



UNIVERSITY OF MINNESOTA

# Agriculture State Special April 2013

**Presented to:**  
2013-2014 Minnesota Senate  
Higher Education  
& Workforce Development Committee

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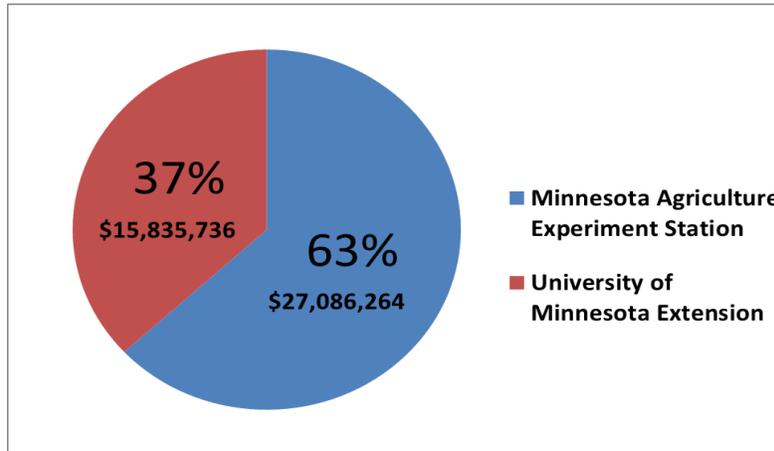
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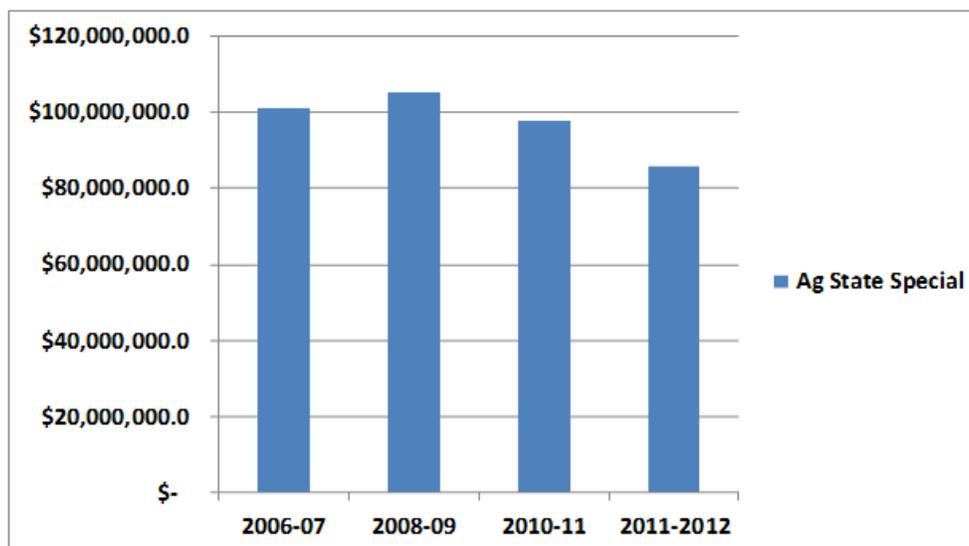
## Agriculture State Special: Funding Background

The University of Minnesota Agriculture State Special funding is a line item in the Minnesota Higher Education bill, which dedicates dollars for the Minnesota Agricultural Experiment Station and Extension at the University of Minnesota. Approximately 37% of Agriculture State Special funds are appropriated to University of Minnesota Extension and 63% to Minnesota Agricultural Experiment Station (Figure 1).



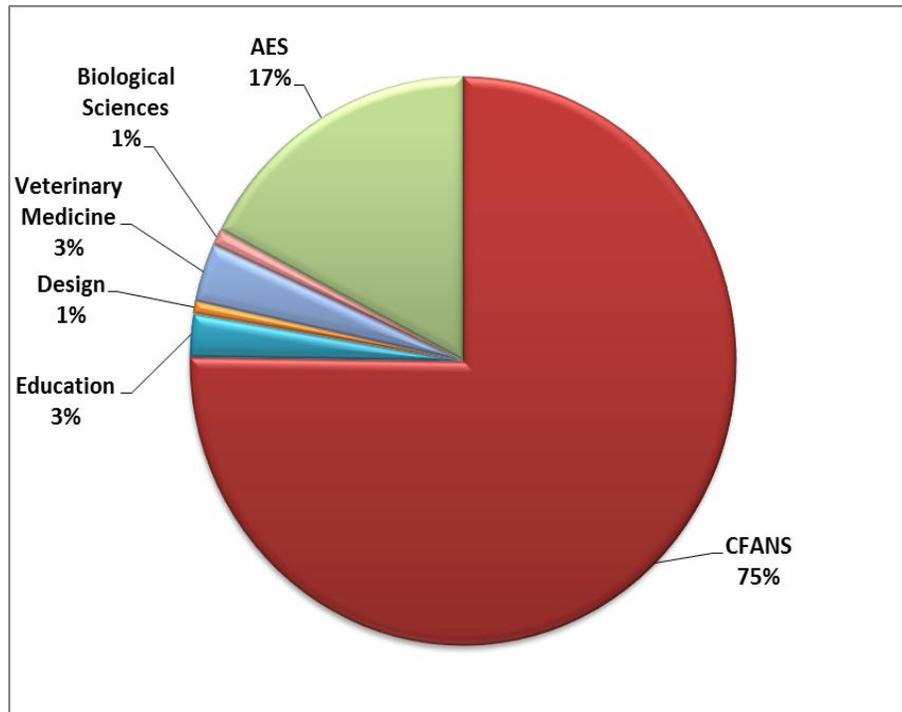
**Figure 1: Agriculture State Special Current Funding FY12-13**

The Agriculture State Special was increased in 2008-2009, but decreased in 2010-2011. The impact of that cut was larger in the second half of the biennium when legislation reduced overall University of Minnesota funding by 8% and the Agriculture State Special by 12.7%. In fiscal year 2011, the Agriculture State Special was \$45.6 million – its lowest level since at least the mid-1990s. Further, for the biennium starting in fiscal year 2012, the Agriculture State Special fund was reduced 2.7% to 42.9 million (Figure 2).



**Figure 2: UM Agriculture State Special FY2006-2012**

Agriculture State Special funding provides the base salaries of University of Minnesota Agricultural Experiment Station research and Extension faculty — on campus and throughout the state. The Agriculture State Special, via the Minnesota Agricultural Experiment Station, provides research funding to faculty in the Colleges of: Food, Agricultural and Natural Resource Sciences(CFANS), Veterinary Medicine (CVM), Design (CDes), Education and Human Development(CEHD) and Biological Sciences(CBS) (Figure 3).



**Figure 3: FY12 Minnesota Agricultural Experiment Station Allocation by College**

Extension provides agriculture state special funding to the colleges of: Food, Agricultural and Natural Resource Sciences, Veterinary Medicine, Education and Human Development, Design, and Humphrey School of Public Affairs. These collegiate collaborations increase Extension’s capacity for interdisciplinary research and Extension education (Table 1).

**Table 1. Agriculture State Special Allocation**

## Agriculture State Special Allocation

	FY2012	FY2013
<b>Minnesota Agricultural Experiment Station</b>		
<b>Research</b>		
Animal Science	\$ 1,891,209	\$ 1,627,210
Animal Health	\$ 1,404,897	\$ 1,407,845
Atmospheric Sciences	\$ 456,807	\$ 471,795
Economics & Bio-economy	\$ 1,640,468	\$ 1,897,086
Human Development & Family Well-being	\$ 1,853,273	\$ 1,804,206
Land and Water	\$ 1,489,357	\$ 1,476,550
Natural Resources	\$ 2,210,468	\$ 2,177,520
Nutrition & Food Science	\$ 1,698,824	\$ 1,771,597
Plant Diseases	\$ 1,472,166	\$ 1,629,638
Plant Science (crops and horticulture)	\$ 2,865,197	\$ 2,924,712
Research and Outreach Centers	\$ 3,515,262	\$ 3,617,785
Mission Support	\$ 2,751,734	\$ 2,853,044
<b>Ag Special Targeted Programs</b>		
Small Grain Initiative	\$ 648,966	\$ 648,966
Rapid Agricultural Response	\$ 835,529	\$ 835,529
*Regional Sustainable Development Partnerships	\$ 902,363	\$ -
<b>Program Support Reserve</b>	<b>\$ 379,266</b>	<b>\$ 310,200</b>
<b>Operations and Administration</b>		
University Central Research Support (Libraries & Research)	\$ 627,068	\$ 236,595
University Central Support (IT and Administration)	\$ 209,524	\$ 232,076
St Paul Campus Research Support (Debt & Warehouse)	\$ 324,004	\$ 340,766
Collegiate Units	\$ 812,245	\$ 823,144
<b>Total</b>	<b>\$ 27,988,627</b>	<b>\$ 27,086,264</b>
<b>University Minnesota Extension</b>		
Food, Agriculture and Natural Resources	\$ 7,726,664	\$ 7,827,467
Youth Development and 4-H	\$ 1,724,186	\$ 1,462,246
Community Vitality	\$ 2,603,730	\$ 3,571,189
Family Development and Nutrition	\$ 1,981,383	\$ 2,131,765
Operations and Administration	\$ 897,410	\$ 843,069
<b>Total</b>	<b>\$ 14,933,373</b>	<b>\$ 15,835,736</b>
<b>Total Agriculture State Special Allocation</b>	<b>\$ 42,922,000</b>	<b>\$ 42,922,000</b>

\*Regional Sustainable Development Partnerships allocation moved to Extension in FY13

The Agriculture State Special is an important component of funding for the Minnesota Agricultural Experiment Station and Extension; however it is not the only source. Other funding is provided by the University of Minnesota, the federal government, tuition, competitive grants, gifts and county governments for Extension (Figures 4 &5).

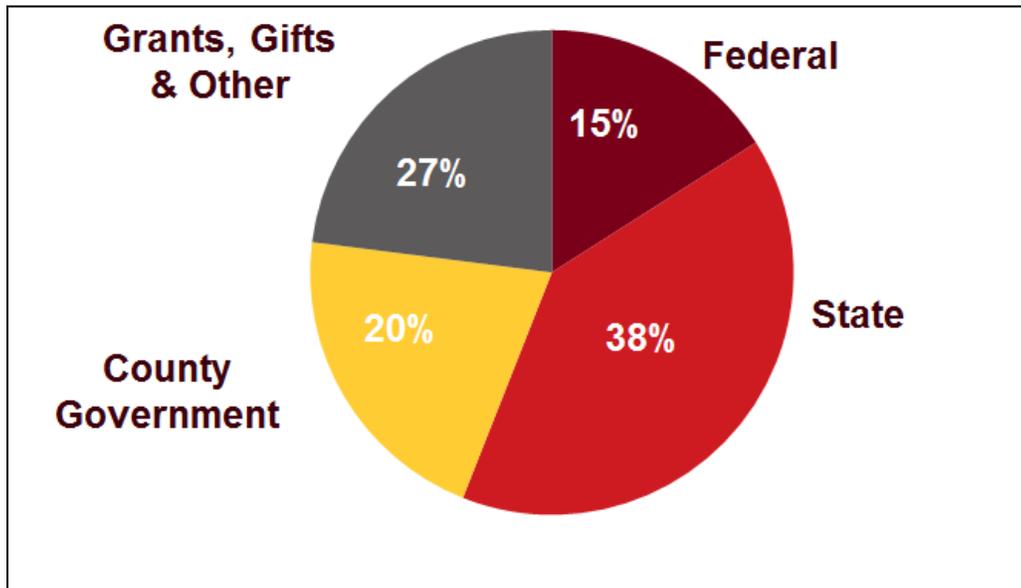


Figure 4: Extension FY 2012-13 Budget: \$70.6M

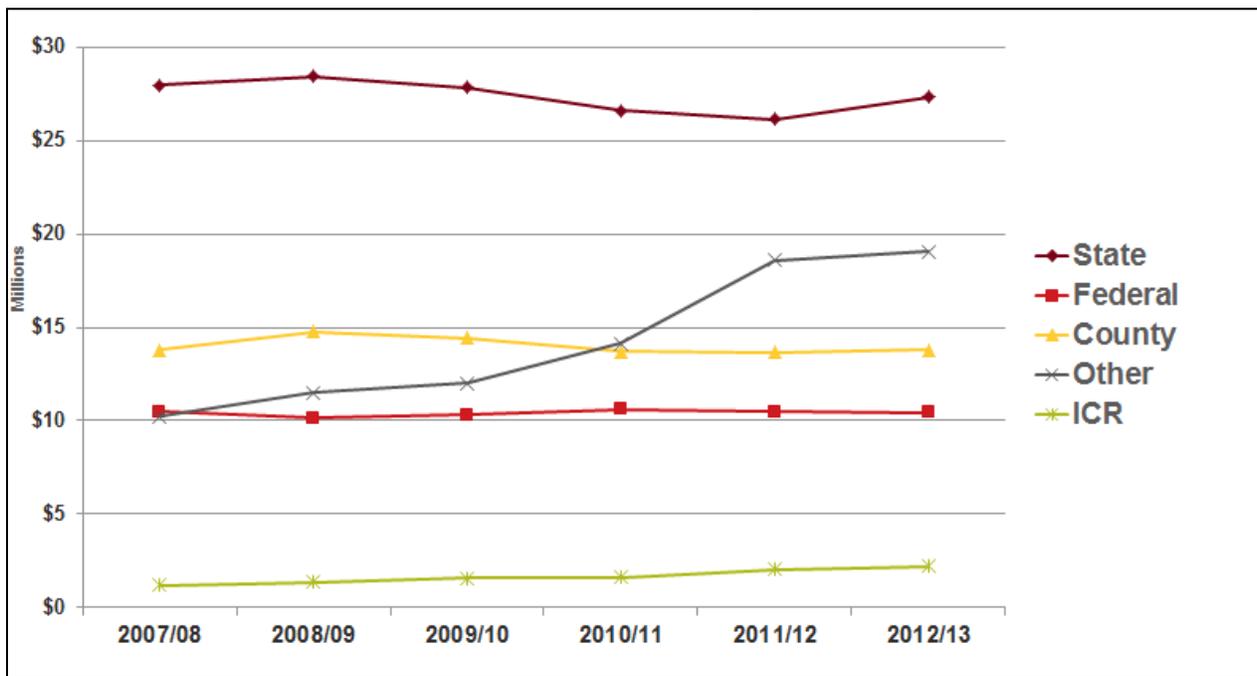


Figure 5: Extension Funding Trends

CFANS (Figures 6 & 7) and CVM (Figures 8 & 9) are funded by a variety of sources as well.

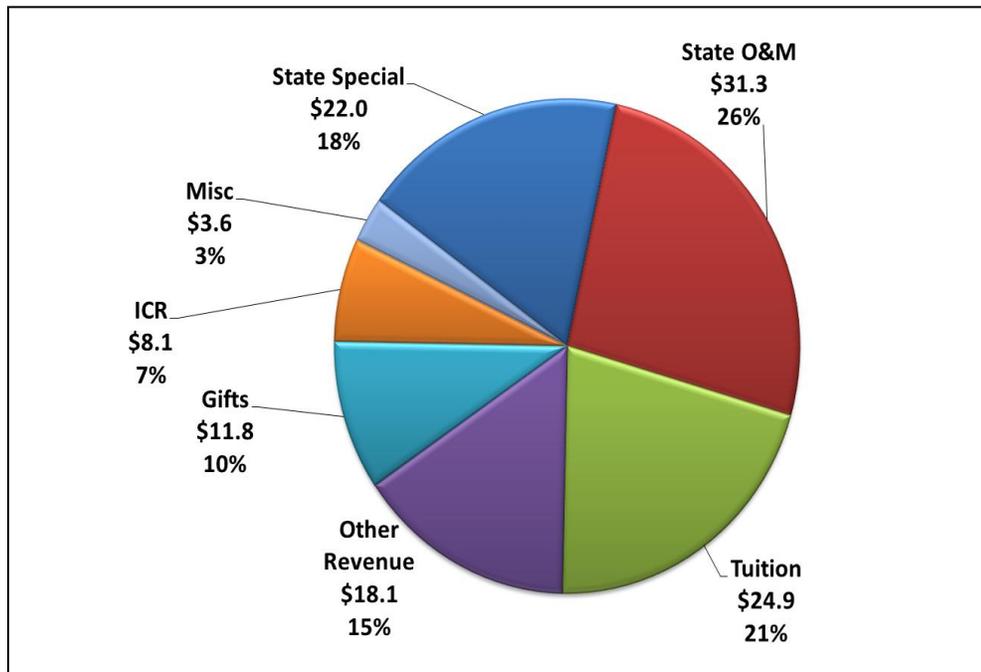


Figure 6: CFANS 2011-2012 Budget: \$119.8M

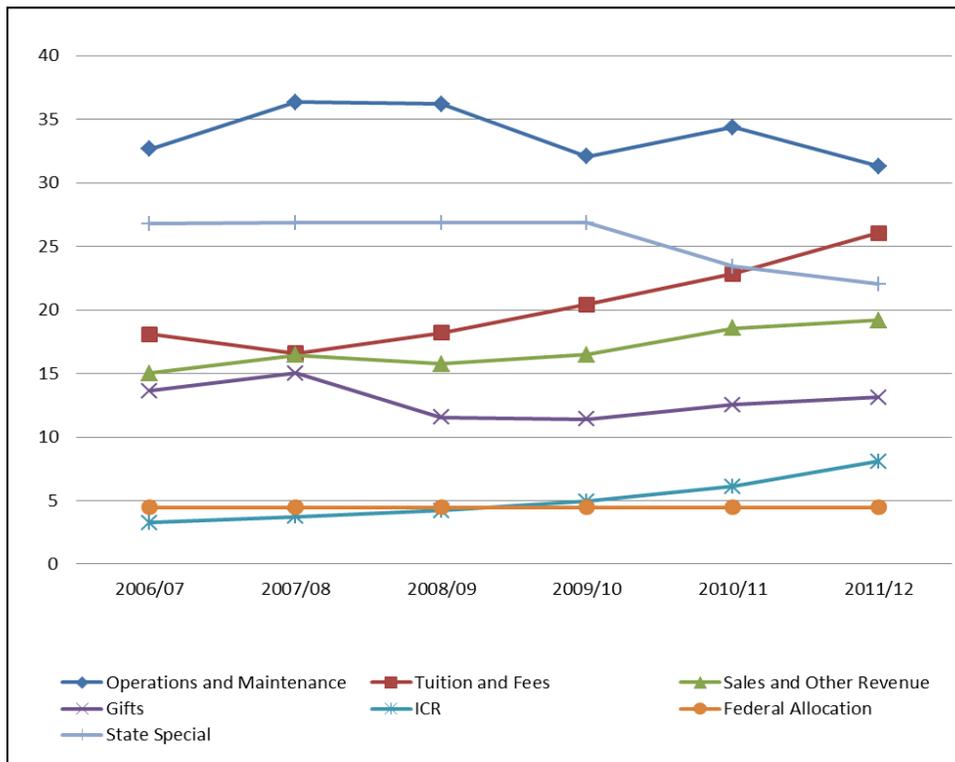


Figure 7: CFANS Funding Trends (Millions)

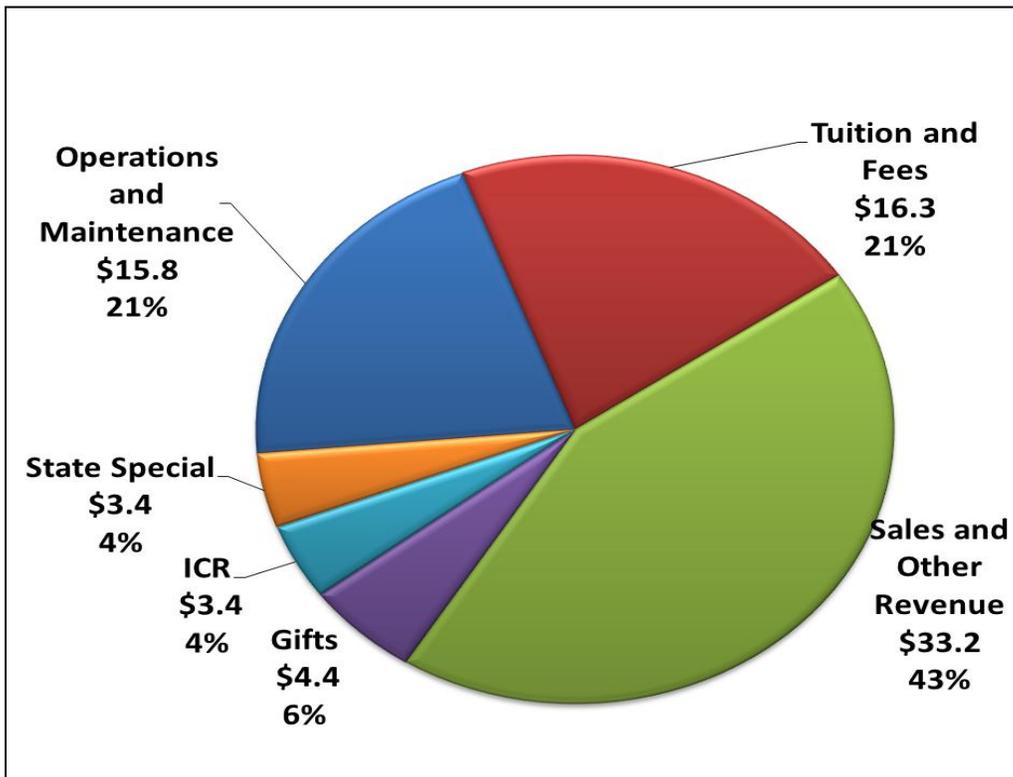


Figure 8: CVM 2011-2012 Budget: \$76.5 Million

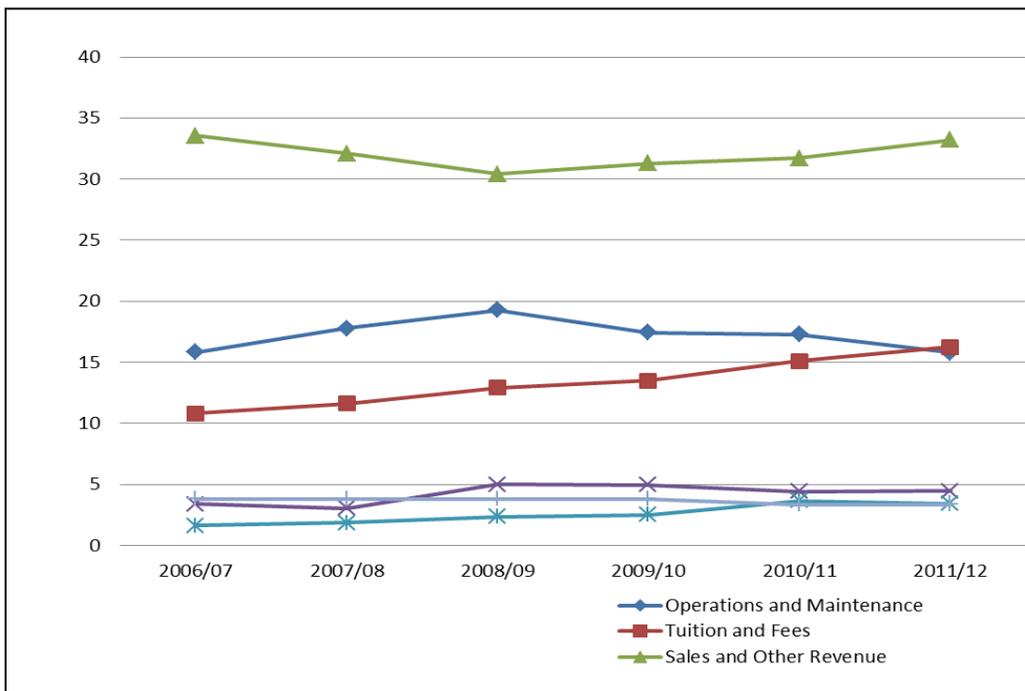


Figure 8: CVM Funding Trends (Millions)

## Agriculture State Special: Creating Impact

Minnesota Agriculture Experiment Station research and Extension benefits Minnesota:

**Consumers** through **lower food prices**

**Producers** through **lower costs**

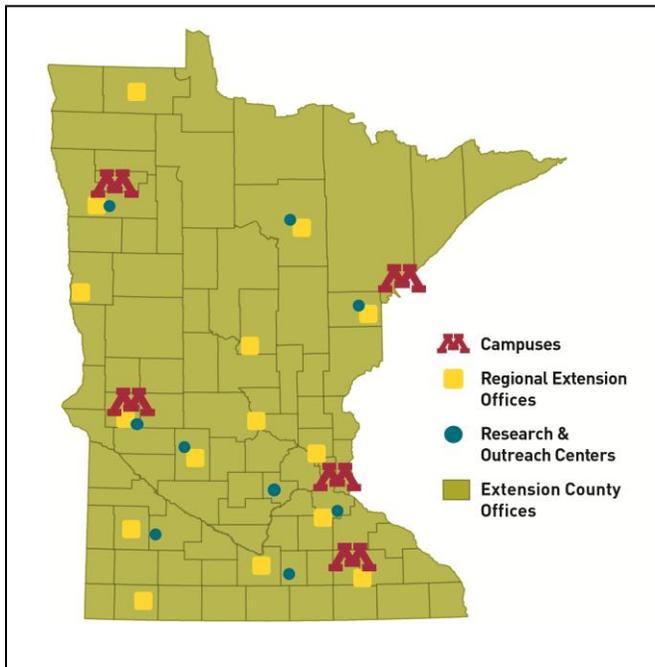
**Economy** through **improved competitiveness**

**Food safety & environmental quality** through **prevention and conservation programs**

**National security** through **global security**

**Families** through **better nutrition**

**Communities** through **better leadership**



The University of Minnesota Agriculture State Special makes University research and extension available to all Minnesotans.

Faculty and educators are located at University campuses, Research and Outreach Centers, Regional Extension Offices and County Extension Offices.

Across the state, faculty and educators engage individuals and organizations in asking the challenging questions to discover science-based answers that make a difference.

## University of Minnesota Extension

Extension addresses important issues in Minnesota, making it a better place to live, work and play. By providing practical and trusted research-based education and research, Extension helps people, businesses and communities solve problems, develop skills and build a better future. Extension has faculty located throughout the state in 15 regional offices and all 87 counties. Together, we engage Minnesotans to:

- Respond to extreme weather and natural disasters
- Keeping food safe and affordable
- Prepare youth to excel in a complex, global world
- Ensure Minnesota communities are strong and vital
- Improve our environment
- Help families make better decisions

## Extension: 2012 Impacts and Outcomes

820,000	Minnesotans participated in Extension classes and workshops
180,000	Educational materials distributed
125,000	Youth participants
40,000	4-H club members
30,000	Volunteers
5,000	Articles and news stories in Minnesota news media
1,000	Advisory board members
#1	State Extension website

More information is available at: [extension.umn.edu](http://extension.umn.edu)

## Extension research and education

### Leadership Development

Extension leadership programs give participants the confidence to step up to challenges, the competence to solve problems and the connections to bring new resources and perspectives to their communities. Programs include:

- Minnesota Agriculture and Rural Leadership (MARL)
- Red River Valley Emerging Leaders

### Reaching farmers through Agriculture professionals

Extension research on best management practices reaches more farmers through agriculture professionals who are trained by Extension.

- Each agriculture professional reaches more than 60 farmer clients
- Participants in just one Extension training program impacted over 4.3 million acres

### Farm Financial Business Management

Center for Farm Financial Management is a resource for farmers and lenders. 5,000 Minnesota producers improved marketing skills through “Winning the Game” education taught in partnership with banks, cooperatives, crop insurance agencies. FINPACK software is used by:

- 100 Minnesota banks
- 700 producers
- 90 MNSCU farm advisors

### 4-H Youth Development

Extension 4-H creates positively engaged youth and teaches other youth organizations how to do the same. 4-H youth are TWICE as likely to:

- make higher grades
- graduate from college
- pursue science, engineering and technology careers
- engage in community service

## **Food Safety**

Annually in the US

- 76 million foodborne illnesses resulting in 325,000 hospitalizations and 5,000 deaths
- \$6-37 million in medical costs and productivity losses.

Extension's ServSafe program teaches safe good food handling to Minnesota's food service workers. It is taught in person, online and in multiple languages.

## **Cold Climate Research**

Extension high tunnel research helps growers increase the quantity and variety of produce

- Minnesota is the national leader with more than 800 high tunnels
- High tunnels extends Minnesota's growing season

## **Food and Nutrition**

Extension facilitates education about nutrition, food and agriculture in and out of the classroom. Farm to School initiatives open new markets, increasing revenues and customer base for farmers. Extension works locally to develop community support and awareness about local food systems.

# **College of Food, Agricultural and Natural Resource Sciences**

The College of Food, Agricultural and Natural Resource Sciences (CFANS) is devoted to solution-driven science; using critical and innovative thinking plus all the tools of the arts and sciences to make the planet a productive, friendly, and sustainable environment—to solve everyday problems. Researchers study the health of the land and the health of the living:

- ensuring the safety of the food and water supply
- improving the economy and fostering job creation
- strengthening agricultural and natural resource-based industries
- enhancing the social fabric of communities

## **CFANS research and education**

### **Animal Science Research**

- Alternative housing for dairy and swine
- Nutritional value of DDGS for turkeys
- Modeling human disease in animals
- Precision dairying: Robotic milking

### **Plant Science Varieties**

- RB07 Wheat: high yield and protein
- Quest Barley: *Fusarium* head blight resistance
- Soybean: conventional and food grade varieties
- Horticultural: apples, grapes and 3 hardy shrub roses

## **Plant Disease Research Facilities**

The University of Minnesota is the only land-grant university with:

- Insect quarantine facility – researching beneficial insects to control soybean aphids, buckthorn, garlic mustard
- Plant pathogen quarantine facility – researching Ug99 Wheat Stem Rust, Asian Soybean Rust, Sudden Oak Death

The facilities are operated in partnership with the Minnesota Department of Agriculture.

## **Plant Disease Research**

- Durable rust resistance in wheat
- Borlaug Global Rust Initiative
- Ug99
- Breeding wheat for resistance to race
- TTKS
- Identifying resistance in cultivated and wild barley

## **Organic and Sustainable Agriculture**

- Forever Green: Developing high efficiency agriculture for farmer and communities
- Researching native plants that can be used for cosmetics
- West Center ROC in Morris converted to organic dairy
- Minnesota Institute for Sustainable Agriculture

## **Atmospheric Sciences**

Global Warming and Land Use: Using sensitive instruments on a radio tower and on the ground scientists are finding which land use patterns release the most carbon into the atmosphere, and which keep it bottled up in the soil.

## **Economics and Bio-Economy**

- Ethanol and biodiesel by-products
- Biomass systems
- Economics
- Building conservation
- Carbon credits
- Wind systems

## **Food Science and Safety**

- National Center for Food Protection and Defense
- Team of scientists working to prevent *E. coli* in foods
- Team of scientists experimenting with a water-based electrochemical activation system to disinfect food
- Food Industry Center: Research-based analysis for Minnesota's \$330 billion food industry

## **Natural Resources**

- White pines that survive blister rust might hold clues to a disease-resistant forest

### **Human Development and Well-being**

- Healthy Foods, Healthy Lives Initiative: agriculture, health, education and outreach disciplines
- Obesity: prevention and consumer education, improved school nutrition programs
- Zoonotic diseases and parasites affecting humans
- Food Industry Center: research-based analysis for Minnesota's \$300 billion food industry

### **Land and Water**

- Controlled drainage to manage water flow
- Fertilizing crops with precision
- Reducing runoff from urban and lake shore homes
- Testing salt-tolerant tolerant turf

## **Research and Outreach Centers**

Over 100 years ago the realization that agricultural systems needed to be evaluated across Minnesota's diverse ecosystems led to the establishment of an Experiment Station system (ROCs). Today, understanding the complex interactions of human land use on natural resources has broadened the scope and importance of the ROCs.

- 100 CFANS Faculty conduct research at the ROCs
- 130 current graduate students work at the ROCs
- ROCs have research and education collaborations with Extension, coordinate campuses, South and North Dakota State Universities, and the USDA

Without the ROCs, there would be no Honeycrisp or Snowsweet apples! Hundreds of varieties of fruit, flower, wheat, small grain, corn, soybean, forage and other crops have been developed at the University of Minnesota, making Minnesota an agriculturally significant state.

## College of Veterinary Medicine

The College of Veterinary Medicine (CVM) impacts the lives of animal and people every hour, every day through educational, research, service and outreach programs. The College's faculty are nationally and internationally recognized for teaching and research excellence. Areas of research strength include infectious disease, genomics, comparative medicine, public health, epidemiology and dairy, swine, and avian medicine.

### CVM research and education

#### Animal Health Research

- Spread of antimicrobial resistance
- Regional eradication of PRRS swine virus
- Understanding the cause of Johne's disease of cattle
- Salmonella infections of poultry
- Understanding transmission of swine influenza
- Risk assessment of Chronic Wasting Disease in MN
- Management effects on reproductive health in dairy cows
- Box elder trees found to be a cause of fatal horse disease

#### UM Veterinary Research Facilities

- Veterinary Diagnostic Laboratory
- Center for Animal Health and Food Safety
- The Raptor Center
- Veterinary Medical Center

## Appendices

### **Appendix A: Highlights of Research Conducted at the College of Veterinary Medicine**

Minnesota Agricultural Experiment Station (MAES) funds are provided to College of Veterinary Medicine (CVM) faculty as part of competitive review process. Proposals with the highest scientific merit as determined by internal and external reviewers and those complying with MAES guidelines are considered for funding.

Featured below are highlights of research by CVM faculty who have received MAES funding in the last three years and their impact on industry and stakeholders in Minnesota and nationally.

#### ***Randy Singer, DVM, PhD, Associate Professor, Epidemiology, Veterinary and Biomedical Sciences Department***

*“Attributing Diverse Selection Pressures to the Emergence and Spread of Antibiotic Resistance.”* This project has only recently begun, but immediately received recognition for the methods being developed in the project. Specifically, this project is developing methods to predict the emergence, spread, and persistence of antibiotic resistance in bacterial populations.

A second project funded by MAES, entitled *“Predicting Antibiotic Resistance Selection in the Poultry Production System,”* is combining lab work with mathematical models to determine specific compounds that increase levels of antibiotic resistance in the poultry environment. This project will directly help producers and veterinarians respond to the antibiotic resistance problem with interventions that are targeted and that have a high likelihood of being efficacious.

#### ***Kent Reed, PhD, Professor of Genetics, Veterinary and Biomedical Sciences Department***

Funding from the Minnesota Agricultural Experiment Station is currently supporting three high-impact research initiatives in the turkey, an important Minnesota agricultural species. These include the response of the transcriptome to the feed-borne contaminant aflatoxin, the role of *Mx* protein in the innate immune response, and the application of new sequencing technologies to investigate locus remodeling and CNV in the major histocompatibility complex.

#### ***Tim Johnson, PhD, Assistant Professor, Microbiology, Veterinary and Biomedical Sciences Department***

Projects funded through MAES to Dr. Johnson include those focused on poultry and the development of disease (*“Elucidating the Complexities of Escherichia coli Peritonitis in Commercial Laying Hens”* and *“Effects of Age, Stress, and Polymicrobial Infection on Respiratory Disease in Turkeys”*). These projects enabled the development and application of cutting-edge tools related to the field of metagenomics.

A third project funded by MAES (*“Salmonella enterica serovars Kentucky and Heidelberg, the Next Emergent Human Pathogens”*) enabled study of emerging bacterial plasmids in poultry production that encode for multidrug resistance. These plasmids present a great threat to

antibiotic therapy in humans and animals because they are able to encode resistance to all therapeutic antibiotic options.

***Yinduo Ji, PhD, Associate Professor, Microbial Pathogenesis and Functional Genomics, Veterinary and Biomedical Sciences Department***

*Staphylococcus aureus* is an important pathogen that causes both human and animal infections. The continuous emergence of multidrug resistant *S. aureus* has generated significant burden for public health in this country in general and in Minnesota in particular. This organism is one of the major causative agents of bovine mastitis, which dramatically affects the quality and quantity of milk. Mastitis causes billions of dollars in annual losses for the dairy industry in the United States. Dr Ji's long-term goal is to develop alternative therapeutic and/or preventive agents against *S. aureus* infections.

***Montse Torremorell, DVM, PhD, Associate Professor, Veterinary Population Medicine Department***

MAES funding has been fundamental in establishing the research program for swine influenza and enabled the rapid response to the 2009 H1N1 pandemic (the so-called "swine flu"). About \$1 million has been obtained from other sources, which has helped position Dr. Torremorell's group as recognized leaders in influenza transmission.

***Scott Wells, DVM, PhD, Professor, Veterinary Population Medicine Department***

MAES provided funding for the project "Chronic Wasting Disease in Minnesota Farmed Cervids: Improved Understanding of Transmission using Risk Assessment, Modeling, and Diagnostics Approaches."

Chronic wasting disease (CWD) is a fatal neurologic disease of cervids, categorized as a transmissible spongiform encephalopathy in 1978. Recently, USDA APHIS lost federal funding to support a national program of indemnity of CWD-detected herds, meaning depopulation of detected herds will be voluntary to affected producers, though quarantines are expected to be maintained by states. Dr. Wells' team was asked to support the need for information regarding transmission and control of this pathogen by state agencies and the cervid industry.

***Maxim Cheeran, MVSC, PhD, Assistant Professor, Veterinary Population Medicine Department***

MAES provided funding for the project "Influenza Mutation and Effect on Immunity." The ability of influenza virus to evolve within vaccinated and naïve populations has been the bane of vaccination programs across all species affected by this virus. Findings from these studies will not only provide valuable insights into predicting emergence of influenza strains, but also to develop comprehensive vaccine strategies that leverage T-cell responses to influenza.

***Srinand Sreevatsan, DVM, MPH, PhD, Professor, Veterinary Population Medicine Department***

Two projects on *Mycobacterium avium paratuberculosis* (MAP) were supported from MAES funds within the last couple of years.

Project 1: MAP-host interaction. Potential impact of these findings are a greater understanding and appreciation of the complexity of host-pathogen interactions with an emphasis on

advanced levels of cross-talk between multiple cell types; development of an entire bovine source co-culture system, which may be used to screen potential MAP vaccine candidates for attenuation (i.e. attenuation may be described as the loss of macrophage recruitment to the epithelium); and a potential therapeutic for MAP (i.e. blocking of the calcium channel responsible for the induced acidification process). Project 2: RARF. The study was highly impactful in establishing a phylogenetic structure for *M. bovis* and identification of host specificity and interspecies transmission.

***Ricardo C. Chebel, DVM, MPVM, Assistant Professor, Veterinary Population Medicine Department***

MAES has provided funding for research in dairy health, behavior, and management. With funds from MAES, Dr. Chebel developed a non-antimicrobial treatment for endometritis of dairy cows, a disease that affects 20-40 percent of dairy cows in the USA and results in significant economic losses due to compromised reproductive performance. Also with funds from MAES, Dr. Chebel explored the importance of gestational weight loss to the health of the dam. Finally, with support from the MAES, Dr. Chebel conducted research projects demonstrating that management strategies that have been preconized in recent years, alleging improvement in health and performance because of improved behavior, are not justified. Stephanie Valberg, DVM, PhD, Professor, Veterinary Population Medicine Department Beliefs about seasonal pasture myopathy, an important disease in horses, fail to hold up to scientific scrutiny. Dr. Valberg discovered a surprisingly common source of the devastating condition: box elder seeds.

## **Appendix B: Small Grain Initiative**

Minnesota lawmakers first appropriated funding to advance research of Fusarium Head Blight (FHB, scab) in 1994, following the severe 1993 epidemic that affected much of the Northern Plains. The Minnesota Fusarium Head Blight funding is now referred to as the “Small Grain Initiative (SGI).

The SGI is awarded to faculty within the College of Food, Agricultural and Natural Resource Sciences (CFANS) on a biennial basis. The SGI provides a means for the U of M to initiate or accelerate problem-solving and/or opportunity research, and associated extension programs, and to support and sustain Minnesota’s wheat and barley industry. Although there are no set guidelines for minimum or maximum grants, it is the intent to fund significant, comprehensive proposals, rather than small individual proposals.

The funds are restricted to project expenses; they are not intended for long-term recurring commitments for faculty and staff.

### **Accomplishments**

What has resulted is a scab research/extension initiative that may be the largest and most comprehensive effort among agricultural experiment stations in the nation. Thanks to the sustained funding commitment by the state of Minnesota, the U of M SGI has resulted in a number of structural and programmatic accomplishments including a working coalition between small grain producers and the U of M, stronger linkages with crop scientists regionally and nationally to focus on scab research, and increased public awareness of the community-wide impacts of agricultural disasters.

The Initiative has resulted in better greenhouse and field research techniques, so that plant breeding material and pest management protocols can be tested no matter what the weather conditions. The Initiative has also resulted in a more rapid and accurate means of measuring micotoxin levels in grain samples.

Programmatic accomplishments include new wheat and barley varieties with improved scab tolerance, to be followed by even better varieties several years down the road. The Initiative has also resulted in the discovery of sources and different types of scab resistance in exotic and domestic gene pools, and a better understanding of management techniques. This includes chemical and biological control products, and application techniques, as well as a better understanding of the impacts of tillage, previous crop, row spacing, companion crops and other crop management approaches as a means of minimizing the susceptibility of wheat and barley to scab.

The Minnesota SGI was used as a model to obtain federal research funding via USDA-ARS. The current funding for the National Scab Initiative is \$5.5 M.

### **Small Grains Initiative FY 10 / FY 11**

- Accelerated Breeding of Disease Resistant Wheat
- Evaluation of Wheat and Barley Breeding Lines for Multiple Disease Resistance
- Mycotoxin Analysis Services for Fusarium Head Blight Research
- Bacterial Leaf Stripe of Wheat: An Emergent Problem in Need of Solutions
- Chromosome Mapping of New Genes for Leaf Rust Resistance in Wheat and Enhancement of Leaf Rust Resistance in Spring Wheat Cultivars
- Enhancement of Scab Resistance in Wheat and Barley by Molecular Genetics
- General Wheat Support / Fusarium Head Blight Nursery
- Marker assisted breeding for enhanced disease resistance in barley
- Evaluating spring wheat and barley lines for resistance to multiple diseases in Northwest Minnesota
- Breeding Barley for Multiple Disease Resistance
- Red River On-Farm Yield Trials for Spring Wheat and Barley

### **Small Grains Initiative FY 12 / FY 13**

- Accelerated Breeding of Disease Resistant Wheat
- Evaluation of Wheat and Barley for Multiple Disease Resistance
- Mycotoxin Analysis Services for Fusarium Head Blight Research
- Bacterial leaf streak of wheat: An emergent problem in need of solutions
- Evaluating spring wheat and barley lines for resistance to multiple diseases in Northwest Minnesota
- Marker assisted breeding for enhanced disease resistance in barley
- Breeding Barley for Multiple Disease Resistance

## **Appendix C: Rapid Agricultural Response Fund**

### **The Nature of the Problem**

The Minnesota State Legislature has a strong history of responsiveness to the concerns of citizens involved with our state's natural resources. A recent example is the devastating impact "scab" has had on small grain crops such as wheat and barley. Growers who depend on those crops appealed to the legislature for special funding of control and eradication research, and breeding efforts to develop resistant varieties. In a few short years, promising advances have taken shape as a result of that initiative.

Often, however, attention to such problems has been piecemeal; insufficiently coordinated with activities already underway within Minnesota's research institutions. Every group with a need for assistance has had to press its case individually, tying up legislative time and attention. The University of Minnesota, particularly the Minnesota Agricultural Experiment Station (MAES), has long been a focus for research related to our natural resources. Recognizing this, the legislature looked to the University and the MAES for direction and coordination of research initiatives needing special emphasis or rapid response.

### **The Legislative Response**

To improve speed of response and organize the decision making process, in 1998 the Minnesota State Legislature authorized a program and created a fund to enable rapid responses to urgent issues and challenges that have arisen and face Minnesota's agriculture and natural resource based industries. An initial allocation of \$1.5 million was provided for designated projects in 1998, and a recurring allocation of \$1 million was created in 1999. State funding cutbacks have since reduced this amount to less than \$900,000.

Under the management of the MAES, the Rapid Agricultural Response Fund has enlisted the support of faculty in the colleges of Food, Agricultural, and Natural Resource Sciences, Veterinary Medicine and University of Minnesota Extension; Examples of projects that have been funded to date include efforts to:

- control bovine tuberculosis in Minnesota
- maintain the vitality of the honey producing industry
- eradicate Porcine Reproductive and Respiratory Syndrome from large swine systems
- control and eradicate avian diseases associated with Minnesota's turkey industry
- improve the viability of canola as an alternative crop for northwest Minnesota
- develop effective approaches for managing aphid transmitted viruses in seed potatoes
- eliminate scab infestation of wheat and barley

### **RARF Funded Projects FY-10/FY11**

- Breeding Wheat Varieties Resistant to the Ug99 Race of Stem Rust
- Mitigating Greenhouse Gas Emissions and Disease Transmission from Animal Facilities with Gas-Phase Biofilters
- Moving Pork Producers to Socially Acceptable Sow Housing: Transition from Gestation Stalls to Group Housing
- Population Genetic Frameworks of Mycobacterium Bovis and Their Correlation with Virulence and Environmental Survival
- Developing Critical Technology for Managing the Emerging Virulent Populations of the Soybean Cyst Nematode
- Evaluating Use of Recycled Manure Solids as Bedding Material for Freestall Dairy Barns in the Upper Midwest
- Air Emissions Mitigation Techniques for Sand Bedded
- Development and Evaluation of a Universal Swine/Avian Influenza Vaccine
- Preparing Minnesota for the Viral Hemorrhagic Septicemia
- Effect of Feeding Distiller's Grains on Escherichia Coli O157:H7 Prevalence in Feedlot Cattle
- Univoltine European Corn Borer in Southern Minnesota Sweet Corn: Impact, Research and Response to an Expanding Ecotype
- Do Feed Ingredients Affect Microbial Pathogens and Thus Indirectly Impact Poultry Health and Meat Safety?
- The Role of Astrovirus and Other Enteric Viruses in Poult Enteritis Syndrome
- Co-Digesting the Wasted Milk from Dairy Operations with Cattle Slurry to Reduce Water Pollution

### **RARF Funded Projects FY-12/FY13**

- Microbial Analysis of Foaming Swine Manure Improve Deep-Pitted Swine Barn Safety
- Threat Assessment of PRRSV Isolates in High Season PRRS
- Effects of Stocking Density and Grouping Strategies of Parturient Dairy Cows on Wellbeing, Behavior, Innate and Humoral Immunity, and Productive and Economic Performance
- Bacterial Leaf Streak of Wheat and Barley
- Cellulitis in Turkeys: Pathogenesis and Control
- Corn Rootworms: Exploring Potential Resistance To Transgenic Corn
- Successful Biological Control of Soybean Aphid: The Link to Buckthorn
- Investigation of a Possibly Emerging Disease Referred to as Peri-Weaning Failure to Thrive Syndrome in Minnesota Swine Herds
- Season Pasture Myopathy: An Emerging Disease in Minnesota
- Patulin Control and Detection in Apple Juice and Cider
- Wildrice Breeding Resources: Advancement, Preservation, and Genetic Distinctiveness
- Novel Turkey Reovirus in Minnesota: Virus Characterization and Determination of the Role in Turkey Lameness

## Appendix D: Regional Sustainable Development Partnerships

The Regional Partnerships were funded by the Minnesota Legislature in 1997. The Regional Partnerships have been established in Northwest, Northeast, Central, Southwest, and Southeast Minnesota. Each Regional Partnership has a board made up of citizens with backgrounds and interests in agriculture, natural resources, tourism, and sustainability as well as University faculty and staff from a wide range of departments. A Statewide Coordinating Committee composed of staff and citizens from each region, at-large citizen representatives, and University representatives provides leadership for the program's coordinated efforts.

The goals of the Regional Partnerships are:

- to build and strengthen effective relationships between citizens, communities, and the University of Minnesota;
- to promote active citizen leadership in strengthening the long-term social, economic, and environmental health of greater Minnesota; and
- to invest in research, education and outreach projects that advance the understanding and achievement of regional sustainability.

To date, the Regional Partnerships have supported over 500 projects throughout greater Minnesota. The five regions are also currently collaborating on Community/University ventures that bring together networks of partners inside and outside of the University to facilitate future program development.

More information on the Regional Sustainable Development Partnerships is available at [www.regionalpartnerships.umn.edu](http://www.regionalpartnerships.umn.edu)