MINNESOTA DEPARTMENT OF AGRICULTURE

Minnesota's Agricultural Fertilizer Research and Education Council (AFREC)

2013 LEGISLATIVE REPORT

Lysimeter Research Plots at the University of Minnesota's Southern Research and Outreach Center, Waseca, MN Photo from Jeff Vetsch

Table of Contents

Cover Photo: Overhead view of the drainage lysimeter complex at the Southern Research and Outreach Center near Waseca, Minnesota. Lysimeters are large blocks of isolated soil which are instrumented to allow researchers the unique opportunity to study nutrient and water movement leaching through the soil profile. This field installation was constructed in the mid-1970's and has provided extremely valuable information on the interactions between crop production, fertilizer rates, rainfall, and nitrogen losses. One of AFREC's first projects provided supplemental funding to continue water quality research and crop response in a corn-corn-soybean rotation at this location.

Photo provided by Dr. Gyles Randall and Jeff Vetsch.

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Executive Summary

As application technology, climate patterns, plant genetics, new crops and other agricultural changes continue to emerge, fertilizer recommendations and associated strategies will need to evolve to insure maximize fertilizer use efficiencies and profits. To meet that challenge, Minnesota recently became the twelfth state in the nation to establish a soil fertility program that is funded by fertilizer sales.

Since conception, the Agricultural Fertilizer Research and Education Council (AFREC) has funded over $2.75 million for soil fertility research and associated educational programs. AFREC has 12 appointed positions representing Minnesota organizations. Statutes specifically designated the following Minnesota organizations and the number of positions (in parenthesis) as: Corn Growers (1), Soybean Growers (1), Crop Production Retailers (2), Grain and Feed (1), Wheat Growers (1), Certified Crop Advisors (1), Farmers Union (1), Farm Bureau (1), Irrigators Association (1), Potato Growers (1) and the Sugar Beet Industry (1).

This council has demonstrated its ability to identify common soil fertility research goals across a very diverse state with multiple cropping systems and move forward with critical decision-making and funding selection. AFREC continues to refine and articulate its priorities to bring high quality research and education projects to the table for consideration. Recently, the council has sought additional assistance by securing a research coordinator. As a direct result of this coordinator, there has been a huge increase in communication between the various commodity groups, research institutions and national private industry. Additionally, there has been a high level of activity in coordinating and moving forward on large statewide projects that individual organizations could never before even consider. Recently, AFREC identified some specific research priorities and invested substantially in some of the smaller market crops and began the process of bringing in more private partnerships.

This type of program does not work without significant support and dedication by the University of Minnesota. UM staff has provided an enormous amount of energy and technical expertise into their projects as well as administrative support for grants and budgets.

MDA invests substantially into the program as well. MDA's role is to provide technical support, report reviews, administrative work related to the Request for Proposals, and contracting responsibilities. Collectively these activities require approximately 1 FTE (full time equivalent). Staff continues to strive to fully support the council and program as well as the larger emerging partnership across industry, land grants, commodity research councils and other potential research entities.

While AFREC is now one of the largest fertilizer check-off programs in the country, the future needs are significant. Based on the first five funding cycles, there are generally three times more funding requests than available funds. As AFREC begins to set its sights on the development of advanced technology and large statewide projects, the need for additional coordination and funding opportunities with industry and the commodity groups will become even more important.

As an outcome of the creation of AFREC and the associated partnerships, Minnesota agriculture is now in a much stronger position to provide Minnesota farmers with the most advance technology and confident recommendations. It appears that Minnesota farmers have made a very sound investment for the future of soil fertility research, technology development and supporting education.

Introduction

Minnesota's Agricultural Fertilizer Research and Education program is responsible for advancing soil fertility research, technology development, and education. This program is vital in ensuring that Minnesota farmers are maximizing their fertilizer investments while minimizing environmental impacts. The Agricultural Fertilizer Research and Education Council (AFREC) manages the program and the affiliated funding. AFREC consists of twelve members who are either farmers or agricultural professionals such as crop retailers or consultants. AFREC is responsible for identifying research needs from their respective organizations, projects that have statewide benefits, and then allocating funding in a cost effective manner.

This program is relatively new starting in 2008. The program's associated funding mechanism evolved over several legislative sessions. Since its official conception, AFREC has provided over $2,000,000 in funding via 40 contracts. An additional $800,000 was recently allocated and a majority of these funds will be in place for the 2013 cropping season. All AFREC funds are allocated as competitive bids through the "Request for Proposal" process.

Long-term funding is generated from a fertilizer tonnage fee. Collection of this fee increase started in 2009 and Minnesota farmers pay an additional 40 cents per ton across all fertilizer products. Very simply calculated, Minnesota farmers invest approximately $0.05[1] per cropland acre/year into the program. Funds from the new fees recently became available starting in 2012[2]. The Legislature established a maximum spending ceiling of $800,000 per year. Due to recent strong fertilizer sales, this program will operate at the maximum amounts in 2012, 2013 and 2014[3]. Based on current corn acres and sales trends, AFREC will likely be fully funded in the near future.

Staff from the Minnesota Department of Agriculture are responsible for assisting AFREC with the following: meeting facilitation; administrative duties such as grants, budgets and Request for Proposals (RFP) management; ex officio representation; and legal console. In the developmental stages of the program, there was significant ex officio input from the House and Senate. The University of Minnesota (UM) also holds an ex officio position. It is important to note that MDA and the UM do not have voting authority.

Although AFREC funds are open to any organization to compete for the funds, a very large proportion of the funds are allocated to the University of Minnesota and the affiliated Research and Outreach Centers. The importance and value added to this program from the UM cannot be overstated.

[1] Calculated by the average tonnage sold from 2008-2012 (2.699 million tons) times 40 cents/ton divided by Minnesota's 22 million acres of cropland.
[2] Fiscal year 2012 starts July 1, 2011 and ends June 30, 2012.
[3] Fees for the 2014 allocation were collected on the fertilizer tonnage sold between 7-1-11 through 6-30-12.

Background

In the 1990's and early 2000's, there were growing concerns that Minnesota's fertilizer recommendations and supporting research efforts were not keeping up with a rapidly changing agricultural landscape and production levels. State appropriations that once adequately funded the University of Minnesota soil fertility research became extremely limited. Confidence in the UM recommendations by farmers, crop retailers and industry appeared to be at an all-time low. Where funding was available from private industry, researchers often questioned the overall benefit to Minnesota agriculture. The number of undergraduates and graduates in soil fertility programs also dropped significantly.

As a result of these concerns, the 2005 Legislature passed legislation directing the Commissioner of Agriculture to assemble the Agricultural Nutrient Task Force (ANTF) to study a number of fertilizer related issues. Specifically related to soil fertility issues, ANTF was asked to review and make recommendations on the following:

- The need for research, education and training in the selection and application of agricultural fertilizer and soil nutrients in the state;
- The imposition of a tonnage fee on all agricultural fertilizer applied in Minnesota and the designated uses of the proceeds from the fee.

The ANTF overwhelmingly agreed that Minnesota desperately needed a dedicated program and that fertilizer users should fund the activities through some type of tonnage fee. The recommendations, which included a refundable 40 cent/ton check-off, were submitted to the Legislature in March 2006. While all of agricultural groups strongly believed in the need for a program, the major stumbling block was the issue of refunds to individuals who did not want to pay the fees. MDA estimated that if 5-10% of the producers requested refunds, a very large portion of the funds would be lost in the administration of the refunds. Consequently, the program did not have the legislative support needed in the 2006 Legislative Session.

Interest in the program remained high going into the 2007 Legislative Session. Legislation related to the formation of a governing council, which was primarily based upon the ANTF recommendations, eventually passed. The Agricultural Fertilizer Research and Education Council (AFREC) was officially created on January 1, 2008. The new language removed the controversial refund clause and inserted an expiration date (January 8, 2017). A one-time funding allocation of $600,000 was also established to provide grants. Out of this allocation, the Commissioner of Agriculture was allowed to use a set percentage of these funds to offset MDA costs incurred for fiscal and administrative duties.

The legislation also directed the Commissioner to report to the House and Senate Committees with jurisdiction over agricultural finance. Reports were submitted on February 1, 2009 and again in 2011.

Securing long-term funding was resolved in 2009 when the Minnesota Legislature established the funding mechanisms for the program. Starting July 1, 2009, MDA's Fertilizer Inspection Fee was increased by $0.40 per ton to support the Agricultural Fertilizer Research and Education Program. The new fees became available to AFREC starting on July 1, 2011. AFREC was granted the authority to spend up to $800,000 per year to support soil fertility research and associated educational activities. During the two-year transition period, the program was temporarily funded by using 57% of the existing Fertilizer Inspection Fee (Minnesota Department of Agriculture) as directed by Minnesota Laws Chapter 94, Article 1, Section 3, Subdivision 5.

With support from MDA staff, AFREC spend a considerable amount of time developing its mission statement, internal operating procedures, research priorities, and the process for the Request for Proposals. Much of this early developmental work occurred in 2008-09. In more recent years, there has been considerable discussion on how to identify research priorities and ways to improve coordination with other funding sources.

Past AFREC minutes and other related information about the program can be found at:

http://www.mda.state.mn.us/chemicals/fertilizers/afrec/meetinginfo.aspx

Milestones

2005 Legislature directed the Commissioner of Agriculture to assemble a task force to study topics related to agricultural nutrient issues. The Agricultural Nutrient Task Force (ANTF) met five times between September 2005 and February 2006. The most significant issue that the ANTF worked on was the need and funding options for soil fertility research and education programs.

2006 Agricultural Nutrient Task Force reported its recommendations and fee structure to the Legislature (March 6, 2006). The proposed fertilizer check-off was to be refundable and calculated at 40 cents per ton. Legislation did not proceed primarily due to complications and high associated costs to implement refunds.

2007 Legislature created the program and governing group called the Agricultural Fertility Research and Education Council (AFREC). Long-term funding was not included in the legislation however the Legislature did provided a one-time funding allocation of $600,000 from the general fund to launch the program. Additionally, funding and direction was provided to the Commissioner of Agriculture to help facilitate staff and support AFREC and its programs.

The unofficial AFREC team worked with MDA staff to issue its first “Request for Proposals” in the fall of 2007.

2008 AFREC was officially established on January 1, 2008 and quickly established a mission statement and operating procedures. These outcomes were reported in the 2009 Legislative Report.

By-laws were approved on June 27, 2008. A schedule for membership rotations was also established.

AFREC and MDA laid out a general annual plan consisting of the following activities:

- SUMMER MEETING: Establish research priorities and conduct internal business discussion;
- FALL: Issue the Request for Proposals (RFP);
- DECEMBER MEETING: Oral updates from all active projects;
- JANUARY MEETING: Oral presentations on new proposals and funding allocations;
- JANUARY-MARCH: Finalize work plans and grants;
- APRIL: New projects begin.

Nine projects were awarded $552,000 (General Fund) and contracts were executed April 1 in time for the 2008 cropping season.

2009 The Commissioner of Agriculture submitted a Legislative Report to the House and Senate Committees with jurisdiction over agricultural finance.

The Legislature established a long-term funding mechanism for the program. Starting on July 1, 2009, the Fertilizer Inspection Fee was increased by $0.40 per ton to support the Ag Fertilizer Research and Education Program. These fees, as stated by the Legislative, became available for distribution starting July 1, 2011. During the transition period, MDA was required to provide up to 57% of the Fertilizer Inspection Fees as directed by Minnesota Laws Chapter 94, Article 1, Section 3, Subdivision 5.

Legislative housekeeping changes were also made to allow MDA to have granting authority for up to five years. This allowed multi-year experiments which are critical in soil fertility research.

AFREC issued its second "Request for Proposals" in the fall of 2009.

2010 Seven projects were awarded $414,200 (MDA Fertilizer Inspection Fee as part of the transition period) and contracts were executed in early April.

AFREC issued its third "Request for Proposals" in the fall of 2010.

The Minnesota Crop Production Retailers hosted a half day session dedicated to AFREC projects as part of the Crop Pest Management Short Course (December)

2011 Legislative Report was submitted on February 1, 2011. MDA presented a short overview of the AFREC program to the Senate as part of Water Day.

Eight projects were awarded $262,346 (MDA Fertilizer Inspection Fee as part of the transition period) and contracts were executed April.

As of July 1, AFREC has full access to the new funds generated by the increased tonnage fee (40 cents/ton).

AFREC issued its fourth "Request for Proposals" in the fall of 2011.

Minnesota Crop Production Retailers hosted a half day session dedicated to AFREC projects as part of the CPM Short Course at the Minneapolis Convention Center (December). This session was done in partnership with the Fertilizer Institute.

2012 Sixteen projects were awarded $800,000 and contracts were executed in early April.

A research coordinator was hired with AFREC funds via a grant obtained by the Minnesota Crop Production Retailers. Participation by the coordinator started on April 1.

Research priorities were established with the assistance and coordination efforts from the new coordinator. Several new priorities were identified including more participation from industry and providing funding for soil fertility research on some of the minor acreage crops (less than

10,000 acres). AFREC also decided that it will pursue solicitation for nitrogen variable rate technology development.

AFREC issued its fifth “Request for Proposals” in the fall of 2012.

2013 Allocations were made immediately after oral presentations on January 11, 2013. Eighteen projects were funded with $719,216. AFREC decided to hold back approximately $80,000 to reissue a RFP related to variable rate nitrogen applications.

Legislative Report was due February 1, 2013.

AFREC Allocations and Financial Information

TOTAL FUNDS AWARDED (2008-2013): $2,747,762

Table 1. Funding request amounts, awarded amounts, funding sources, and award type by year from 2008-2013.

Fiscal Year	Amount Requested	# Applications	Amount Awarded	Funding Source	Total # Awards	# New Projects	# Continuations
2008	$1,241,390	19	$552,000	General Fund	9	9	0
2009	$0	0	0	None	0	0	0
2010	$1,535,291	15	$414,200	57% of Existing Inspection Fees	7	6	1
2011	$602,525	12	$262,346	57% of Existing Inspection Fees	8	8	0
2012	$2,134,642	26	$800,000	Increase in Tonnage Fees	16	10	6
2013*	$3,081,241	18	$719,216	Increase in Tonnage Fees	18	9	9
Totals	**$8,595,089**	**90**	**$2,747,762**		**58**	**42**	**16**

AFREC has funded a total of 58 projects so far with an average award of approximately $47,000. It is noted that 42 are classified as “new projects” in Table 1. “Continuation” projects are also very important option used by the council. It is common to receive research projects and associated budgets spanning three to five years (maximum allowable). A common option used during the allocation process is to fund projects for one to two years. Researchers are encouraged to design projects that may take years to complete recognizing that they will probably only secure a portion of the original request. Using this method, AFREC can get a broader range of projects started sooner. AFREC then provides some assurance by specifically placing a higher priority for partially funded projects in future “Request for Proposals”.

There have also been situations where the researcher may decide to ask for another allocation of funding to extend a study for one to two more cropping seasons. Due to the drought conditions over the past two years, this type of extension is common. In this case, the projects are not listed as a priority in the RFP. For purposes of this legislative report, both funding scenarios are lumped as “continuations”.

AFREC receives oral annual updates at the end of each growing season. If the council is not satisfied with the progress or scientific validity of the project, they can terminate future funding. If a grantee does not provide the required quarterly updates and annual reports, MDA can also terminate a contract if necessary. If there are problems, MDA and AFREC would work cooperatively to resolve the issues before terminating a project. To date, no contracts have been terminated early due to complications associated with MDA or AFREC.

MDA support to AFREC is included in Table 2. It should be noted that funds used to pay MDA staff are charged directly to the Fertilizer Inspection Fee. The amounts do not impact the amount of funding available for AFREC grants. Costs reported here include staff time for supporting AFREC planning, meetings, grant management, developing and implementing the RFPs, and other administrative functions. Costs do not include time and support from the Division Director, legal console, support from Commissioner's Office or from other MDA divisions.

Table 2. Awards and MDA staffing costs for technical and administrative support, grant management, and support. Time periods are in fiscal years (FY[4]).

	FY08	**FY10**	**FY11**	**FY12**	**FY13**	**Totals**
AFREC Grant Awards	$ 552,000	$ 414,200	$ 262,346	$ 800,000	$ 719,216	$ 2,747,762
MDA Labor Costs	$ 48,000	$ 49,550	$ 69,975	$ 64,150	$ 64,971	$ 296,646
Indirects on Labor	$ -	$ 7,680	$ 10,846	$ 9,943	$ 10,071	$ 38,540
MDA Staff w/Indirects	$ 48,000	$ 57,230	$ 80,821	$ 74,093	$ 75,042	$ 335,187
MDA Support %	8.7%	13.8%	30.8%	9.3%	10.4%	12.2%

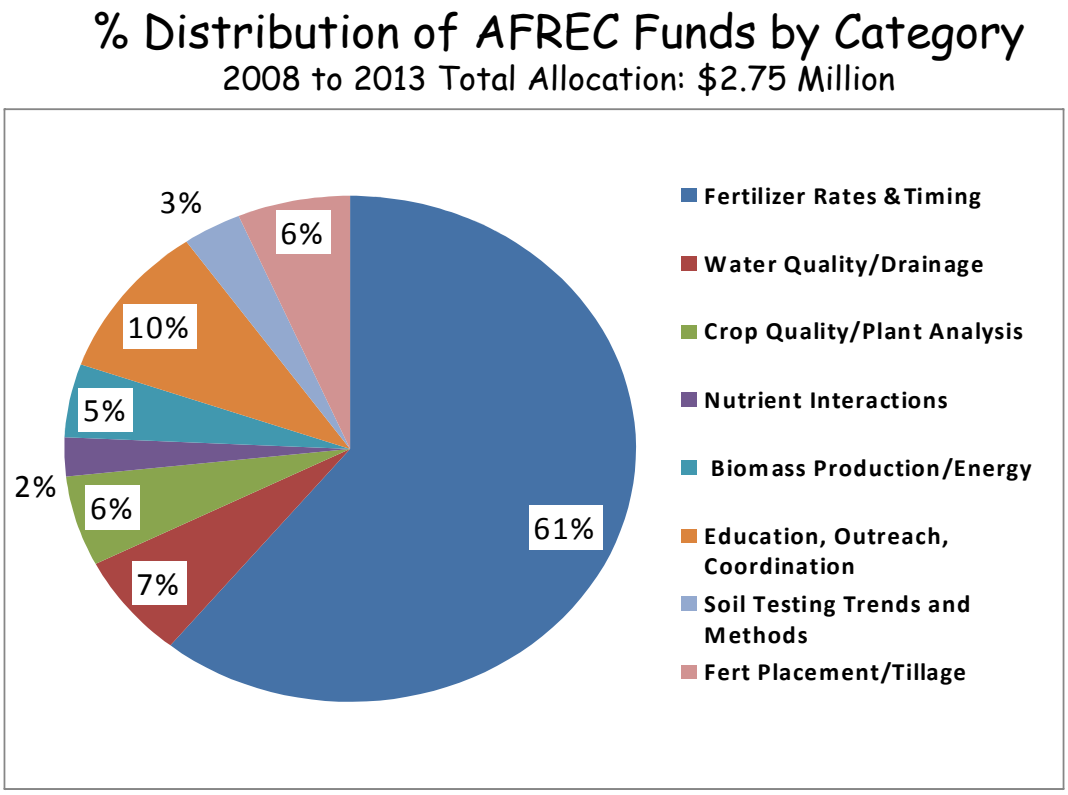
During early stages of the program (FY08-FY11), MDA support staff was approximately equivalent to 15% of the awarded funds. These numbers were high because there was a significant amount of work in program development coupled with limited grant funding. Now that the program has matured and AFREC is at full funding, it appears that MDA staffing costs will be equivalent to about 10% of the awarded values.

It is important to note that AFREC does not allow any indirect costs be charged to the grants. The University of Minnesota contributes significant administrative resources for budget and grant management that does not get directly reimbursed by AFREC.

Figure 1 provides a general analysis on the type of projects funded over the life of the program. For purposes of this report, the 58 awards were lumped into one of eight general categories: 1) Fertilizer rates and timing; 2) Water quality and/or drainage research; 3) Crop quality and plant analysis as impacted by soil fertility; 4) Nutrient interactions in a high yielding environment; 5) Fertilizer recommendations for crops used in biomass production and energy; 6) All education, outreach and project coordination; 7) Soil testing trends and methods; and lastly, 8) Fertilizer placement and interactions with tillage.

[4] Fiscal Years run from July 1 to June 30. FY13, for example, runs from July 1, 2012 through June 30, 2013.

Figure 1. General category distribution of AFREC funds from 2008 to 2013.



Insuring that the basic UM recommendations are valid for today's higher yielding genetics has always been a top priority for AFREC. As a result, over 60% of the funding has been directed towards the verification of the fertilizer rate recommendations. As originally identified the AG Nutrient Task Force, only limited validation work has been conducted over the past several decades due to very limited funding. In the past, securing funding for this type of research was extremely difficult. Another complicating factor is that basic calibration/correlation type research is difficult to get published in refereed journals. As a result, researchers striving for publications tend to shy away from this type of research. Fortunately AFREC funding has revitalized this type of research since it is this type of local knowledge that is extremely important to farmers and ag professionals.

It is anticipated that after the appropriate amount of verification and modifications are completed, that more research emphasis will be directed towards other topic areas including advanced technologies for applying fertilizers on a very prescriptive basis.

From early on in the development of Minnesota's fertilizer program, the value of education and outreach has been extremely important to AFREC. As a direct result, it is a requirement that all projects have an education and outreach component. Those contributions are not reflected in Figure 1. Additionally, AFREC has arbitrarily allocated roughly 10% of the annual budget to be used for projects that are purely education and/or outreach when issuing the RFP. As shown in Figure 1, the long-term average has been right at the 10% level. Actually funding spent on education efforts across all projects is probably in the 15-20% range.

Since AFREC has been operating, approximately 94% (Figure 2) of the funding has been awarded to the University of Minnesota. This is not surprising since the land grant university systems have been very prominent in providing fertilizer recommendations and supporting information for decades. USDA-Agricultural Research Service staff frequently work in partnership with UM staff but rarely serve as the project/fiscal manager; less than 2% of the funding has been directly managed by this federal organization.

As previously mentioned, AFREC has recently expressed interest in bringing in more projects and partnerships with the private sector. Less than 4% of the awards have been managed by a private group.

Figure 2. AFREC funding distribution to the various organizations from 2008 to 2013.

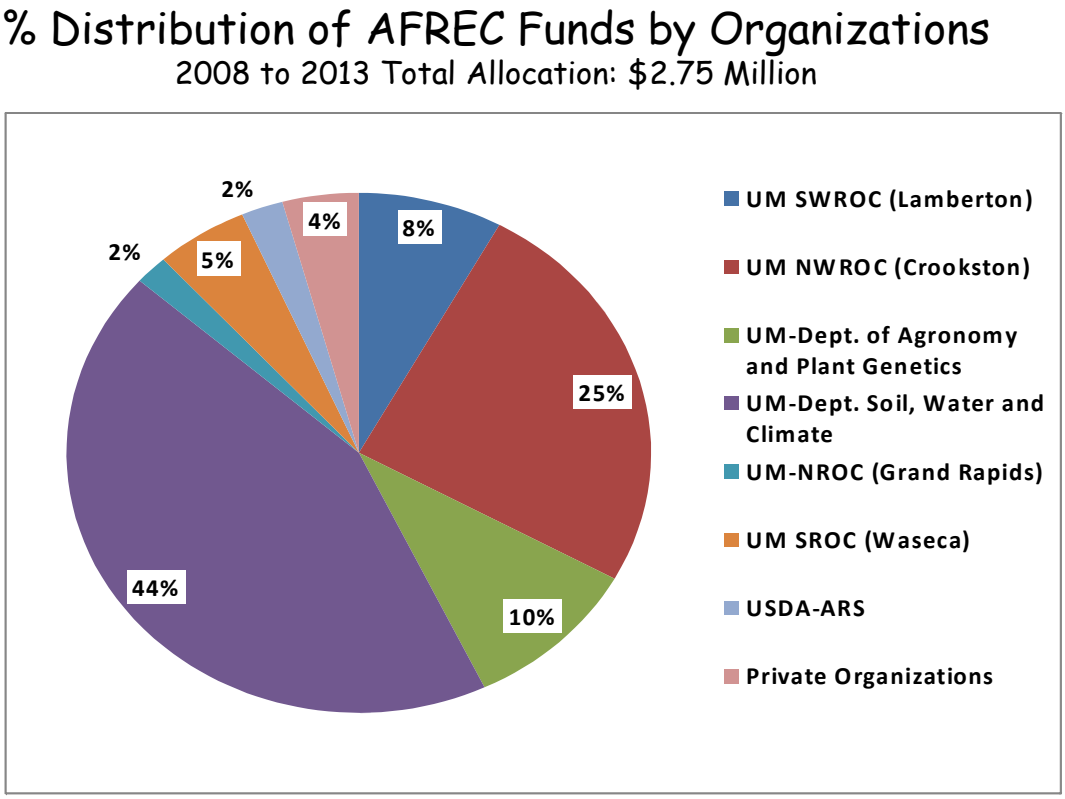


Table 2. Status and summaries of AFREC projects funded from 2008 through 2011.

YEAR	Titles for Projects Starting in Spring, 2008	Principal Investigator	Organization	Total AFREC Award	Current Status as of 1/31/2013
2008 Funded Projects	Zinc and Sulfur Fertilization for High Yield Corn Production	Vetsch	UM-Southern Research and Outreach Center	$ 30,197	**Completed**
	Minimizing Nitrate Loss to Drainage by Optimizing N Rate and Timing for a C-C-S Rotation	Randall	UM-Southern Research and Outreach Center	$ 35,860	**Completed**
	Impact of phosphorus fertilization strategies on efficiency of nitrogen use by corn rotated with soybean	Kaiser	UM-Dept. Soil, Water and Climate	$ 96,721	**Completed**
	Efficient management of nitrogen fertilizer for wheat grown in Minnesota	Kaiser	UM-Dept. Soil, Water and Climate	$ 77,431	**Completed**
	Fertilizer requirements for native perennial plants harvested for biomass	Sheaffer	UM-Dept. of Agronomy and Plant Genetics	$ 55,928	**Completed**
	Drainage control to promote high crop yields and diminish nutrient losses from agricultural fields in Minnesota	Strock	UM Southwest Research and Outreach Center	$ 87,338	**Completed** ($11,000 back to General Funds)
	Tillage and Sulfur Management for Corn in Fine Textured Soils	Strock	UM Southwest Research and Outreach Center	$ 89,252	**Completed** ($3,696 back to General Funds)
	Validating topdressed K fertilizer recommendations in an alfalfa-corn rotation	Russelle	USDA-ARS	$ 64,273	**Completed**
	Advancing Improved Management of Nitrogen in Minnesota With Best Management Practices (BMP) Publications	Lamb	UM-Dept. Soil, Water and Climate	$ 15,000	**Completed** ($2,800 back to General Funds)
	Nine Projects for an average of $61,333/project			$ 552,000	
2010 Funded Projects	**Titles for Projects Starting in Spring, 2010**	**Principal Investigator**	**Organization**	**Total AFREC Award**	**Current Status as of 1/31/2013**
	Development of a Website for Nutrient Management Education Materials	Lamb	UM-Dept. Soil, Water and Climate	$ 20,000	**Completed** ($73 back to Fertilizer Account)
	On Farm Assessment of Critical Soil Test P Values in Minnesota	Kaiser	UM-Dept. Soil, Water and Climate	$ 97,802	**Completed (future work merged with Critical Potassium research)**
	Minnesota Long-Term Phosphorus Management Trials: Phase 1, the Build Period	Sims	UM-NW Research and Outreach Center	$ 127,991	**Workplan on Track, Continuation Funded with 2012**
	Nitrogen Update, Distribution, and Utilization in Hard Red Spring Wheat Varieties	Sims	UM-NW Research and Outreach Center	$ 84,674	**Workplan on Track, Continuation Funded with 2012**
	Zinc and Sulfur Fertilization for High Yield Corn Production	Vetsch	UM-Southern Research and Outreach Center	$ 21,613	**Continuation Completed**
	Enhancing Continuous Corn Production in Conservation Tillage with Starter Fluid Combinations and Placements	Vetsch	UM-Southern Research and Outreach Center	$ 38,108	**Workplan on Track**
	Effect of Bioenergy Crop Residue Removal on Secondary and Micronutrients in Minnesota Soils	Allen	UM-Dept. Soil, Water and Climate	$ 24,012	**Workplan on Track, Continuation Funded with 2012**
	Seven Projects for an average of $59,171/project			$ 414,200	
2011 Funded Projects	**Titles for Projects Starting in Spring, 2011**	**Principal Investigator**	**Organization**	**Total AFREC Award**	**Current Status as of 01/31/2013**
	Development, Updating, and Publishing of Nutrient Management Bulletins	Lamb	UM-Dept. Soil, Water and Climate	$ 15,500	**Extension Granted to 3-31-13**
	Optimal Utilization of Phosphorus, Potassium, and Sulfur fertilization in Corn-Soybean Rotations	Kaiser	UM-Dept. Soil, Water and Climate	$ 66,555	**Workplan on Track; Continuation Funded in 2013**
	Evaluation of Critical Potassium Levels in Minnesota Soils	Kaiser	UM-Dept. Soil, Water and Climate	$ 47,044	**Workplan on Track; Continuation Funded in 2012**
	Rate and Timing of P and K Fertilization in Corn-Soybean Rotations in Minnesota	Kaiser	UM-Dept. Soil, Water and Climate	$ 43,027	**Workplan on Track; Continuation Funded in 2013**
	Nutrient Update of Four Spring Wheat Varieties Grown Under Varying Nitrogen Stress	Kaiser	UM-Dept. Soil, Water and Climate	$ 21,578	**Workplan on Track; Continuation Funded in 2012**
	Potassium Fertilization Requirements for Intensively Managed Modern Alfalfa	Sheaffer	UM-Dept. of Agronomy and Plant Genetics	$ 38,557	**Workplan on Track; Continuation Funded in 2012**
	Wheat Yield, Quality, and Plant Health Parameters from Starter Applications of MicroEssentials in Northwest Minnesota	Ehlke	UM-Dept. of Agronomy and Plant Genetics	$ 7,500	**Completed**
	Effect of Bioenergy Crop Residue Removal on Secondary and Micronutrients in Minnesota Soils	Allen	UM-Dept. Soil, Water and Climate	$ 22,585	**Completed**
	Eight Projects for an average of $32,793/project			$ 262,346	
	All AFREC Funded Projects Between 2008-2011			$ 1,228,546	

Table 3. Status and summaries of AFREC projects funded from 2012 through 2013. Specifics on the 2013 awards will be released when the contracts are executed.

2012 Funded Projects

Titles for Projects Starting in Spring, 2012	Principal Investigator	Organization	Total AFREC Award	Current Status as of 01/30/13
Nitrogen Update, Distribution, and Utilization in Hard Red Spring Wheat Varieties	Dr. Albert Sims	UM-NW Research and Outreach Center	$ 54,089	Workplan on Track
Minnesota Long-Term Phosphorus Management Trials: Phase 1, the Build Period	Dr. Albert Sims	UM-NW Research and Outreach Center	$ 156,214	Workplan on Track
Wheat Yield and Quality as Influenced by Coated Nitrogen (ESN) Timing, Rates and Mixtures with Urea	Dr. Nancy Ehlke	UM-Dept. of Agronomy and Plant Genetics	$ 24,141	Workplan on Track
Evaluation of Sulfur Mineralization and Availability in Soil and Manure and Sulfur Content in Plants	Dr. Daniel Kaiser	UM-Dept. Soil, Water and Climate	$ 74,801	Workplan on Track
Improving Predictability and Adoption of Alfalfa N Credits for Corn	Dr. Jeffrey Coulter	UM-Dept. of Agronomy and Plant Genetics	$ 44,842	Workplan on Track; Continuation Funded in 2013
Potassium Fertilization Requirements for Intensively Managed Alfalfa Varieties	Dr. Craig Sheaffer	UM-Dept. of Agronomy and Plant Genetics	$ 39,360	Workplan on Track; Continuation Funded in 2013
Evaluation of Critical Phosphorus and Potassium Levels in Minnesota Soils	Dr. Daniel Kaiser	UM-Dept. Soil, Water and Climate	$ 79,354	Workplan on Track; Continuation Funded in 2013
Nutrient Uptake of Four Spring Wheat Varieties Grown under Varying Nitrogen Stress	Dr. Daniel Kaiser	UM-Dept. Soil, Water and Climate	$ 13,420	Workplan on Track; Continuation Funded in 2013
Evaluation of Fertilizer Placement and Timing in Continuous Corn in Three Long-Term Tillage Systems	Dr. Daniel Kaiser	UM-Dept. Soil, Water and Climate	$ 19,212	Workplan on Track
Long Term Soil Test Monitoring in Minnesota Cropping Systems	Dr. Daniel Kaiser	UM-Dept. Soil, Water and Climate	$ 26,360	Workplan on Track
Evaluation of In-Furrow Starter Fertilizer Sources for Corn	Dr. Daniel Kaiser	UM-Dept. Soil, Water and Climate	$ 13,756	Workplan on Track
Plant Analysis as Management Tool for Corn and Soybean Fields	Dr. Daniel Kaiser	UM-Dept. Soil, Water and Climate	$ 60,131	Workplan on Track
Enhanced Efficiency Nitrogen as Nitrogen Source for Sugar Beet Production	Dr. Albert Sims	UM-NW Research and Outreach Center	$ 51,952	Workplan on Track; Continuation Funded in 2013
Targeting the Right Audiences with Fertilizer Education: Knowing Who is Influencing Decision Makers	Dr. Michael Schmitt	UM-Dept. Soil, Water and Climate	$ 40,518	Workplan on Track
Improvement and Development of Nutrient Management Outreach Materials	Dr. John Lamb	UM-Dept. Soil, Water and Climate	$ 61,850	Workplan on Track
AFREC Fertilizer Research Coordination by MCPR	Dean Fairchild	MCPR	$ 40,000	Workplan on Track
			$ 800,000	

2013 Funded Projects

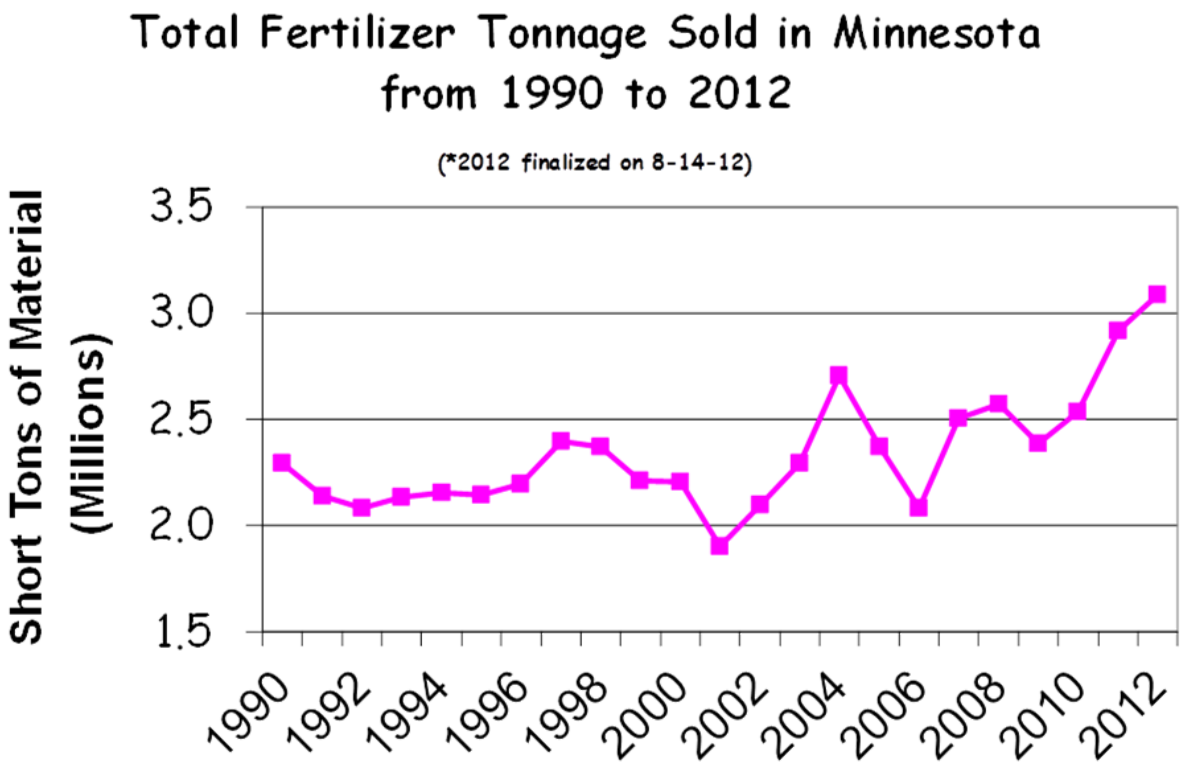
Titles for Projects Starting in Spring, 2013	Principal Investigator	Organization	Total AFREC Award	Current Status as of 01/30/13
			$ 20,706	Contract and Workplan under development
			$ 111,242	Contract and Workplan under development
			$ 39,985	Contract and Workplan under development
			$ 62,129	Contract and Workplan under development
			$ 15,000	Contract and Workplan under development
			$ 59,735	Contract and Workplan under development
			$ 45,500	Contract and Workplan under development
			$ 27,050	Contract and Workplan under development
			$ 33,343	Contract and Workplan under development
			$ 39,443	Contract and Workplan under development
			$ 29,315	Contract and Workplan under development
			$ 16,000	Contract and Workplan under development
			$ 52,875	Contract and Workplan under development
			$ 26,424	Contract and Workplan under development
			$ 49,953	Contract and Workplan under development
			$ 25,350	Contract and Workplan under development
			$ 36,000	Contract and Workplan under development
			$ 29,166	Contract and Workplan under development
Project Names and Investigators Can't Be Released Until Contracts are Executed (April 1, 2013)			$ 719,216	

Future Funding Opportunities and Partnerships

Available funding within the next several years appears to be very strong. Due to the way AFREC funding was established by the Legislature, AFREC will have access to the full $800,000 (maximum ceiling) when the state's annual fertilizer tonnage reaches two million tons. Sales have only been below that level once in the last 22 years. However, due to the required indirect costs as well as administrative costs, technical support, legal console and other costs to MDA, this project realistically needs to operate at 2.53 million or more to adequately cover all costs incurred for both AFREC and MDA.

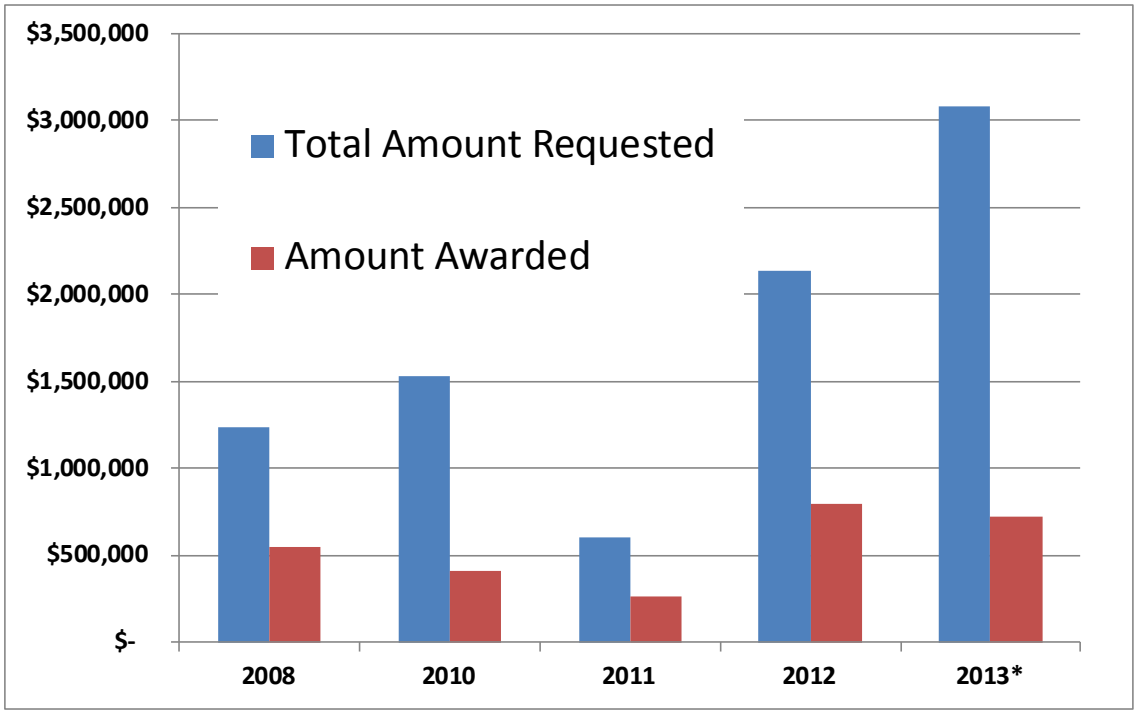
Sales have been very close to the 2.53 million threshold four of the last six years. Sales were very strong in 2011 and 2012. This is due to a number of reasons but the primary ones are: 1) strong corn acres at roughly eight million acres; 2) excellent profits; 3) tendencies for lower fertilizer analysis products (such as urea displacing anhydrous ammonia); and 4) strong sales in micronutrients (such as zinc and sulfur). Interestingly, trends in the macro-nutrient sales (nitrogen, phosphorus and potassium) have been very flat over this 22 year period despite steadily increasing yields.

Figure 3. Minnesota's fertilizer tonnage sales from 1990 through 2012.



Despite the availability of full funding during the last several years, it appears that AFREC funds will continue to be in tight supply (Figure 4). Over the past five "Request for Proposal" periods, there have been approximately $8.6 million in requests for the $2.75 million that has been available. The high demand trends will probably continue to grow especially as more researchers (in both public and private organizations) become more aware of these funding opportunities.

Figure 4. Trends in the amount of AFREC funds requested compared to the amounts awarded. See Table 1 for additional details. There has been $8.60 million requested for the $2.75 million that has been available. Another RFP will be issued in 2013 and it is anticipated that the entire $800,000 will be allocated by June 30, 2013.



One very powerful outcome from AFREC has become extremely apparent. Since the development of AFREC, there has been much stronger communication and coordination within the major commodity groups and the fertilizer industry. Never before did all interested parties have a reason to get together to discuss mutual challenges, shared goals, and united responses. While AFREC funding plays an important role in providing funding, it also serves an equally important role in bringing the commodity groups, the crop production retailers, researchers and MDA together.

The Minnesota Corn Growers, MN Soybean Growers, Minnesota Association of Wheat Growers, and Sugar Beets all fund significant amounts of research for improved genetics, disease and weed control, new technology, as well as soil fertility research. Over the last two years, there have been significant strides in coordinating soil fertility research across these various funding pools. Collectively, these dollars probably dwarf the funding that AFREC can provide. And while attempting to address the entire collection of soil fertility issues across the state, it is likely that there will never be enough funds to address all of them. Continued coordination across all of these funding sources is critical.

Last year, the MN Crop Production Retailers successful obtained AFREC funding to hire an AFREC research coordinator. The coordinator is responsible for ensuring that researchers understand AFREC's research priorities and provide strong, well-coordinated proposals. The coordinator is also aware of

projects being funded by the various commodity groups as well as research being conducted by other land grants and private industry across the Midwest. Dean Fairchild, formerly with Mosaic prior to his retirement, fills the research coordinator position. As a direct result of his excellent contributions, AFREC has been rewarded with much more diverse and coordinated projects.

Achievements

- The five Requests for Proposals (RFPs) generated over $8.60 Million in requests from 90 grant applications;

- AFREC has successfully awarded $2.75 Million through 58 individual awards;

- AFREC has demonstrated its ability to identify common soil fertility research goals across a very diverse state with multiple cropping systems and move forward with critical decision-making and funding selection;

- Researchers and educators from the University of Minnesota (main campus, Extension, and the Research and Outreach Centers) have played a very significant role in providing meaningful proposals and high quality projects;

- MDA staff continue to streamline and improve on the following: the RFP application and scoring process; the quarterly reports from the researchers; and procedural steps to insure that AFREC can focus their limited meeting time for concise business decisions and key discussion resolution;

- AFREC's ability to identify priorities within their respective groups was been greatly improved due to the addition of the Research Coordinator position via the MN Crop Production Retailers;

- The last "Request for Proposals" (Fall, 2012) successfully obtained research grants in direct response to AFREC's research priorities. Those priorities included soil fertility research on some of the small acreage crops, on-farm demonstrations, and more participation from private industry. The RFP however was unsuccessful in starting a research program to address variable rate technology;

- AFREC and MDA have partnered successfully and developed a strong track record for issuing the RFPs, evaluating and selecting projects in a timely fashion, and awarding the contracts within a three-month window in time for the spring field season;

- Council members have devoted significant time into the program. At a minimum, the Council meets 3-4 times per year with the following meeting schedule: Meeting 1-Listen to new project proposals (January); Meeting #2- Deliberate over funding allocations (February); Meeting 3-Organizational and planning issues (August); and Meeting 4-Annual Updates for current projects (December). Frequently issues occur that require additional conference calling and/or subcommittee meetings;

- AFREC has done an outstanding job in providing ample opportunity and contact time to project managers during the oral presentation process;

- Associated Statutes laid out a council member replacement framework to insure that new members and fresh ideas are introduced. Approximately 75% of the members and/or alternates have been rotated since AFREC's conception on 1/1/08;

- Project Managers (primarily from the University of Minnesota and USDA-Agricultural Research Service) have been extremely accommodating in providing timely oral and written research reports and budget updates;

- The Minnesota Crop Production Retailers Short Course has provided excellent opportunities to showcase the AFREC projects. In 2010 and 2011, there was a dedicated half-day session focused on AFREC. Typically, 500+ ag chemical retailers, crop consultants, state and federal agency staff and researchers attended this annual event;

- During public presentations and media opportunities, researchers have clearly identified AFREC when it is the funding source. AFREC has also received significant exposure at the UM Winter Crop Days, the Farm and Power Show, and other producer orientated educational events;

- Each funded project is required to provide an oral annual update to AFREC. Findings are quickly disseminated through numerous winter workshops for producers and ag professionals;

- On UM funded projects, Sponsored Projects Administration (SPA[5]) and MDA have developed boiler plate granting forms and a good working relationship. A quick reporting interview form has also been developed to speed up quarterly billing statements and reduce the reporting requirements by the project managers;

- University of MN has developed a Nutrient Management home page and producers can access the latest fertilizer recommendations, soil testing information, nutrient calculators and research updates: http://www1.extension.umn.edu/agriculture/nutrient-management/index.html

- AFREC meeting minutes and general information can be found on MDA's website: http://www.mda.state.mn.us/chemicals/fertilizers/afrec/meetinginfo.aspx

- The Peer Review process continues to get stronger each year and provides AFREC with insight and recommendations to the hypothesis, experimental design and other research features;

- The quality of many of the projects and the alignment with AFREC's priorities has been greatly enhanced with the addition of the research coordinator. Additionally the research coordinator has significantly strengthened ties with a number of the major commodity organizations.

Extension Bulletins Funded by AFREC (revisions or new)

- Fertilizing Alfalfa in MN (AG-FO-03814-C)
- Fertilizing Wheat (AF-FO-3814-C)
- Plant Analysis Sampling and Interpretation
- Managing Iron Deficiency Chlorosis in Soybean (AG-FO-08672-A)
- Lime Needs in Minnesota (AG-FS-05956-C)

[5] SPA is the University of Minnesota system-wide office authorized to submit research proposals and receive awards from external sources on behalf of the Board of Regents of the University of Minnesota. SPA is also the fiduciary for the U on grant-related matters.

Council Membership and Responsibilities

MN Soybean Growers Larry Muff - Chair larrym@hickorytech.net Steve Commerford-Designated Alternate comagro@comcast.net	**MN Grain and Feed** Laura Lemke mgfa@usinternet.com Robert Zelenka-Designated Alternate mgfa@usinternet.com
MN Farm Bureau Larry Larson Larrylarsona36@gmail.com Jeremy Geske-Designated Alternate jgeske@fbmn.org	**MN Wheat Growers** Brian Jensen brianj@ruralaccess.net Mark Jossund-Designated Alternate mbjossund@cableone.net
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2012-13 Peer Review Team

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This report was prepared on behalf of the Agricultural Fertilizer Research and Education Council and the Commissioner of Agriculture for:

Senate Environment, Economic Development and Agriculture Division
House Environment, Natural Resources, and Agriculture Finance