

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Climate Change

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
102	Soil, Plant, Water, Nutrient Relationships	10%			
133	Pollution Prevention and Mitigation	20%			
205	Plant Management Systems	10%			
601	Economics of Agricultural Production and Farm Management	10%			
605	Natural Resource and Environmental Economics	20%			
608	Community Resource Planning and Development	30%			
	Total	100%			

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	7.0	0.0	0.0	0.0
Actual Paid Professional	17.0	0.0	0.0	0.0
Actual Volunteer	498.0	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
791338	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
791338	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

For 2012, University of Wisconsin-Extension Cooperative Extension reports collaboration among interdisciplinary colleagues and partners providing timely research-based education and assistance to adapt to and mitigate climate change impacts through developing, implementing and evaluating outreach programs to reduce carbon, nitrogen, energy and water footprints in their communities. As described in the audience section, 57 trained tribal members learned to recognize climate impacts and adaptation strategies, and the Climate Adaptation Planning Workshop with the Oneida Nation resulted in 21 representatives of 12 tribal nations building capacity to develop plans leading to climate adaptation and mitigation by the tribes. Supporting this work are the Great Lakes National Visitor Center and interagency Wisconsin Initiative on Climate Change Impacts: <http://www.wicci.wisc.edu>

Reducing the nitrogen footprint improves sustainability: Even as agricultural lenders are looking harder at farm financial performance, Wisconsin farmers face increasing regulatory pressures due to agricultural nutrient contributions producing non-point source pollution to all water resources. Dairy and livestock owners increasingly need nutrient management plans for environmental and cost-sharing compliance, as well as for farmland preservation tax credits. The Nutrient Management Farmer Education (NMFE) curriculum combines classroom instruction, individual consultation, and on-farm field trials to engage farmers in designing nutrient management plans they can understand and follow. As of 2012, 4,156 NMFE-trained producers in 53 counties farm at least 1,033,000 acres of cropland and grazing land under nutrient management plans that meet all local, state and federal regulations. The farmer benefit values \$7.2 million for NM plans, and nearly another \$2.6 million for farmland preservation tax credits.

See the external factors section of this report for a description of how corn growers can adjust the N rate for their location using the new Soil Nitrate Monitoring Network web site: <http://uwlab.soils.wisc.edu/soilnitratemonitoring>

Coastal hazards planning: Great Lakes coastal communities must address and plan for many possible impacts of climate change. Online tools are being developed to assist local officials in addressing existing threats and effects of climate change on Great Lakes communities. The resources were piloted at the Online Tools for Coastal Hazards Planning: Working with Great Lakes Communities workshop held at UW-Green Bay in June 2012. Of participants who completed a post-workshop, online evaluation survey for the event (77%):

- 85% indicated that the workshop increased their knowledge of online tools and information for coastal hazards planning.
- 85% believed the workshop was a good use of their time.
- 60% said they learned something new at the workshop that they will apply in their work. At the time of

the workshop, only 26% of respondents said they were currently including projected climate changes in their work or planning.

2. Brief description of the target audience

Cooperative Extension reached an estimated 46,953 adults and 1,593 youth through direct teaching methods. The audience includes Great Lakes Region colleagues and partners, youth and adult dairy and livestock producers and workers, producer associations, growers and grower associations, agronomists, crop consultants, professional nutrient applicators, coalitions and cooperatives, composters and recyclers, coastal and other community leaders, business owners, town, city, county and tribal governments, elected officials, planning and emergency management departments, planning commissions, economic development practitioners, school districts, 4-H youth and trained volunteer leaders, and others.

Serving under-represented communities: As climate changes, tribal place-based culture and economies must adapt to changing conditions. The Changing Climate, Changing Culture Teacher Institute and the Gikinoo'wizhiwe Onji Wabaan (G-WOW, Guiding for Tomorrow) educational exhibit at the Great Lakes National Visitor Center trained 57 tribal members to recognize climate impacts and adaptation strategies, and raised the awareness of around 3,300 other visitors about the effects of climate change on tribal lifeways. UW-Extension Cooperative Extension's role in planning and delivering the Institute for Tribal Environmental Professionals Climate Adaptation Planning Workshop in Oneida, Wisconsin, resulted in 21 representatives of 12 tribal nations building capacity to develop plans leading to climate adaptation and mitigation by the tribes: <http://www.g-wow.org/en-us/default.aspx>

Wisconsin Initiative on Climate Change Impacts (WICCI): This statewide collaboration brings scientists and stakeholders together to find adaptation strategies to reduce potential negative impacts of climate change in Wisconsin. WICCI issued its first comprehensive report in February 2011, Wisconsin's Changing Climate: Impacts and Adaptation. Wisconsin Cooperative Extension statewide climate specialist David S. Liebl leads the WICCI outreach effort, chairing the WICCI Outreach Committee and serving on the WICCI Science Council. WICCI's outreach program focuses on building capacity among Wisconsin decision makers to integrate climate projections into resource management decisions: <http://www.wicci.wisc.edu>

3. How was eXtension used?

Wisconsin Cooperative Extension campus and county faculty and staff participate in various communities of practice, engaging with colleagues around the country to improve the educational content of research-based programs and assistance delivered to residents across the state and region. Extension colleagues are connected by email ListServ, blogs and online newsletters, and shared resources such as teleconferences and webinars, eXtension Communities of Practice, and the national Extension Disaster Education Network (EDEN) to quickly address critical and emerging issues such as responding to extreme weather during 2012. Interdisciplinary colleagues and other professionals in this network include University of Wisconsin researchers on the Madison, Platteville, River Falls, Stevens Point and Superior campuses and centers, working with 3 tribes, and at 11 agricultural research stations.

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	46953	0	1593	0

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

Patent Applications Submitted

Year: 2012

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	0	13	13

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- {No Data Entered}

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Develop, implement and evaluate outreach programs that reduce carbon, nitrogen, energy and water footprints in their communities.
2	Reduce atmospheric greenhouse gas emissions.
3	Maximize carbon sequestration potential in agriculture and forests.
4	Develop outreach programs that reduce carbon, nitrogen, energy and water footprints in communities - Coastal hazards planning.

Outcome #1

1. Outcome Measures

Develop, implement and evaluate outreach programs that reduce carbon, nitrogen, energy and water footprints in their communities.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	9800000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Even as agricultural lenders are looking harder at farm financial performance, Wisconsin farmers face increasing regulatory pressures due to agricultural nutrient contributions producing non-point source pollution to all water resources. Dairy and livestock owners increasingly need nutrient management plans for environmental and cost-sharing compliance. Government agricultural programs, zoning, large farm licenses, state animal feeding operation permits and new farmland preservation tax credits all require farms to have nutrient management plans. Regulations aside, improving nutrient management practices can also improve farm profitability and water quality.

What has been done

The Wisconsin Cooperative Extension Nutrient Management Team researches and updates guidelines and software to help farmers credit nitrogen from legumes and manure to save fertilizer cost and prevent loss of nutrients from fertilizers and manure to groundwater, lakes, streams, the Gulf of Mexico and the atmosphere. The Nutrient Management Farmer Education (NMFE) curriculum combines classroom instruction, individual consultation, and on-farm field trials to engage farmers in designing nutrient management plans they can understand and follow. Funding, local delivery and collaboration among extension faculty and staff, agency partners, trained agricultural educators and consultants reach farmers most at risk who can benefit the most.

See the external factors section of this report for a description of how corn growers can adjust the N rate for their location using the new Soil Nitrate Monitoring Network web site:
<http://uwlab.soils.wisc.edu/soilnitratemonitoring>

Results

Reducing the nitrogen footprint improves sustainability: Since 2000, an estimated 85% of the total 1,215,300 acres farmed in 53 counties by the 4,156 producers trained by Wisconsin Cooperative

Extension Nutrient Management Farmer Education (NMFE) are now covered by a qualified nutrient management (NM) plan. So as of 2012, at least 1,033,000 acres of cropland and grazing land are covered under an NM plan that meets all local, state and federal regulations. NM plans cost about \$7 per acre for farmer time and effort. Thus, with 1,033,000 acres under NM plans as of 2012 due to NMFE, the farmer benefit values at least \$7.2 million. As an added benefit, farmland preservation tax credits starting in 2010 range from \$5 to \$10 per acre and require compliance with state soil and water conservation standards, including filing NM plans. Conservatively assuming only half of the acres under NM plans as of 2012 due to NMFE claim this tax credit at the minimum \$5 per acre, the farmer benefit values nearly another \$2.6 million.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
133	Pollution Prevention and Mitigation
601	Economics of Agricultural Production and Farm Management
608	Community Resource Planning and Development

Outcome #2

1. Outcome Measures

Reduce atmospheric greenhouse gas emissions.

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Maximize carbon sequestration potential in agriculture and forests.

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Develop outreach programs that reduce carbon, nitrogen, energy and water footprints in communities - Coastal hazards planning.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Great Lakes coastal communities must address and plan for many possible impacts of climate change. This is a complex issue with potential to worsen existing hazards and create new ones. Despite the challenging nature of climate change and lack of precedent to deal with impacts, communities and agencies find themselves facing immediate effects and planning for future scenarios. Moving forward, individuals and decision-makers need locally relevant, science-based data to make informed decisions. Help is also needed to understand new information as it becomes available and build it into the planning process.

What has been done

Online tools are being developed to assist local officials in addressing existing threats and effects of climate change on Great Lakes communities. The tools incorporate geospatial data, science-based information, and visualizations. The Association of State Floodplain Managers and National Oceanic and Atmospheric Administration Coastal Services Center are providing leadership with the Digital Coast partnership. Outputs are intended to help decision-makers understand and document the effects of various activities in terms of community risks and liabilities. Training and outreach strategies are also being developed to bring the online tools to more coastal communities.

The resources were piloted at the Online Tools for Coastal Hazards Planning: Working with Great Lakes Communities workshop held at the UW-Green Bay in June 2012. UW-Extension Cooperative Extension Environmental Resources Center staff led planning efforts for the workshop, working closely with project partners. The workshop shared the resources with attendees and gathered important user feedback for the design process. Workshop planning engaged a team from a variety of organizations with local, regional and national expertise. The target audience included professionals involved in local, state and tribal planning and decision-making on land use, public health, community and economic development, emergency preparedness and natural resource management.

Results

Coastal hazards planning: Of 37 people from various organizations who attended the workshop, most were county government employees. Many indicated that the online tools had great potential. They suggested having information in one location and being able to apply it to real life scenarios. Suggestions for additional data to be included were legal cases or project studies; pictures or videos from recent events such as floods, and bluff failure, and legal standards or requirements. Of participants who completed a post-workshop, online evaluation survey for the event (77%):

- 85% indicated that the workshop increased their knowledge of online tools and information for coastal hazards planning.

- 85% believed the workshop was a good use of their time.
- 60% said they learned something new at the workshop that they will apply in their work. At the time of the workshop, only 26% of respondents said they were currently including projected climate changes in their work or planning.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
605	Natural Resource and Environmental Economics
608	Community Resource Planning and Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Competing Public priorities
- Other (Database development)

Brief Explanation

Natural disasters: Intense heat and severe drought lingered through 2012. University of Wisconsin-Extension Cooperative Extension responded quickly to immediate issues. Planning for, coordinating and leading a longer-term response that focuses on production, financial and human/family aspects of this challenge is critical - to respond proactively now so that as drought impacts unfold, programs and resources are in place to continue responding appropriately.

For example, where drought reduced corn yields, the crop used less nitrogen (N) than applied. This excess N is mostly nitrate, which can be lost to the environment and impair water quality. If excess nitrate remains in the soil, spring nitrogen rates may need adjusting. Producers aware of potentially high-nitrate areas can test for it and reduce N applications if needed. Doing so will both increase farm profitability by applying the right amount of N as well as reduce excess nitrate to maintain water quality.

Extension soil scientist Carrie Laboski developed and coordinated a soil nitrate monitoring network to collect data and educate producers and agronomist about the potential for N to carryover from the 2012 crop to the 2013 crop. Fourteen county agriculture agents assisted Laboski by taking profile soil samples (0 to 2 feet) in 60 locations throughout the state in November 2012, analyzed by the Soil and Forage Analysis Laboratory at the UW Marshfield Agricultural Research Station.

Analysis revealed that nitrate in the soil profile remaining after the 2012 corn crop is quite variable. In some cases, the nitrate content is low enough that 2013 N management does not need to be altered. In other cases, the nitrate content is quite high. If most of this nitrate remains in the soil through winter, then reduced spring N applications will improve profitability and reduce the potential for water quality impairment by having too much N on the 2013 crop. Network members will sample soils again in spring, and producers can find

how to adjust the N rate for their location using the new Soil Nitrate Monitoring Network web site:
<http://uwlab.soils.wisc.edu/soilnitratemonitoring>

UW-Extension Cooperative Extension has devoted resources to work collaboratively with partner agencies to address such challenges of the drought, including production, financial, and humans responding to stressful situations. An extension point person has been designated to work with state specialists, county agriculture and family living educators and partners to coordinate the longer-term response needed. See the report added for 2012 Wisconsin Cooperative Extension Response to the Drought.

Database development: UW-Extension Cooperative Extension is in the midst of replacing the legacy planning and reporting database, which was closed in 2012. For this report: The 2012 direct contacts for adults reported are the 4-year average of past performance of relevant statewide teams in 2008-2011.

The 2012 program participation is in alignment with previous years. The 2012 direct contacts for youth reported are 4-H enrollments in relevant projects reported on the ES-237 form for 2011-2012.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}