted communities.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	96

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Public policy for water management has the goal of promoting environmentally sound management of stormwater through proper action by operators in jurisdictions such as cities and watersheds. Education and consultation is needed to help these operators meet their stormwater permit minimum control measure requirements. Necessary competency is needed in 1) pond management, easements and vegetation maintenance; 2) P8 Modeling; 3) stormwater best management practices; 4) underground stormwater treatment devices; and 5) rain drainage retention regulations.

What has been done
The Stormwater Education Program (SEP) offers management training to operators such as cities and watersheds. They are designed to help them meet their stormwater permit minimum control measure requirements and are designed and developed by a collaborative team including Minnesota Pollution Control Agency, Met Council, local agencies and University of Minnesota. All courses include presentations, hands on learning, and peer discussions with all workshop materials available on a web site.

Results
In 2011, the Stormwater Education Program evaluated their program. A survey was sent to 293 past participants, of which 87 completed the survey. Most often, survey respondents had attended two to three classes. Over half of respondents felt that they could better inspect management practices because of information provided in class (60.3 percent). Most commonly, participants identified a .5 - 1 point increase in knowledge for at least one topic for every class. Some saw an average of at least .5 in over five different topics.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
133	Pollution Prevention and Mitigation

Outcome #2

1. Outcome Measures

Shoreland education workshop participants will practice one or more of five lake/river friendly landscaping behaviors. (Target expressed as a percentage of workshop participants.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	76

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Keeping water resources healthy in the face of increasing development pressure requires informed decision-making and cooperation on the part of citizens and government agencies. Shoreland restoration practices are key in reducing the amount of exposed soil near lakeshore, increasing infiltration of runoff into the soil, capturing sediment and ultimately minimizing sediment, nutrient and pollutant loading into lakes and rivers.

What has been done
Over 100 shoreland restoration demonstration sites have been implemented on public and private lake and river shorelines since 1997. Research has included appropriate installation methods and alternative erosion control techniques. These demonstration and research sites are used to forward the science of shoreland restoration and provide the basis of many of the shoreland educational materials. Extension workshops translate these findings into educational offerings that encourage shoreland owners to take action to protect waters.

Results
An evaluation demonstrated that people that attended shoreland buffer garden workshops put what they learned into action. Seventy six percent reduced mowing on lakeshore (n = 35) which resulted in approximately 55,024 square feet of lakeshore not being mowed. Square feet of lakeshore affected averaged 2,201 per person, suggesting that 257,517 square feet of lakeshore lawn may have gone native by workshop attendees. Fifty four percent of respondents installed a shoreland buffer garden after the workshop, affecting approximately 5,079 linear feet of shoreland. Extrapolating respondents information, we estimate that over 20,000 linear feet of

shoreland buffer gardens have been installed. Of156 attendees, 54% installed shoreland buffer gardens with an average of 242 linear feet per person.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
133	Pollution Prevention and Mitigation

Outcome #3

1. Outcome Measures

Homeowners will modify or change their habits regarding home water and product use to better protect their on-site septic systems. (Measure expressed as a percentage of those evaluated.)

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Small communities will develop a viable plan for onsite sewage treatment--plans that are affordable and address onsite sewage treatment. (Target expressed as number of communities per year.)

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Stormwater Education will result in local action to protect and manage water. (Quantitative target expressed as those reporting that they could better implement practices because of information provided in class.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	60

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Public policy for water management has the goal of promoting an environmentally sound management of stormwater through proper action by operators such as cities and watersheds. Education and consultation is needed to help these operators meet their stormwater permit minimum control measure requirements. Necessary competency is needed in 1) pond management, easements and vegetation maintenance; 2) P8 Modeling; 3) stormwater best management practices; 4) underground stormwater treatment devices; and 5) rain drainage retention regulations.

What has been done
The Stormwater Education Program (SEP) offers management training to operators in jurisdictions such as cities and watersheds. They are designed to help them meet their stormwater permit minimum control measure requirements and are designed and developed by a collaborative team including Minnesota Pollution Control Agency, Met Council, local agencies and University of Minnesota. All courses include presentations, hands on learning, and peer discussions with all workshop materials available on a web site.

Results
The 2011 evaluation of Stormwater programs examined the behavioral and community benefits of the program. Since attending the program, each participant had contributed the following actions in communities because of the information provided by the program.
1. 95.25 Best Management Practices (BMPs) were inspected per respondent
2. 5.8 BMPs modeling reports have been reviewed or created per respondent
3. 11 volume reduction rain garden BMPs have been installed per respondent
4. 3.6 hydrodynamic separators have been designed or installed per respondent

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
133	Pollution Prevention and Mitigation

Outcome #6

1. Outcome Measures

Research will develop ways to track the amount and causes of erosion impairing Minnesota lakes and rivers.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual

2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Sediment is the most common pollutant imparing surface waters in the U.S.

What has been done
Researchers used a number of methods including GIS analysis, aerial photography, bank surveys, soil texture analysis, isotope fingerprinting, and sediment deposition surveys and modeling.

Results
Through the use of sediment fingerprinting technology, it is now understood that cultivated fields generated only about 30 percent of the sediment load in the Upper Mississippi Basin, while the remainder is coming from near-chanel sources such as erosion along bluffs, in ravines, and erosion of streambanks. The results of this research are being used by stakeholder groups to prioritize the sites that have the greatest potential benefits for sediment reduction.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation

Outcome #7

1. Outcome Measures

Research will develop knowledge and processes to deal with invasive fish species.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Although the common carp is Minnesota's first and possibly most damaging invasive fish species,

it has attracted little attention from researchers who until recently viewed it as a lost cause. The common carp dominates fish communities in shallow lakes, wetlands, and rivers across most of the upper Midwest. Through its habit of rooting in the bottom for food, this species literally turns aquatic food webs upside down. Carp are often the leading cause of water quality decline.

What has been done
Studies of carp in several Twin Cities watersheds has led to a wealth of new information about how the fish eats, reproduces, spends their winters and interacts with other species. Experimental management plans based on the information gathered that rely on integrated tools are now in place in several lakes and appear to have great promise.

Results
Several watersheds in Minnesota, Wisconsin, and Iowa are implementing the carp control techniques developed by this research. In addition, the Minnesota State Legislature is considering funding an University invasive aquatic species center based, in part, on the success of this research.

4. Associated Knowledge Areas

KA Code	Knowledge Area
135	Aquatic and Terrestrial Wildlife

V(H). Planned Program (External Factors)

External factors which affected outcomes
- Government Regulations
- Competing Programmatic Challenges

Brief Explanation

Major initiatives of the Water Resources team reflect current issues and priorities of communities. Activities in 2011 reflected the goal to bring municipalities and lake associations to address goals to protect lakes and rivers. This supplanted the development of materials and work with unsewered communities.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The 2011 evaluation demonstrates a mature program logic model for the Stormwater Education program that was prepared for rigorous evaluation of efforts. Besides demonstrating usefulness through knowledge and behavior change, interviews with participants highlighted several other long-term impacts of the program. Some mentioned policy or regulatory changes they made based on what they learned in class. A local government worker explained that they changed a local erosion control ordinance because of the information. The stormwater education program has also been instrumental in providing cities with information they need to plan for future improvements.

Key Items of Evaluation

The stormwater education program at the University of Minnesota is supporting local environmental policy, while helping local government make system improvements.

Evaluations of the program are demonstrating knowledge change, behavior change, and change in local policy and planning as a result of the information provided.

V(A). Planned Program (Summary)

Program # 14

1. Name of the Planned Program

Forestry

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
123	Management and Sustainability of Forest Resources	40%		60%	
124	Urban Forestry	25%		10%	
125	Agroforestry	25%		20%	
133	Pollution Prevention and Mitigation	10%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	7.3	0.0	24.7	0.0
Actual Paid Professional	7.5	0.0	36.2	0.0
Actual Volunteer	2.3	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
577220	0	89200	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1644700	0	2120236	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
636332	0	2898580	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

MAES forestry research in 2011 focused on several threats to the northern forests of Minnesota due to invasive species and climate change, as well as opportunities to better manage forest land and both use and protect forest resources including its wildlife. Some of those opportunities relate to the Sustainable Energy issue, and others specifically have impact for Climate Change and are reported under that program in this report. Some examples of forestry research results of note in 2011:

• The time-frame for forest management decisions requires a way to predict future forest stand conditions, however, in the Lake States there has been a shortage of such models for managed stands. One research project is filling in the gaps. Forest research has provided data for low to high density conditions of managed red pine.

• Tree diseases and wood deterioration cause billions of dollars in economic loss each year. One of the reasons the losses have been so severe is the lack of basic information on the biology of the pathogens and host-parasite interactions. One very serious disease that has been introduced into the southeastern U.S. is Laurel Wilt, which threatens avocado growing in the U.S. Minnesota research and methodology on tree/pathogen interactions are being used to select resistant cultivars of avocado.

• Long term forest data collected by MAES supported research at the Cloquet Forestry Center include 99 years of climate data, 55 years of timber harvesting records and 41 years of reforestation records. This data is now in digital form for ease of use by forest managers and researchers.

• Forest researchers have pooled Federal Forestry Service Forest Inventory data from over 30 years and these data are now being used for modeling the growth of intensively managed forest stands for all Minnesota forest cover types. With that, forest managers will for the first time have a readily available means of assessing forest management potentials local to statewide.

• Field research on the fungal biology of trees has found that logs with decay fungi act as a reservoir for exchangeable calcium that is superior to soils. In soils stressed by acid rain, which includes most of the northeastern U.S. forests and many more around the world, calcium depletion affects tree health and contributes directly to disease and decline. Tree sapwood in a fallen log attracts decay fungi that tip this balance. Because they are large, slow-decaying reservoirs for this wealth of exchangeable calcium, they can act as a safe rooting zone for the next generation of trees. This has impact for forest management decisions.

• Last year we reported impacts and results on research to halt the spread of earthworms in Minnesota's hardwood forests, which are attacking the soils of the northern forests, killing off understory plants. As Minnesota anglers are a major group moving worms, researchers have been working with bait shops in northern Minnesota to educate and conduct surveys. That work was enlarged to include fishing resorts and more bait shops. Research on use of bait container labels showed that the labels made it 40 percent more likely for an angler to dispose of a bait container properly. Meanwhile, a third round of major field sampling was completed to analyze the effects of earthworms in northern forest soils. Results showed that as the earthworm invasion proceeds, they affect the total soil carbon storage, and also alter soil calcium and phosphorous concentrations/

Extension. A large percentages of Minnesota's woodlands are privately owned, so the degree to which Minnesota's forests are healthy is directly related to the commitment and ability of these owners to

be good stewards of their trees and land. The Forestry Team is a constant resource to Minnesota's forest landowners. They are working to provide timely, responsive education, consultation and problem-solving resources.

In 2010, we reported about the team's efforts to update landowners about public policy changes that have made tax policy for forest owners difficult to understand. That effort ended in 2011. Efforts instead were directed at land transfer and forest restoration efforts, as well as the maintenance of a convenient web site that helps Minnesota's forest owners discover resources and peers to answer questions and guide decisions.

2. Brief description of the target audience

Primary audiences for Extension forestry programs are farmers and woodland owners, loggers, wood processors and marketers, natural resource and green industry professionals, volunteer educators, and local and state government personnel engaged in forestry, parks and recreation, soil and water conservation. A secondary audience is youth.

Target audiences for MAES forest research include public and private forest land managers, state natural resources agencies, state and federal policymakers, other forestry researchers, Extension educators, Minnesota Tree Improvement Cooperative, and Native American nations.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	3048	40555	687	0

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	4	24	28

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Workshops, tours, and demonstration projects will increase awareness of landowners, volunteers, loggers, natural resource professionals and businesses involved in forestry, agroforestry, urban forestry and forest products. (Target expressed as the number of events.)

Year	Actual
2011	122

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Program participants (landowners) will learn new information that helps them manage forest land. (Target expressed as percentage of participants.)
2	Program participants will improve forest management on a significant number of acres. (Target expressed as number of acres on which management was improved.)
3	Forest lands will be retained despite the threat of intergenerational transfer. (Target expressed as the number of acres projected to remain in forest over the next 20 years.)
4	Research will support local forest management decisions
5	Research will provide information to allow local government agencies make urban forestry management decisions

Outcome #1

1. Outcome Measures

Program participants (landowners) will learn new information that helps them manage forest land. (Target expressed as percentage of participants.)

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	90

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Content has long been a strength of the Forestry team, but for much of the past decade, educational efforts were offered only in ways that were expensive to deliver and inconvenient for learners. Typically, only about 1.5% of Minnesota woodland owners (about 750 people) attend an Extension forestry workshop in a given year.

What has been done
MyMinnesotaWoods.com is a website that integrates digital communication tools such as YouTube, Google Calendar, Adobe Breeze, RSS feeds, Twitter, Facebook and more. MyMinnesotaWoods.com has dramatically increased the visibility and "discoverability" of Extension forestry content in formats other than live workshops. These tools allow the team to publish content simultaneously across multiple platforms, delivering the content to learners wherever they are and in a variety of formats to suit different learning styles.

Results
Surveys of those who attended online and face-to-face workshops resulted in 90 percent reporting knowledge gains. This was enhanced by the availability of MyMinnesotaWoods.com. In 2011, 40,555 individuals accessed Extension forestry content through the site. This is a dramatic increase in exposure over past workshop attendance. About 2,400 subscribe to a monthly HTML-formatted email. Several hundred attended webinars. Thousands seek information to support decision-making through the various Internet channels. The site has changed the way Minnesota landowners get information and connect to others. The team's digital communications work has made forestry content more visible to landowners who can apply it to improve their land management activities, and has improved the social capital and trust among land owners and the University of Minnesota.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
124	Urban Forestry
133	Pollution Prevention and Mitigation

Outcome #2

1. Outcome Measures

Program participants will improve forest management on a significant number of acres. (Target expressed as number of acres on which management was improved.)

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	68043

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
One example of a forestry project that supported land management is The Lost Forest Sugarloaf project. The Lost Forest stretches along Highway 61 from Duluth to Grand Portage. Historically, it was dominated by white pine, cedar, spruce and fir. Logging and homesteading cleared those trees, and slash fires burned remaining soil and destroyed the seed bank. A healthy, restored North Shore Forest is good for the health of wildlife, streams, forests, and the aesthetics of drives through this tourist region.

What has been done
The North Shore Stewardship Association requested assistance from U of M Extension's forestry team to design, implement and evaluate an 18-month education program aimed at restoring Sugarloaf. All program participants contributed time to plant trees on their property and restore forest health. Twelve family participants contributed about 1,100 hours in 2011. They planted trees, talked with neighbors, wrote grants and met with local units of government and nonprofits. They invested more than $5,000 in the forest restoration.

Results
As a result of this project, informed private citizens are acting to preserve the forest. One participant prepared a grant to manage invasive species along the north shore. Another is

developing a directory of nursery stock providers for landowners. Yet another has taken a staff position with the North Shore Forest Collaborative. The group has developed a web site telling the story of the forest that is hosted on Extension's myminnesotawoods web site.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources

Outcome #3

1. Outcome Measures

Forest lands will be retained despite the threat of intergenerational transfer. (Target expressed as the number of acres projected to remain in forest over the next 20 years.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	11000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
As the population of forest owners ages, there is a looming large-scale change in ownership and control of this land. In many cases, land is sold or subdivided during or shortly after ownership change. Due primarily to economies of scale associated with land management, smaller parcels are less likely to provide the same economic or environmental benefit to society as large parcels. Avoiding unwanted land subdivision may help to keep more land forested in the future, avoiding conversion to alternative land uses.

What has been done
The University of Minnesota Intergenerational Land Transfer Class is designed to inform individuals and families of options and assist in decision-making. Consistent with best practices in transfer education (Fetsch 1999), the class content includes: 1) the consequences of being unprepared, 2) family communications, 3) discussions about values and goals, 4) discussion of how to hold a successful family meeting, and 5) legal and financial tools for transferring land.

Results
As a result of the class, some participants contacted an attorney, forester or CPA for the specific purpose of making a plan to pass property to the next generation. One of the goals of the class is to keep forestland in forest. Participants were asked to rank using a 5-point scale whether it was

"not at all likely" to "very likely" that property will remain in forest over the next 20 years. Of 67 valid responses, 62 indicated it was either likely or very likely that their land, totaling more than 11,000 acres, would remain forested in the next 20 years.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
125	Agroforestry

Outcome #4

1. Outcome Measures

Research will support local forest management decisions

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Minnesota has more acres of aspen over age 70 than were present before the oriented strand board industry started in the state in the late 1970s. Aspen acres over age 70 have little if any net timber growth and are a major reason why overall timber productivity is low in the state. Aspen is a relatively short-lived species that does not store well on the stump. Statewide, how these older aspen acres are managed in the near term will impact economic returns substantially.

What has been done
The decision support tools that forest researcher have developed is being used by Minnesota counties in their timber sales revenue assessments. In one recent example, researchers prepared modeling results for one Minnesota county with different tree cover types, including aspen. Researchers showed county planners that using a broader systems approach across cover type would counterbalance age class imbalances in other cover types.

Results
Using the broader systems approach will raise timber sale revenues substantially over simple approaches done separately for each forest cover type. Revenues from timber harvesting are especially important for this Minnesota county, as they support all county forest programs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
125	Agroforestry

Outcome #5

1. Outcome Measures

Research will provide information to allow local government agencies make urban forestry management decisions

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
With the recent arrival of emerald ash borer, an invasive pest that preys on one of Minneapolis' most common trees, the city must prepare to face the most significant threat to its urban forest since Dutch elm disease ravaged its stately boulevard trees.

What has been done
High-resolution imaging satellite was used by U of M forest researchers to produce the most detailed map ever of the city's urban canopy.

Results
The survey showed that trees shade about 51.5 percent of the city, and that number will serve as the new benchmark for Minneapolis as it plans new investments in its urban forest and devises strategies to protect it. It will help managers target tree-planting programs to counteract heavy losses of ash.

4. Associated Knowledge Areas

KA Code	Knowledge Area
124	Urban Forestry

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Competing Public priorities

Brief Explanation

Demand for intergenerational land transfer influenced the content of much of the forestry programming in 2011.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Special initiatives of the forestry team have been evaluated to understand whether they are effective in meeting goals. Last year, we featured the evaluation of an initiative to help forest owners understand new property tax laws. This year, we featured the Intergenerational Land Transfer classes. Consistently, the team considers how many acres of Minnesota's forest land is being affected by improved land management.

Key Items of Evaluation

Forestry educators helped forest land owners manage over 68,000 acres of land in 2011. Outcomes included the restoration of the Lost Forest in Northern Minnesota, and the more effective transfer of thousands of acres of land to the next generation of land owners.

V(A). Planned Program (Summary)

Program # 15

1. Name of the Planned Program

Housing

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
608	Community Resource Planning and Development	0%		30%	
610	Domestic Policy Analysis	0%		30%	
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	100%		40%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	3.3	0.0	0.0	0.0
Actual Paid Professional	2.1	0.0	2.7	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
432051	0	64997	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1419958	0	312176	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
471474	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

MAES: For this 2011 Federal Accomplishment Report, the Housing Technology planned program of previous years has been re-named Housing. This allows clearer reporting of MAES research related to housing, which includes both public policy analysis and research into changing needs for housing in Minnesota communities. Some research in this planned program is in early stages and results will be reported in subsequent years. Research with impacts in this reporting year are reported under Outcomes. Other research in 2011 includes:

- An investigation into the housing needs and preferences of older persons has been initiated. An online survey and focus groups were conducted in a major metropolitan county in Minnesota, focusing on the needs of Baby Boomers. The results were presented at a national housing education and research conference and shared with county policymakers and human service groups.
- As rural areas in Minnesota continue to suffer from a lack of health care workers, researchers are evaluating the opportunities of innovative housing strategies to help rural communities attract such workers, especially nurses.
- A new study is looking at culturally sensitive design in housing to support the health and well-being of Minnesota's diverse communities.

Extension. The housing technology team at the University of Minnesota continues to respond to issues precipitated by the volatile housing market. In 2011, more specialized workshops were offered to the remodeling industry. A depressed residential new construction industry has resulted in increased attention to remodeling and increased competition for those jobs. Remodeled construction involves a higher level of risk for housing safety because it involves changes to existing homes. Changes in one part of a home may trigger problems in other parts of the construction of a house. Concern about remodeling issues prompted the Minnesota Pollution Control Agency and several other sponsoring organizations to provide education to remodeling businesses who have limited understanding of building science, building diagnostics and performance protocols and processes.

University of Minnesota staff also continue to play a leading role in radon mitigation. Our program trains individuals to conduct radon measurement, mitigation and revention across the North Central Region of the United States. After our courses, clients sit for national proficiency examinations we administer.

2. Brief description of the target audience

In 2011, Extension targeted efforts reached individuals who sought national proficiency in radon mitigation in the North Central Region of the United States, the remodeling industry,and public agencies who are invested in the quality of home construction. In addition, U of M Extension provides policy and program recommendations to states, tribes, the Environmental Protection Agency, Health Canada and the World Health Organization.

Other target audiences for MAES research include design practitioners, policy makers, affordable housing providers, building managers, architects, engineers, older adults, and local decision makers in rural communities.

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	550	4682	0	0

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	3	4	7

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Educational courses will be delivered to the target audiences.

Year	Actual
2011	41

Output #2

Output Measure

- New research will result in the development of new and revised educational materials. (Target expressed as the number of new or revised curriculum materials.)

Year	Actual
2011	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Improve the durability of new homes by working with builders. (Target expressed as the number of builders trained.)
2	Improve the availability of healthy and affordable housing through the mitigation of indoor environmental risks. (Target expressed as number of homes affected.)
3	Research on housing foreclosure will inform public policy
4	Research will support sustainable building design.

Outcome #1

1. Outcome Measures

Improve the durability of new homes by working with builders. (Target expressed as the number of builders trained.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	297

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
A depressed new-construction industry has resulted in increased attention to remodeling as a market for construction firms. Remodeled construction involves a higher level of risk for housing safety because changes in one part of a home triggers problems in other parts.

What has been done
In 2011, more specialized workshops for the remodeling industry were conducted. The Pollution Control Agency and several other sponsoring organizations have partnered with Extension to provide education about building science, building diagnostics and performance protocols and processes.

Results
The training prepared 297 builders to safely meet the demand for remodeling.

4. Associated Knowledge Areas

KA Code	Knowledge Area
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures

Outcome #2

1. Outcome Measures

Improve the availability of healthy and affordable housing through the mitigation of indoor environmental risks. (Target expressed as number of homes affected.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	30000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Radon in homes is responsible for 21,000 U.S. lung cancer deaths per year. Indoor radon is the most serious indoor environmental toxican, killing 70 times more people than accidental carbon monoxide exposure in homes. Controlling this risk is essential for the cost-effectiveness of renewable energy.

What has been done
The Indoor Radon Exposure program trains individuals to conduct radon measurement, mitigation and prevention primarily across the North Central Region of the U.S. After the course, clients sit for national proficiency examinations. Passing the exams is required for certification or state licensing.

Results
Following national certification and/or state licensing, graduates each year measure radon in tens of thousands of homes and mitigate elevated radon in about 30,000 homes. Using a U.S. Environmental Protection Agency matrix, graduates prevent about 500 lung cancer deaths per year.

4. Associated Knowledge Areas

KA Code	Knowledge Area
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures

Outcome #3

1. Outcome Measures

Research on housing foreclosure will inform public policy

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The economic recession and decline in housing prices focused attention on the difficulties of home owners, particularly rural home owners.

What has been done
Researchers gathered and analyzed foreclosure data from communities across Minnesota. Following up on this work, they analyzed data related to the post-foreclosure movements of former homeowners.

Results
Findings from this project have helped to formulate state housing policy in Minnesota. In particular, methods used to compile foreclosure data were used in developing new foreclosure data regulations. Findings have also been used to develop federal policies, as the researcher provided expert guidance to federal officials at the Federal Reserve Bank of Philadelphia.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
610	Domestic Policy Analysis

Outcome #4

1. Outcome Measures

Research will support sustainable building design.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Business owners have been concerned that there is little or no return on their investment in sustainable building design.

What has been done
Researchers tested an evaluation instrument they developed to assess occupants statisfaction with their interior work space in six buildings. The findings were shared with design researchers, educators and design architecture firms.

Results
The evaluation survey instrument designed and used by the researchers offers proof that indoor environmental quality, including thermal, lighting and acoustic conditions, furnishings and aesthetics, does positively impact employees who work in sustainable buildings. Firms are beginning to consider using the questionaire to inform their design team and business owner of the influence that sustainable interior environments has on their employees or other building occupants.

4. Associated Knowledge Areas

KA Code	Knowledge Area
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

Curriculum development was a priority in 2010, but delivery of that new curriculum was the priority in 2011, and so no new materials were developed.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The classes offered to the builders and other industry professionals are in accordance with research on building quality. Participation results in certification of builders, thus assuring more safety and quality services in the building industry. Evaluation of the outcomes of these programs rely mostly on third party assessments of how quality building and safety maintenance affects home owners and home safety.

Key Items of Evaluation

The Housing Technology team is providing a means to prepare home builders and remodelers to assure the safety and quality assurance of the industry. Education is based on research. Third-party research examines the value of the service to the industry.

V(A). Planned Program (Summary)

Program # 16

1. Name of the Planned Program

Agricultural Business Management

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	10%		20%	
602	Business Management, Finance, and Taxation	40%		20%	
603	Market Economics	10%		30%	
604	Marketing and Distribution Practices	40%		20%	
610	Domestic Policy Analysis	0%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	8.3	0.0	1.2	0.0
Actual Paid Professional	10.7	0.0	15.7	0.0
Actual Volunteer	0.0	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
632503	0	455302	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
2151044	0	756935	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
1230308	0	2697730	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Highlights of MAES research to support agricultural business management in 2011 included:

- A study was completed on the impact of increasing levels of loss given default and probability of default and their correlation on the economic capital requirements of an agricultural lender through the agricultural business cycle. The study improves understanding of how changes in economic conditions in agriculture drive the loan losses and capital levels of lenders.
- Research addressed the issues of competition in the livestock and meat sectors. The study was initiated as a result of recent calls for increased antitrust enforcement and legislative proposals to address competition in animal agriculture. The findings from the research have directly impacted national level conversations on competition issues in animal agriculture. The principal investigator provided testimony at USDA and Department of Justice joint hearings on competition.
- A study showed that residual herbicide price rebates can substantially increase the use of residual herbicides in Roundup Ready soybean cropping systems. However, price rebates are not as effective at increasing residual herbicide use in Roundup Ready cotton and corn cropping systems. Increased use of residual herbicides is one of several key strategies that have been identified for reducing the risk of herbicide resistant weeds. The results of this research have been recognized by the National Academy of Sciences, which appointed the principal investigator to their planning committee for a national summit on strategies to managem herbicide-resistant weeds.
- Researchers analyzed whole farm profitability and risk under conventional and organic practices using long-term experimental trial data at the Southwest Research and Outreach Center . The analysis found that the number of acres that can be farmed organically is considerably less than that for a conventional operation. This has important implications for farms in transition, since it suggests that they may downsize as part of the transition process.

Extension. In 2011, prices for most Minnesota crops being high, and so demand for education about planning to enhance farm income was very low. Tax planning was of concern, and so media and on-line educational materials were focused at issues of depreciation and other issues of tax planning.

However, family farm owners expressed concern about protecting their farm estates as the value of the land has increased, and so there was a demand for programming was for the program called Farm Transition and Estate Planning: Create your Farm Legacy. This program is an in-depth, interactive program focused on assisting farm and ranch families with the transition of their business to the next generation. Topics included in the program workshop are establishing transfer and estate goals, intergenerational communication, tax issues, business entity and transfer strategies, estate laws and planning strategies, long-term care issues, treatment of heirs, establishing a transfer and estate planning team, and developing a written transfer and estate plan outline. In 2011, the small ABM team conducted a total of 14 program workshops throughout Minnesota, North Dakota, South Dakota and Montana.

Increasingly, discussion during farm transfer trainings and consultations turned to the farmers' concern about long-term health care planning. Children of aging parents, aging farmers themselves, and consulting attorneys have all requested educational programming on the issue. In 2011, Agricultural Business Management educators developed materials for programming that will be offered in 2012.

MAES. Research foci will be on review of policy that relates to agricultural business management, the farm bill, commodity crops and precision agriculture. Key research studies will include the following:

- Research to support improved decision-making in farm planning and financing for farmers and lenders
- Research to support improved decision-making in financing for agricultural business owners.
- Research on the economic interrelationships in both the domestic and foreign food and agricultural industries.
- Development and maintenance of an analytical support system that facilitates research and analysis on food, agricultural and trade policy issues.
- Evaluation of supply, demand and policy factors in the U.S. and abroad that influence both short-term and long-term trade prospects and patterns.
- Information to help public policy participants and decision makers evaluate issues and increase public understanding of these issues.

2. Brief description of the target audience

Our survey and anecdotal data has shown that Extension and Experiment Station research has a greater impact on agriculture when it directly reaches those who disseminate key information. Therefore, our target audiences for Ag Business Management programs include:

- Farmers, especially crops farmers with growing real estate values
- Other agricultural professionals (e.g., crop consultants)
- Farm business management educators
- State and federal policy makers

3. How was eXtension used?

eXtension was not used in this program

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	447	40496	0	0

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total

Actual	1	12	13

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Educational events will deliver agricultural business management content. (Target expressed as the number of events.)

Year	Actual
2011	14

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	In post-program surveys, farm owners will report increased net in farm income as a result of actions taken. (Target expressed as an average net income increase for outcomes of any program intervention.)
2	Participants of the Agricultural Business Management (ABM) program workshops/classes and conferences will achieve significant learning gains regarding research-based agriculture business management knowledge and skills. (Target expressed as the percentage of participants who achieved significant learning gains as a result of attending ABM program workshops/classes and conferences.)
3	Participants of Agricultural Business Management (ABM) workshops/classes and conference sessions intended to improve participant agriculture business management practices will significantly improve their management practices as a result of attending the program. (Target expressed as a percentage of participants that significantly changed one or more of their agriculture business management practices as a result of attending workshops/classes and conference sessions intended to improve participant management practices.)
4	As a result of proactive management of estate planning and transfer for the next generation, business and personal assets will be protected. (Outcome expressed as the dollars of estate for which orderly plans are in place, in millions of dollars.)

Outcome #1

1. Outcome Measures

In post-program surveys, farm owners will report increased net in farm income as a result of actions taken. (Target expressed as an average net income increase for outcomes of any program intervention.)

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Participants of the Agricultural Business Management (ABM) program workshops/classes and conferences will achieve significant learning gains regarding research-based agriculture business management knowledge and skills. (Target expressed as the percentage of participants who achieved significant learning gains as a result of attending ABM program workshops/classes and conferences.)

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Participants of Agricultural Business Management (ABM) workshops/classes and conference sessions intended to improve participant agriculture business management practices will significantly improve their management practices as a result of attending the program. (Target expressed as a percentage of participants that significantly changed one or more of their agriculture business management practices as a result of attending workshops/classes and conference sessions intended to improve participant management practices.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	77

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The complicated nature of farm transfer, combined with the complicated nature of family dynamics, often cause families not to establish a plan for estate transfer. The future of the family farm relies upon careful transfer. The rising value of land complicates this transfer and grows the stake rural people have in the family farm.

What has been done
Workshops and workbooks, offered throughout the upper Midwest, provide information that families need to develop or update their business transfer plan or to develop or update the personal estate plan.

Results
Six months following workshops, surveys were mailed to all farm business units with members participating in the program. Participants were asked to indicate if they had started to develop or update their transfer plans or estate plans. Participants reported a change in action because of the program. Specifically,
1) 49.4 percent had completed 75 percent or more of the business transfer process; 50.6 percent had completed 25-50 percent.
2) 47 percent had completed personal estate plans; 53 percent had completed 25-50 percent of the process.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation

Outcome #4

1. Outcome Measures

As a result of proactive management of estate planning and transfer for the next generation, business and personal assets will be protected. (Outcome expressed as the dollars of estate for which orderly plans are in place, in millions of dollars.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	59

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Orderly plans for transfer of business and personal assets to the next generation protects family farms, and assures more personal control over family assets.

What has been done
Workshops and materials dissemination reached a total of 447 farm/ranch family members from 135 different communities in Minnesota, North Dakota, South Dakota and Montana.

Results
The total actual financial impact of this program effort, where there is now an orderly plan for transfer, was $58.5 million dollars for the 2010-11 program year. (Note: The quantitative number was rounded because the field would not accept decimal points.)

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation

V(H). Planned Program (External Factors)

External factors which affected outcomes
- Economy
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

As noted in the activities section, there was low demand for business planning, but there was great demand for estate transfer planning because land values increased. The team responded by focusing efforts on land transfer, and by beginning to expand that curriculum to cover long-term disability issues.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The program has had a demonstrated impact in moving farm owners to action in planning for land transfer. The team will continue to evaluate the longitudinal effects of the program.

Key Items of Evaluation

The Agricultural Business Management program has quantified the number of acres and amount of money that is effectively transferred after our educational efforts are complete. This will continue to be the measure of success for the program.

V(A). Planned Program (Summary)

Program # 17

1. Name of the Planned Program

Horticulture

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	5%		10%	
132	Weather and Climate	5%		5%	
201	Plant Genome, Genetics, and Genetic Mechanisms	5%		25%	
204	Plant Product Quality and Utility (Preharvest)	20%		10%	
205	Plant Management Systems	50%		25%	
211	Insects, Mites, and Other Arthropods Affecting Plants	10%		15%	
213	Weeds Affecting Plants	5%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	8.9	0.0	50.6	0.0
Actual Paid Professional	7.8	0.0	67.7	0.0
Actual Volunteer	63.2	0.0	0.0	0.0

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

Extension		Research	
Smith-Lever 3b & 3c	**1890 Extension**	**Hatch**	**Evans-Allen**
569567	0	522027	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1642285	0	5370998	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
914293	0	5812355	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

MAES:

In 2011 MAES continued to make progress in providing new cold hardy fruits, flowers and woody plants to support Minnesota's horticultural industry and home gardeners. Research also progressed on Minnesota's major horticultural crops, including potatoes, sweet corn and other vegetables. Some notable results of research this reporting year:

- Important outcomes from potato genomics research include a meta-analysis of the resistance gene space of the Solanacease (potato/tomato/tobacco family) that included nearly 800 DNA sequences. This has provided the research community with common terminology useful for cross-species analyses.
- Project outputs of studies to improve forage use in Minnesota have created greater awareness of the forage potential, value and differences among perennial cool-season grasses in Minnesota and the North Central region. Dairy producers are using more grasses as a result.
- Many golf courses in Minnesota are considering the conversion of Kentucky bluegrass rough to no-mow low-input grass species as a way of reducing water use and pesticide inputs. However, little information on this type of conversion process has been available. Researchers have completed a two-year study evaluating several conversion establishment techniques with multiple low-input grass species. Results indicate that several grass species can be used for this type of conversion and that low-cost conversion methods exist. The results from this project will be useful to golf course superintendents throughout much of the northern U.S.
- Studies on management of elms have greatly influenced the selection and pruning of elms through Minneapolis and the U.S.
- Floriculture breeding work has led to the release of a new, cold tolerant gaura.
- Four recent rose cultivars continue to sell well in retail nurseries in the upper Midwest and data from Earth-Kind trials (low input growing conditions replicated in multiple sites in the U.S.) reveal them to be among the top performers in such conditions.
- U of M work to evaluate and select native and ornamental grasses has increased the sales and popularity of these grasses as low maintenance landscape plants.

Impacts from horticultural research in 2011 related to bee health and the Minnesota wine grape industry are reported under Outcomes in this report

Extension: The horticulture team at Extension is a trusted and well-known resource for garden growers and the horticulture industry. Over 2,000 Master Gardeners are in place border-to-border to

provide guidance and support to others who care about Minnesota's green spaces. They provided over 130,000 hours of volunteerism.

Master Gardeners work in public housing, schools, and alongside youth projects. In Hennepin and Ramsey County -- the two most urban counties in Minnesota -- Master Gardener projects reached low-income schools, community sites, public housing units and Habitat for Humanity homeowners. A recent study from the Extension Center for Community Vitality reinforce the importance of this endeavor. Dr. Ryan Allen of the Humphrey Institute determined that household income has a strong negative association with physical neighborhood problems. His study demonstrates a link between poverty and physical problems in neighborhoods and suggests a positive role for beautification programs that can be an initial step to addressing the impact of poverty on neighborhoods.

As described in program outcomes, the horticulture team is another of Minnesota's teams directing considerable effort to using technology to provide education more efficiently throughout the state.

2. Brief description of the target audience

The audiences are:

1) fresh market producers, including growers of fruits and vegetables for processing, the processing industry, associated agribusiness turf professionals, nurseries and garden centers, and landscape professionals. Several of these groups have high representations of new immigrants.

2) consumers of horticultural information for yards, gardens and landscapes. These include audiences where information is needed in a timely fashion and those who want to build basic knowledge about horticulture and environmental stewardship over time.

Other specific research audiences include plant biologists and geneticists, state and regional fruit and flower growers, vegetable processors, potato growers, the local regional and national wine industry, nurseries and beekeepers.

3. How was eXtension used?

eXtension is an outlet through which some of Minnesota's most sophisticated Master Gardeners contribute to Extension, serve gardeners, and enjoy the use of their training to help others. Extension's Master Gardener site links directly to eXtension. Volunteers are registered into the eXtension program and have indictated the types of questions that they are most available to answer. They also choose the geographic boundaries from which questions can come. Sometimes, questions frequently asked of eXtension volunteers are fodder for educational materials that educators produce. eXtension offers a nice alternative for Master Gardener volunteers, especially those with physical limitations.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	196126	1612845	59359	0

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

Patent Applications Submitted

Year: 2011
Actual: 0

Patents listed
255,485

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	10	32	42

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Workshops, classes and seminars will provide information to professionals in the commercial horticulture industry. (Target expressed as number of events.)

Year	Actual
2011	66

Output #2

Output Measure

- Master Gardeners, trained by Extension, will deliver hours of educational service to the residents of Minnesota. (Target expressed as the number of volunteer hours committed by Master Gardeners in a year.)

Year	Actual
2011	131450

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Participants of Horticulture program events will achieve significant learning gains regarding horticulture. (Target expressed as the percentage of participants who achieved learning gains.)
2	Participants of Horticulture program events intended to improve participant horticulture practices will improve practices as a result of attending events. (Target expressed as a percentage of participants that changed one or more horticulture practice.)
3	An online diagnostic tool will provide an online resource that increases access to diagnostic information and helps growers select appropriate management strategies. (Outcome expressed is the percentage of users surveyed who said on-line diagnosis allowed for appropriate management strategies.)
4	Research will support the development and improvement of a Minnesota wine grape industry.
5	Research will provide information to support bee health

Outcome #1

1. Outcome Measures

Participants of Horticulture program events will achieve significant learning gains regarding horticulture. (Target expressed as the percentage of participants who achieved learning gains.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	84

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Research-based information about horticulture in Minnesota's cold environment help to create more beautiful and profitable spaces where Minnesotans live, work and play.

What has been done
Educational courses are offered for and by volunteers in community and online settings.

Results
In an examination of horticulture workshops, 198 of 237 persons asked reported learning gains.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
132	Weather and Climate
201	Plant Genome, Genetics, and Genetic Mechanisms
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
213	Weeds Affecting Plants

Outcome #2

1. Outcome Measures

Participants of Horticulture program events intended to improve participant horticulture practices will improve practices as a result of attending events. (Target expressed as a percentage of participants that changed one or more horticulture practice.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
In urban areas, there is growing interest in developing public green space both as a means to beautify neighborhoods, provide local foods and nurture ties and bonds among community members.

What has been done
Master Gardeners in Ramsey and Hennepin County worked with community initiatives to train local residents and volunteers to revamp and maintain community gardens. These initiatives reached over 20 schools, more than 20 community sites, two public housing units and 61 Habitat for Humanity homeowners.

Results
100% of these projects engaged community members in training that resulted in the development or maintenance of public gardens.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
132	Weather and Climate
201	Plant Genome, Genetics, and Genetic Mechanisms
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants

213 Weeds Affecting Plants

Outcome #3

1. Outcome Measures

An online diagnostic tool will provide an online resource that increases access to diagnostic information and helps growers select appropriate management strategies. (Outcome expressed is the percentage of users surveyed who said on-line diagnosis allowed for appropriate management strategies.)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	91

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Horticultural pest problems were formerly addressed through a myriad of clinics, phone lines and on-site helps. As Extension has evolved, many of these resources were discontinued and educators were reassigned to service areas too large for daily individualized consultation on pest issues.

What has been done
From 2006 to 2011, the horticulture team developed and expanded an online diagnostic tool called "What's wrong with my plant?" (at extension.umn.edu/gardeninfo/diagnostics). The tool includes 32 deciduous trees and shrubs, 19 perennials, 14 vegetables, six fruit trees and turf grass. Five annuals and 20 shrubs will be added in spring of 2012. Federal and state dollars leveraged over $50,000 in grants for the tool from the IPM Center, the MN Fruit and Vegetable Growers Association and the MN Renewable Resources Extension Act.

Results
The online diagnostic tool received 15,277 from April - September, 2011. In a follow up survey of Master Gardeners, Extension educators and Minnesota gardeners (n=193), 92% reported the tool helped diagnose a pest problem; 91% reported that having a proper diagnosis allowed them to select appropriate management strategies; 100 percent of Extension educators and landscape professionals reported that having a proper diagnosis allowed them to recommend appropriate practices to manage the pest problem. The tool is now tapped regionally and nationally by the Wisconsin DNR and national eXtension.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
213	Weeds Affecting Plants

Outcome #4

1. Outcome Measures

Research will support the development and improvement of a Minnesota wine grape industry.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The Minnesota wine grape industry in Minnesota only exists because of U of M developed cold hardy wine grapes. To grow that industry more research is needed.

What has been done
In the past 30 years, the U of M has developed cold hardy grapes that are now made into the four most widely produced wines in Minnesota. It's wine industry has been growing progressively for the past 15 years. There are now 33 wineries throughout the state, and more than 1,000 acres of vineyards. Last year, researchers produced 100 different kinds of wines for trials.

Results
As a result of this success, a new $2.5 million grant from the U.S. Department of Agriculture will allow Minnesota researchers and scientists from 11 other institutions to research more climate-resistant wine grapes, the acidity and taste within wine grapes and how best to market the wine to consumers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms

204 Plant Product Quality and Utility (Preharvest)

Outcome #5

1. Outcome Measures

Research will provide information to support bee health

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
One-third of the food we eat is dependent on the plant pollination of bees. In 2006 there was a massive die-off of bee colonies--up to 90 percent of colonies were killed in one season--and since then there has been considerable concern for the survival of the U.S. bee population.

What has been done
U of M bee research has been focusing on the possible causes of what is now known as colony collapse. Researchers have found that colonies that fail to thrive often have weakened immune systems because they are starving. Pollen and nectar from plants provide the protein and carbohydrates bees need to survive and there simply aren't enough diverse plants to sustain them.

Results
Through a unique outreach effort, the leading U of M bee researcher has established a program to assist commercial honey bee breeders in Minnesota and California to select bee stocks for traits that help bees defend themselves against pathogens and parasites. Hightened understanding of colony collapse is changing farm policy. The U.S. Department of Agriculture is combining grant money with road projects. States that expect support for highways must also replant road edges with native plants for pollinators.

4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Competing Public priorities

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

The horticulture team measures its outputs in regard to the amount of volunteerism it creates for the state of Minnesota. It also tracks progress in creation community sites where gardens grow.

Key Items of Evaluation

The Master Gardener program in Minnesota leveraged the equivalent of 63.2 full-time staff to nurture green space and citizen gardeners throughout the state.