Annual Report
of
Accomplishments and Results

FY 2005

Plan of Work for Agricultural Research
And Extension Formula Funds (AREERA)

UNIVERSITY OF MINNESOTA

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Executive Summary

This report of research progress for 2005 summarizes Minnesota Agricultural Experiment Station (MAES) research in several areas. As we did in last year's report, joint Research/Extension sections are included under key themes. This year those are: *Agricultural Profitability, Agricultural Competitiveness, Food Safety, Human Health, Agricultural Waste Management, Family Resource Management, and Parenting.* The report describes the impact of MAES research on many areas of the Minnesota economy, as well as its reach nationally and internationally. This ranges from farming risk management, to human health impacts, to family research informing public policy.

***Goal 1*: Through research and education, empower the agricultural system with knowledge that will improve competitiveness in domestic production, processing and marketing. (An agricultural system that is highly competitive in the global economy.)**

MAES funded research has contributed to advances toward achieving this broad goal in many targeted ways. It is interesting to see how much the techniques of biotechnology have been adopted and integrated into a broad spectrum of research, from control of animal diseases, to productivity of crops. There is progress reported this year under Goal 1 relating to animal disease, tools to provide important marketing and production systems information to farmers. Progress in limiting or controlling several insect an pathogen threats to Minnesota agriculture, as well as progress in creating and supporting the Minnesota grape wine industry is described.

Total Expenditures by Source of Funding:
Hatch--$511,440; MRF--$19,557; State--$1,520,126; Other Federal--$386,244; Other Non-Federal--$866,802
Total (Experiment Station only): $3,304,169
FTE's Experiment Station only: 37.3

***Goal 2:* To ensure an adequate food and fiber supply and food safety through improved science based detection, surveillance, prevention and education (A safe and secure food and fiber system.)**

Research has focused on rapid detection methods of pathogens to help the food industry. To control food-borne diseases, long-term research has led to the development of a successful Extension program.

Total Expenditures by Source of Funding
Hatch--$14,932; MRF--$26,912; State--$105,474
Total (Experiment Station only): $147,318
FTE's Experiment Station only: 1.7

Goal 3: **Through research and education on nutrition and development of more nutritious foods, enable people to make health-promoting choices. (A healthy, well-nourished population.)**

Progress in human health research has identified specific foods that promote health and may reduce disease. Agricultural research reported under Goal 1 in previous reports has provided some unexpected benefit to human health—honeybee research that has implications for HIV, and genomic research on pigs that has developed a key finding that may help cure human diabetes.

Total Expenditures by Source of Funding
Hatch-- $59,975; MRF--$358; State Funds--$237,791; Other Federal--$137,681; Other Non-Federal--$348,504
Total (Experiment Station only): $784,309
FTE's Experiment Station only: 9.1

Goal 4: **Enhance the quality of the environment through better understanding of and building on agriculture's and forestry's' complex links with soil. Water, air and biotic resources. (An agricultural system that protects natural resources and the environment.)**

The recent accomplishments reported here include application of technologies and applied research to improve water quality in Minnesota, including not only the state's many lakes, but also its important waterways, the Mississippi and Minnesota Rivers. Given the importance of Minnesota's lakes to its tourism industry and residents' perception of quality of life, the work being done on managing invasive species in those lakes is of high value, and is described in this report.

Total Expenditures by Source of Funding
Hatch--$224,722; MRF--$59,489; State Funds--$1,146,556; Other Federal--$371,002; Other Non-Federal--$862,796
Total (Experiment Station only): $2,664,565
FTE's Experiment Station only: 31.7

Goal 5: **Empower people and communities, through research-based information and education, to address the economic and social challenges facing our youth. Families and communities. (Enhanced economic opportunity and quality of life for Americans.)**

Research to help Minnesota families manage their financial resources to improve their economic stability and quality of life at several stages of the life cycle has focused on housing, tax policies, retirement strategies and low-income family support. The results have informed legislative policymakers and led to educational programs and greater public understanding of the complex issues families must deal with to establish and maintain financial stability.

Total Expenditures by Source of Funding
Hatch--$27,616; MRF--$52,243; State Funds--$277,369; Other Federal--$9,268; Other Non-Federal--$108,641
Total (Experiment Station only): $475,137
FTE's Experiment Station only: 7.2

Key Theme: Plant Health *(Research)*

MAES Plan of Work: GOAL 1, Programs 7, 8, 9, 12, 13

a. Description
In the early to mid-1990s, researchers found that surrounding early-generation seed potato fields with borders of soybean protected against spread of Potato virus Y (PVY), an aphid-transmitted disease. Use of crop borders to protect seed potatoes from PVY spread was widely adopted in Minnesota and North Dakota. Emergence of soybean aphid as a major pest throughout the Midwest in 2003 and discovery that this insect is a capable vector of PVY caused growers to question the advisability of continuing to use soybean as a crop border. To address that concern, large-scale replicated field plot research has been undertaken to compare the efficacy of soybean and three alternative borders (fallow, potato and spring planted winter wheat) in preventing PVY spread.
b. Impact
Research has shown that crop borders of soybean, potato, or winter wheat can reduce spread of PVY by 50-to-70 percent. Crop borders provide better control of PVY than is usually achieved with insecticides or crop oils. However, the recent establishment of soybean aphid in North America and our demonstration that this aphid is a efficient vector of PVY made it critical to reassess this technology. This research showed that strategies that work at one time need to be continually reassessed based on current conditions. Minnesota produces over 5 percent of the world's soybeans, and brings in more than $1 billion to the state's agricultural economy.
c. Source of funding: Hatch
d. Scope of impact: State and Multi-State

a. Description
A method for analyzing ergosterol in ground and single kernels of barley and wheat was developed using gas chromatography-mass spectrometry. The method developed can be used to handle 80 samples daily by one person, making it suitable for screening Fusarium Head Blight resistance. The method also provides a tool to investigate early fungal invasion.
b. Impact
This rapid, sensitive and reliable method for analyzing ergosterol in barley and wheat provides an important tool for screening FHB resistant cultivars. Fusarium Head Blight caused $870 million in losses to wheat and barley growers from 1998 through 2000, and the total economic impact from FHB was estimated at $2.7 billion in the United States.
c. Source of funding: Hatch
d. Scope of impact: State and Multi-State

a. Description
Using genomic technology to identify and isolate disease resistance genes in potatoes has resulting in significant discoveries. Researchers are accessing natural resistance genes for potato improvement.

b. Impact
In Minnesota, the annual potato crop is worth over $120 million. Late blight and Verticullium wilt are among the most costly potato diseases. Chemical control of late blight costs Minnesota growers $16-to-32 million a year with possible negative environmental impacts. We have identified three wild potato species as sources of resistance to late blight and Verticillium wilt.

a. Description
A survey of organic farmers who are not currently using fall-seeded rye cover crops showed they would be likely to do so if this practice could lead to the suppression of soybean aphids. Field research showed that the rye cover crop did lead to lower soybean aphid densities on most of the farms studied. The experimental field data were complemented by sampling conducted by the Minnesota Department of Agriculture, which corroborated the experimental results.
b. Impact
Results suggest that planting a rye winter cover crop prior to soybeans can lead to lower densities of soybean aphids. This is an important finding for organic farmers who have no reliable insecticides to use against soybean aphid.
c. Source of funding: Hatch
d. Scope of impact: State

a. Description
Soybean rust, recently introduced into the U.S, poses a new threat to soybeans both nationally and in Minnesota. Although SBR has not been identified in Minnesota, research to prepare for that eventuality is critical. Results from analysis of rainfall samples indicate that long distance transport of SBR spores into Minnesota occurred during summer 2005.
b. Impact
Current recommendations for management of SBR rely on fungicide application, a practice that will add to the cost of soybean production. Timely, cost effective fungicide application will require accurate forecasts of SBR risk coupled with early, accurate detection of SBR by trained observers. Collaborative research projects have been established with researchers in the north central U.S. to establish a system of sentinel plots to provide early indication of soybean rust infection and develop a disease forecasting system to provide growers with sufficient warning for timely fungicide application. In Minnesota, soybeans planted on 7.2 million acres in 2004 provided approximately 20 percent of farm income. They have become the state's most important source of farm income.
c. Source of funding: Hatch
d. Scope of impact: State

Key Theme: Animal Health *(Research)*

MAES Plan of Work: Goal 1, Programs 4, 5, and 6

a. Description
A study to estimate the prevalence of lameness in high producing Holstein cows housed in 50 free stall barns showed lameness was on average three times higher than the prevalence estimated by the herd managers on each farm.

b. Impact
Lameness is one of the most important diseases affecting dairy herds today. The study showed significant association between the lameness and some management and housing factors. Improving those factors could reduce lameness in free stall housed dairy cattle, improving both economic and animal welfare issues for the dairy industry. Each case of lameness costs approximately $300 and this condition causes extreme pain to the cow.
c. Source of funding: Hatch
d. Scope of impact: State

a. Description
A summary of research results using polyclonal antibodies (PAP) against respiratory pathogens of feedlot steers has been completed. Results showed that using PAP against respiratory pathogens in combination with conventional health procedures such as vaccination reduced morbidity. This commercial preparation is now in full use for preventative treatment of over one million head of feedlot cattle in the U.S.
b. Impact
Polyclonal antibody preparations have been successfully introduced for prevention of respiratory disease at a commercial scale. Sale of these products is helping to finance projects to expand their use in ruminant nutrition applications. One development of this work is international collaboration with two research teams in Spain and Brazil to bring these preparations to commercial use internationally.
c. Source of funding: Hatch
d. Scope of impact: State

Key Theme: Ornamental/Green Agriculture *(Research)*

MAES Plan of Work: GOAL 1, Program 11

a. Description
Until recent times, any wine grape that could survive Minnesota's harsh climate was appreciated for its strength of character. It seemed too much to ask that it also taste good. However, University of Minnesota research to develop grape wine varieties has changed that. This year Marquette will be released, a cold-hardy, disease resistant grape that yields a pinot noir-like red wine comparable to that produced in California. Marquette marks the fourth variety released in six years by the MAES-supported grape-breeding program—a shot in the arm for the emerging Minnesota wine industry and a boost for traditional Minnesota agriculture.
b. Impact
Twenty years ago there was one commercial winery in Minnesota. Now there are 16 wineries, about 50 commercial vineyards, and more than a hundred small hobby vineyards. Well over half of those grapes being grown are varieties developed by the Minnesota program. As an example of the impact of this work: One of those vineyards is run by a farmer who also grows 650 acres of corn and soybean and sees grapes as an in-demand, high-value crop that diversifies his crop portfolio. He makes between $4,000 and $5,000 per acre of grapes, and says when he has 10-to-12 acres of fully producing grapes, he'll make as much from them as he does from the 650 acres of corn and beans.

c. Source of funding: Hatch
d. Scope of impact: State and Multi-state

Key Theme: Agricultural Competitiveness *(Joint)*

MAES Plan of Work: GOAL 1: Program 1, 2, 9 and 13

a. Description
Results of ongoing research tracking the viability of Minnesota family farms has showed that average farm income for the 125 farms in the Southwestern Minnesota Farm Business Management Association was $98,300 in 2004. In constant dollars, 2004 was the third most profitable year for SW Association farmers in the past 20 years. Average farm income for the 46 farms included in the Southeastern Minnesota Farm Business Management Association was $113,400. 2004 was the most profitable year for SE Association farmers in the past 20 years.
b. Impact
The annual farm financial reports are used by farmer-members and many others. Bankers use them to check their own numbers and to compare to their customers. Other farmers use them as a point of comparison for their own operations. People interested in investing in farmland use them to evaluate the potential returns. Companies use them to evaluate the potential profitability of their potential markets. Reports explain current conditions to legislators, media and the general public.
c. Source of funding: Hatch
d. Scope of impact: State

a. Description
The FINBIN farm management database has been further developed and has expanded to include data from seven states. This database allows producers and agricultural professionals to search and query actual farm data from more than 3,200 farms representing more than 2.9 million acres of crop land, over 72,000 dairy cows, and over 2.1 million pigs. Extension farm management association and technical college farm business management education programs in nine states are cooperating to expand farm management assistance provided producers.
b. Impact
As a result of this research, producers and agricultural professionals have access to a dynamic benchmarking database to explore financial topics such as differences between GMO crops and non-GMO crops, large and small dairy herds, different tillage systems, farm sizes, and geographic locations. The magazine *Farm Futures* called FINBIN "the big dog of public databases." FINBIN reports were used in presentations on financial benchmarking at the 2005 ABA National Agricultural Bankers Conference, the Minnesota Crop Insurance Conference and in presentations on using cost of production in market planning in the award winning Winning the Game workshop series in several Midwest states.
c. Source of funding: Hatch
d. Scope of impact: State and Multi-state

a. Description
The Indianmeal moth (IMM) is a major pest of grains and processed foods. Infestation caused by this pest can cause food contamination and loss of revenue for producers and processors. Despite being one of the most cold-hardy stored-product pests, research has determined the response of IMM to low temperatures and the conditions under which these temperatures could control this pest.
b. Impact
The control of Indianmeal moth in raw grain depends on chemical protectants or fumigants for disinfestation purposes. For stored grain alone, losses of 7-20 cents per bushel of grain may occur through damage and related control activities. With the upcoming loss of methyl bromide and the potential risk of resistance to hydrogen phosphide, new control tactics for this insect are needed. Disinfesting and protecting organic-certified grain is another major concern because none of the currently registered fumigants can be used on grain destined for the organic market. Our work has demonstrated there is sufficient capacity of low temperatures to disinfest grain in the upper Midwest. This completed project demonstrated a simple system of control easily employed by producers using readily available equipment and ambient temperatures.
c. Source of funding: Hatch
d. Scope of impact: State and Multi-state

a. Description
Foliar fungicides have been marketed to farmers to provide yield improvement even in the absence of foliar pathogens. Several studies were done to investigate the beneficial effects of foliar fungicides for Minnesota grown soybean. No positive yield or seed quality effects were detected in these studies.
b. Impact
Thousands of Minnesota soybean producers have purchased foliar fungicides for their soybean crop based on recommendations by the chemical industry. Data indicates that prophylactic use of these fungicides is impractical, and economically (and potentially environmentally) costly. Although up to one million acres of Minnesota soybeans have the potential to be sprayed with these fungicides, needless applications will be greatly reduced based on this work.
c. Source of funding: Hatch
d. Scope of impact: State and Multi-state

a. Description
Research on nutrient management in Minnesota cropping systems has reduced losses in soybean from iron chlorosis. Related work under this project determined that 2003, 2004, and 2005 responses to nitrogen fertilization by non-resistant and resistant sugar beet varieties for rhizomania were not different. This information will change the current N recommendations.
b. Impact
The economic impact of the research conducted as part of this Experiment Station project has reduced losses to soybean producers from iron chlorosis by $12,500,000 a year in Minnesota. The impact of the nitrogen management research for sugar beet producers decreased expenses in fertilizer and processing by $46 per acre for growers.
c. Source of funding: Hatch
d. Scope of impact: State and Multi-state

Key Theme: Agricultural Profitability *(Joint)*

MAES Plan of Work: GOA 1: Programs 1, Agricultural Production and Farm Business Management; 2, Agricultural Marketing and Distribution; 3, International Economic Competitiveness, and 5, Animal Production and Management Strategies

a. Description
Research efforts are focused toward developing new barley varieties with resistance to Fusarium Head Blight (FHB), desirable field performance, and acceptable malting quality. This year we grew and evaluated 51 early generation populations and evaluated 1574 F5 lines for FHB resistance in nurseries in three locations. Two of four variety candidates were rated satisfactory in industry pilot-scale malting evaluations.
b. Impact
The latest variety release, Lacey, was grown on 18.5 percent of the acres in Minnesota, North Dakota and South Dakota in the 2005 growing season which is up from 13.6 percent in the 2004 season.
c. Source of funding: Hatch
d. Scope of impact: State and Multi-state

a. Description
Low-input dairy systems are gaining favor among small and moderate size dairies and custom heifer growers in Minnesota and across the Upper Midwest. There are many management decisions in a low input system. Forage species selection, pasture management, seasonal calving, and raising dairy heifers on pasture are just a few of them. This project assessed the economic feasibility of these management choices. A three-year on-farm research trial showed raising dairy heifers on pasture is both technically and economically feasible. The net returns per acre for raising dairy heifers exceeded average net returns per acre for corn and soybeans over the three years of the research trial.
b. Impact
The comparison of pasture versus feedlot systems for raising growing dairy heifers is being used by professional custom dairy raisers in the Upper Midwest. It provides objective comparisons of productivity and costs of two production systems. In addition, the calculations of returns per acre allow producers to evaluate expected returns for converting corn and soybean acres into pasture.
c. Source of funding: Hatch
d. Scope of impact: State and Multi-state

a. Description
Soybeans occupied approximately 2.7 million hectares in Minnesota in 2005 with an average yield of about 2.8 Mg/ha. Publicly developed cultivars were grown on about 8 percent of the soybean hectarage. Several cultivars developed by the Minnesota Agricultural Experiment Station are grown extensively. Two new cultivars were released in 2005. One cultivar had very high yield and one contained the glyphosate resistance gene.
b. Impact
Recently released general purpose and special purpose Minnesota cultivars contributed about $1,000,000 extra income in 2005 compared with yield of older cultivars.
c. Source of funding: Hatch

d. Scope of impact: State and Multi-state

EXTENSION Plan of Work GOAL 1, Programs 1, 2

a. Description: The mission of the Center for Farm Financial Management and the U of M Extension Service Agricultural Business Management program is to improve farm financial and risk management through educational programming, trainings, publications, and software. This program serves farmers, ranchers, university/technical college educators, lenders, veterinarians, and other public agencies and businesses that can use educational information to make the agricultural economy more profitable. This program effort is built upon research and data base construction that was described in 2003.

b. Impact:

Behavior Change:

According to Winning the Game follow-up evaluations conducted six months after program delivery, targeted workshops created the following changes in farm management behaviors:

- 90.3% of participants developed a pre-harvest marketing plan.
- 98.6% utilized a revenue-based crop insurance to manage production and price risk.
- Those attending stated that they pre-harvest marketed 12.2% more corn, 29.2% more soybeans, and 12.8% more spring wheat than the previous year.
- 76.1% reported developing a post-harvest marketing plan. Of those producers, 90.3% implemented the plan.
- 68% stored less corn than the previous year, and a total of 61.8% of participants stored less soybeans than the previous year.

According to end-of meeting evaluations for Farm Transition & Estate Planning programs:

- 82.3% of participants did not have a farm business transfer plan and 48.2% did not have an up to date estate plan. As a result of attending the program, 92.3% of participants reported they were going to establish a farm business transfer plan and an associated estate plan.

Economic Impact:

Based upon a follow-up evaluation of Winning the Game completed six months after program delivery, participants reported an increase in revenue of $0.26 per bushel of corn sold, $0.52 per bushel of soybeans sold, and $0.22 per bushel of spring wheat sold. This is an average increase of $4,800 per participant farm. Total financial impact of the program effort was $3.2 million.

Based upon follow-up evaluation, 92.3% of participants in Farm Transition and Estate Planning offerings, 92.3% stated they would develop and implement a farm transition plan and associated estate plan, the total impact for the program effort was $93.3 million.

Based upon an evaluation of marketing club participants, it was found that because of participating in the marketing clubs and utilizing the techniques taught, producers gained on average an additional $20,401 in net farm income.

c. Source of Funding: Smith-Leever 3b&c, state, county, sponsorship fees from various ag commodity groups and a Community Assistant Partnership Grant

d. Scope of Impact: Multi-state, Integrated Research and Extension (DE, IA, MN, ND, NE, SD, TX, WI)

a. Description:
The Dairy Modernization program works with dairy producers to improve the profitability of dairy businesses. A major program effort is the Minnesota Dairy Initiative Program, a collaborative effort to increase dairy income by reducing somatic cell counts. In seven regions throughout the state, this initiative educates dairy producers and other dairy industry professionals. This program manages farm management teams, field days, educational conferences and other initiatives in order to create a strong impact statewide.

b. Impact
Improved health for milk-producing herds: At the beginning of the decade, Minnesota was among the dairy states with the highest average somatic cell counts. According to University of Minnesota dairy scientists, these high counts robbed farmers of nearly $53 million in potential income every year. Concerned about the impact on the dairy sector, the Minnesota Department of Agriculture (MDA) joined with the University, producer groups and processors to help farmers reduce somatic cell counts. When the program started in June 2003, the state's average SCC hovered above 400,000.

In June of 2005, Minnesota Agriculture Commissioner Gene Hugoson announced that Minnesota's dairy farmers are closing in on the goal of reducing average herd somatic cell counts to below 300,000 in 2005. The median SCC was 305,000 in May, putting the state within reach of the 300,000 goal. Overall, the May DHIA average was down 20,000 from May 2004 and down 60,000 from May 2003.

c. S*ource of funding*: Smith Lever 3b & c, state, county, State of Minnesota MDI program, Minnesota Department of Agriculture, Sponsorships, Dairy Associations

d. Scope of impact: Multi-state Integrated Research and Extension (IA, IL, MN, ND, SD, WI)

***a. Description*:**
The new National Animal Identification System is designed to trace animals to the physical locations where they have been so that threatening disease spreads can be identified and isolated within 48 hours. The U of MN Beef Team, in coordination with the USDA, MN Department of Ag and MN Board of Animal Health, delivers outreach education to MN's livestock industry in order to increase levels of beef registration into the system.. The U of MN Beef Extension Team developed and coordinated professional Animal ID "Train the Trainer" education to all extension ag/livestock staff, veterinarians and other agriculture industry professionals. A total of 28 National Animal ID Trainers were certified to deliver animal ID information and value-added opportunities to Minnesota's livestock industry. Extension staff also delivered over 121 educational Animal ID sessions in 2005.

b.Impact:
The impact of Extension's outreach efforts is reflected in the registration of Minnesota's livestock premises (physical location of livestock operations) by livestock producers. *Minnesota ranks in the top 7% of states with premises registrations to date*. In 2005 over 25% (10,485 Minnesota livestock farms) voluntarily registered their premises in the new National Animal ID Program.

c. Source of funding: Smith-Leever, Hatch, Minnesota Board of Animal Health (USDA)

d. Scope of impact: Multi-state Integrated Research and Extension

a. Description:
Experiment Station research conducted and previously reported to CSREES developed new ways to reduce the amount of pesticide and antibiotic use in honey bee colonies for control of two harmful PESTS: 1) the parasitic mite, Varroa destructor, and 2) the highly contagious bacterial disease, American foulbrood. In 2005, educational materials guided beekeepers to make sound treatment decisions. The project works with commercial beekeepers to breed for traits that allow the bees to actively resist diseases and mite pests. The breed of bees is selected for hygienic behavior and reduced mite reproductive success. A web-based course for beekeepers is being developed that emphasizes treating colonies for diseases and mites only as a last resort. A new research project aims to develop a sampling guideline for beekeepers to help them make educated treatment decisions to control Varroa mites.

b. Impact:
Behavior Change: In 2005, beekeeping supply businesses and bee breeders report that they are selling tens of thousands of queens from the Minnesota hygienic line all over the United States and Canada.

Economic Impact: Using pesticides increases costs; moreover, labor is required to apply them. Colony losses have more than doubled in many cases even with the use of the pesticides due to re-infestation and increase in the overall stress imposed by the mites. If beekeepers halve the number of treatments they apply by using resistant bee stock, operating costs are halved. Reduction in pesticide use by beekeepers will enhance environmental quality and economic viability of individual beekeeping operations, strengthen an agricultural system based on small and moderate-scale owner operated farms, protect human health and safety by preventing the risk of contaminating honey and hive products and promote the well-being of the world's vital pollinators of crops, gardens and wildflowers.

c. Source of funding:
Smith Lever 3b & c, state, county, National Science Foundation, North Central Sustainable Agricultural Research Fund, National Honey Board and Beekeeping Associations in MN, ND, SD, IA, and WI

d. Scope of impact: Multi-state Integrated Research and Extension (WI)

Key Theme: Food Safety *(Joint)*

MAES Plan of Work: GOAL 2. To ensure an adequate food and fiber supply and food safety through improved science based detection, surveillance, prevention, and education

a. Description
New government mandates in the ready-to-eat foods industry require testing for Listeria on a regular basis. It is essential that these facilities have a rapid method to determine if the pathogen is present in their environment in order to control its presence in the food products. Researchers have been working on developing and implementing "real-time" assays for food pathogens to help the food industry in controlling potential food borne outbreaks and help the industry meet the regulatory requirements in microbiological testing, both economically and efficiently.
b. Impact
Researchers have developed a Listeria assay which detects down to 10 Listeria cells and this assay has received AOAC approval. A 90-minute assay for the detection of Listeria in environmental samples has also been developed and submitted for AOAC approval and is being adopted by the food industry.
c. Source of funding: Hatch
d. Scope of impact: State and Multi-state
Extension Plan of Work: Goal 2, Program 1

a. Description
On June 7th a two hour *To Your Health!* Food safety session was piloted for family practice nurses, Day Care Providers and Day and Foster Care licensors. All participants were pre-selected based on professional experience and place of residence. Participants received a food safety tool kit. The course content was tailored to meet the needs of a professional audience that serves high risk clients such as pregnant women, infants, young children and seniors.
b. Impact
Behavior change:

1. In post sessions, 100% stated that the course would have a long-term impact in regard to changes that make day cares safer.
2. Within one month, 100% of those trained had used the items in the food safety kit in their professional service to high-risk groups, with benefits for those groups.

Community Action*:*
The pilot program discovered effective ways to integrate food safety checks into existing community-based institutionalized programs. As a result of *To Your Health! Food Safety for High Risk Audiences*, several counties are having Public Health Home Health Aids check the refrigerator/freezer temperature in the homes of the elderly families they serve. One school district's Early Childhood Family Education staff checks for general food safety issues when they do home visits. If they note any concerns, they recommend the parents attend this Extension course. In addition, a public department work unit for the developmental delayed is working on changing hand washing policy. Because of the usefulness the tools and content are having, this pilot will be replicated more widely in coming years.
c. Source of funding: Smith Lever 3b & c, state, county, participant fees
d. Scope of impact: State Integrated

Key Theme: Human Health *(Joint)*

MAES Plan of Work: GOAL #: Through research and education on nutrition and development of more nutritious foods enable people to make health-promoting choices.

a. Description
Colon cancer continues to be one of the most common forms of cancers and one with a poor prognosis. Although it is clear that diet influences colon cancer risk, it is not as clear which foods may be most protective against the disease. Researchers have studied the effects of wheat and cruciferous vegetable consumption in reducing colon cancer risk.
b. Impact
Researchers have demonstrated that red wheat (used in bread making primarily) reduces colon cancer risk. Second, they have found that three different types of cruciferous vegetables—watercress, green cabbage, and broccoli—are all highly effective at reducing risk. Thus, there is now evidence for two different dietary interventions that show significant promise in reducing colon cancer risk.
c. Source of funding: Hatch
d. Scope of impact: State and Multi-state

a. Description
Whole grain consumption is associated with reduced risk for chronic diseases, however, national dietary intake data show that children are consuming only one-third of the recommended three servings of whole grain foods per day. A school-based intervention research project was conducted to test a multi-component intervention including curriculum and school cafeteria menu changes.
b. Impact
To our knowledge, this is the first published report of a multi-component school-based intervention designed to increase intake of whole grain foods by children. The results of this study indicate that modifying school cafeteria menus to include more whole grain foods can increase whole grain consumption by children to levels closer to the current recommendations. The successful outcome of this research has direct relevance to the National School Lunch Program and school meal policies. This research also demonstrates to the food industry that pilot testing of whole grain foods can be successfully implemented in a school food service program.
c. Source of funding: Hatch
d. Scope of impact: State and Multi-State

a. Description
Since 1993 Minnesota researchers have been painstakingly breeding queen bees to propagate a new strain of bees with the genetic instincts to protect themselves. They carefully select and breed queens who demonstrate the "hygienic" genetic traits that will promote survival. Our honeybee population has dropped by half since 1950. This is of major concern because honeybees are responsible for the pollination of about one-third of all U.S. food crops. Beekeepers throughout the U.S. are using our MN Hygienic line of bees with the aim of reducing pesticide and antibiotic use within bee colonies. Now this bee research has led to an important human health connection. Propolis, or bee glue, is resin that bees collect from the leaf buds and

bark of some trees. Researchers are working with an interdisciplinary team including researcher from the University's medical schools to testing propolis against HIV.

b. Impact

Every propolis sample the researchers have tried, (sourced from three sites in Minnesota, three in Brazil, and one in China) killed HIV in lab cultures. The propolis also appeared to at least partially inhibit HIV's ability to enter cells—an elusive and sought after property in potential HIV treatments. Propolis is a cheap, natural substance. Of the forty million people affected by this virus, ninety percent of them are living in the developing world and cannot afford the current, expensive HIV treatments.

c. Source of funding: Hatch

d. Scope of impact: State and Multi-state

a. Description

Research on food security is being conducted with additional funds from the National Center for Food Protection and Defense, as part on long term Hatch supported research on the changing structure of the food industry and consumers' food attitudes. A consumer survey has been conducted to determine the relative value consumers put on defending the food supply as opposed to other potential terrorist targets. Benchmarking of retail food firms with respect to their readiness to defend their faculties and the food they handle from terrorist attacks has been pilot tested.

b. Impact

A key finding of this first-of-its-kind survey--a representative national sample of 4,200 U.S. residents--is that people believe guarding the nation's food supply merits more federal spending than protecting against any other potential terrorist target, from airports and rail lines to the electrical power grid and national monuments. The national spends billions to shield the nation from terrorists. But until now, the Department of Homeland Security and Congress had no way of knowing what priorities Americans put on different kinds of things. The results showed that the American public expects their food supply to be well protected. The food industry has worked hard to keep accidental contaminants from entering the food supply chain. Consumers expect the same kind of effort to be made to protect against deliberate contamination.

c. Source of funding: Hatch

d. Scope of impact: State and multi-state

a. Description

Research in animal genomics has focused on the characterization and the manipulation of the pig genome. Progress on this front has been reported in previous *Accomplishment Reports*. New technologies coupled with genomic sequencing enable the use of the pig as an alternative animal model (replacing laboratory mice) for study of human diseases such as cystic fibrosis and diabetes. The physiology of swine and their organs are remarkably similar to humans, making this an ideal animal model. In collaboration with University of Minnesota medical researchers, our researchers are investigating treatment for type 1 diabetes. They were able to reverse diabetes in monkeys by transplanting insulin-producing cells from pigs. If successfully applied to humans, genetically manipulated pigs could produce islet cells and provide an alternative to insulin injections.

b. Impact

This study raises the potential for an endless supply of insulin-producing cells to cure the disease that affects 20 million Americans. The study involved only a dozen monkeys. But it showed "proof of principle" that pig cells can cure animals that are "close to humans." One Minnesota man believes the research is so promising that he's heading efforts to raise $20 million to build and operate a high-tech facility to raise pigs for future studies. So far his group has raised about $4 million.

c. Source of funding: Hatch

d. Scope of funding: State and Multi-State

EXTENSION Plan of Work: Goal 3, Program 1

a. Description

In preparation to working with communities around the Wellness policy Extension created create a curricula and assisted in hosting statewide Actions for Healthy Kids downlink satellites to inform stakeholders, agencies and food service workers about the upcoming 2004 Child Nutrition and WIC Reauthorization Act. The hundred page guide includes step by step community meeting process and nutrition education resources. Over one hundred guides were purchased by schools to work with a large variety of community members toward developing their local nutrition and physical activity school plans.

"Weight Issues: Obesity to Vitality" was an educational packet used to reached community groups addressing the obesity issue and lifestyle changes. Participants shared this information in non formal educational group settings with community members. Each participant reached approximately 5 other community members.

b. Impact

- Participants in *Weight Issues: Obesity to Vitality* participants created three personal goals related making their own healthy lifestyle changes—including increased physical activity, limits in snacking, increased consumption of healthy beverages, avoided large portion sizes and seconds, and increased consumption of fruits and vegetables.

- Educators trained food service workers and community organizations in the MyPyramid and New Dietary guidelines. Food service workers reported they had not taken the time to study the new changes between the Food Guide and the MyPryamid so this program reached an important audience who, in turn, improved the nutritional value of food service settings.

- 26% of health and nutrition professionals attending the "How America Eat: Health and Weight Management Implications downlink satellite presentation from Iowa State University" and changed their teaching methods and/or lesson plans to encourage their participants/clients to improve their own diets.

- Jump into Food and Fitness staff trainings were conducted across the state in 2004 and 2005, focusing on activity and lifestyles. Strong impact was shown – youth returned to

the session the following year sharing the main concepts of healthy living that they learned the pervious year.

- A lifestyles program was also integrated into Extension, based on the philosophy that Extension staff should model healthy lifestyles in communities. Nine offices completed the challenge with a total of 48 participants staying on a six-week physical activity and healthy eating program.

c. Source of funding: *Smith-Leever 3b&c, state, county*
d. Scope of impact: *State Integrated*

Key Theme: Wildlife Science and Management *(Research)*

MAES Plan of Work: GOAL 4, Program 5

a. Description
The sea lamprey is an ancient, parasitic fish that invaded the Great Lakes a century ago, when it triggered the collapse of many fisheries. Like many fishes, this species relies on chemical cues to mediate key aspects of its life, including migration and reproduction. Researchers have discovered a multi-component steroidal pheromone that is released by steam-dwelling larval lamprey and guides adults to spawning streams. This mixture is the first migratory pheromone identified in a vertebrate and is being investigated for use in lamprey control. The sea lamprey migratory pheromone has now been isolated, and found to consist of three unique disulfated steroids. Research has shown that this pheromone will attract migratory sea lamprey.
b. Impact
This pheromone is now being developed as a new control strategy and a patent application has been filed. Possible applications for this pheromone include enhancing existing riverine trapping efforts at low cost, redirecting animals to desirable locations and measuring the pheromone to assess larval population abundance. Furthermore, because this pheromone appears to be evolutionarily conserved and common to other lamprey species, it may prove useful for restoring some of the endangered lamprey species along the Atlantic and Pacific seaboards.
c. Source of funding: *Hatch*
d. Scope of impact: State and Multi-state

Key Theme: Agricultural Waste Management *(Joint)*

MAES Plan of Work: GOAL 4, Program 6

a. Description
Multi-state cooperative research has measured emission rates of odor, ammonia, hydrogen sulfide, carbon dioxide and particulate matter from six types of animal confinement buildings for poultry and swine. Air sampling from two adjacent identical buildings for each type was conducted over a year and three months revealing seasonal variation in emissions depending on emission and building type.

b. Impact
The air emissions from animal buildings reported from this project has a significant impact for both regulatory and dispersion modeling purposes. The emission data from livestock and poultry buildings found in this study are a valuable resource to individuals who need accurate estimations of various gas and particulate emissions to use in dispersion models to predict downwind concentration of particular pollutants. This is important for purely regulatory purposes but also to site facilities to avoid adversely affecting neighbors.
c. Source of funding: Hatch and Multi-State
d. Scope of impact: State and Multi-state

EXTENSION Plan of Work**:** Goal 4, Program 1

a. Description
In order to improve manure management, Extension educators lead groups of livestock, crop producers and agronomy professionals through a process of creating field manure/nutrient management plans. Since 2003, 710 participants have prepared plans in 68 workshops and made associated management practice changes. In 2005, twelve sessions were held in nine counties, attended by 137 participants. Information on planning and practice changes made by these participants was gathered through in-session and post-cropping season surveys.

This project was featured in the cover article in the April 8, 2005 edition of Successful Farming magazine.
b. Impact
Behavior change:

- Of 260 respondents to the post cropping season surveys (47% response rate), 60% had completed their plans for the entire farm as a result of the sessions, 4% were still completing their plans, while 10% had completed them prior to the sessions.
- Of respondents, the increase in practice adoption from pre-workshop to post-season was 21% for soil testing, 19% for testing manure, 21% for calibration of spreaders, 27% for crediting nutrients in manure, and 31% for keeping records of manure applications. An additional 10-19% indicated that they intended to adopt the practice within two years.

Increased Profitability

- 86% of participants calculated in the sessions that they would save an average of $14 per acre in fertilizer purchases if they followed their new plans and 56% would save more than $10 per acre. Of respondents, 92% were producers, managing an average of 785 acres, which indicates that the total crop acreage managed by all producer participants to date is approximately 513,000 acres. Assuming that the minimum of $14 / acre was saved on the 50% of those acres in corn production, the economic impact would be $3.6 million.

c. Source of funding: Smith Lever 3b & c, state, county, Minnesota Pollution Control Agency, USDA, Environmental Protection Agency 319 and the Minnesota Department of Agriculture
d. Scope of Impact: State Integrated

Key Theme: Water Quality *(Research)*

MAES Plan of Work: GOAL 4, Program 5

a. Description
Research previously reported described success using satellite imagery for monitoring environmental and natural resources in Minnesota. Techniques to monitor lake clarity, a key indicator of water quality, have been developed and used to classify over 10,000 lakes. This method provides a cost effective way to obtain information on nearly all of our states' proudly advertised lakes, and result from the lake censuses have been used to produce a database of lake clarity date in Minnesota that is available to the public on the Internet. Now the potential of remote sensing of streams and rivers is being evaluated with high resolution image data acquired over five segments of rivers. Results show that there is significant variation in the spectral properties of river waters that is related to amounts of suspended solid sediment, turbidity and chlorophyll.
b. Impact
Because of the success of this research in providing fast and inexpensive digital classification and mapping agencies and resource managers have improved information on Minnesota's environmental and natural resources. Agency partners using this data and information include the Minnesota Pollution Control Agency, Minnesota Department of Natural Resources, Metropolitan Council, and the USDA Forest Service.
c. Source of funding: Hatch
d. Scope of impact: State

a. Description
Research has been focusing on identifying opportunities to improve agricultural productivity and profitability in many locations of the Minnesota River Basin while improving water quality and the hydrologic condition of the river. It has brought results in several areas.
b. Impact
A model has been used to simulate stream flow changes on tributaries of the Minnesota River Basin due to converting areas of corn-soybean crops to hybrid poplar and restoring wetlands in the wettest areas. The larger changes in land use were input into economic models to estimate benefit associated with flood control, saving in dredging costs and recreation benefits. Increased acreage of hybrid poplar and the economic benefits associated with different scenarios of land use change were potentially $12/acre to $35/acre for reduced flood damages, and up to $65/foot of savings in ditch cleaning costs. In other work, progress with four learning groups focusing on hazelnut and native seed production in the Greater Blue Earth watershed have shown that learning groups provide a good model for bringing interested partners together from the private, public and university sectors and are being adopted by an Upper Mississippi River Basin, "Green Lands, Blue Waters Initiative.
c. Source of funding: Hatch
d. Scope of impact: State and Multi-State

a. Description
Much long term research has focused on developing best management practices for improving water quality and the economic analysis of agricultural drainage systems. Recently, a planning

model for evaluating public ditch management and development projects was completed and demonstrated in an application to a public ditch system in Blue Earth County, Minnesota.

b. Impact

The model can be used to estimate the costs of improvements designed to improve water quality as well as agricultural productivity. Other work has provided interesting insights into the role of drainage on hydrology of agricultural landscapes in Minnesota. Over an 85-year historical record, computer modeling has revealed that approximately 40 percent of precipitation ends up leaving the landscape through subsurface drainage systems, concentrated primarily in the months of April through June. Research results help state agency officials make decisions regarding the allocation of conservation program funds toward improved drainage practices.

c. Source of funding: Hatch

d. Scope of impact: State

Key Theme: Family Resource Management (*Joint*)

MAES Plan of Work: Goal 5: Empower people and communities through research-based information and education to address the economic and social challenges facing our youth, families and communities.

a. Description

Final reports were written from the data analysis of 25 families who participated in the match savings program to build assets: own a home, small business or higher education. Low-wage families, who do not have access to the government subsidized programs such as 401(k) and property tax deductions, had access to Individual Development Accounts, a national model. Most wage-earning families reached their goal over the four year program and were motivated to build assets through the structured program.

b. Impact

The Minnesota Legislature made Family Assets for Independence in Minnesota a permanent program based on research findings from this qualitative study and the quantitative data of the 500 families in the pilot program. Over the four years of the study, FAIM coordinators adjusted the program based on our findings from semi-annual interviews with 25 participants, including clarifying rules for savings to be matched, coaching participants in their choice of goals, and seeking additional resources to improve the financial coaching.

c. Source of funding: Hatch

d. Scope of impact: State

a. Description

The financial security of Minnesota's families, as well as the security of the state's economy will be adversely affected if Minnesotans are not adequately prepared to make informed decisions about financing long term care. An examination of long-term care financing decisions facing family members has identified key factors explaining gaps in intentions and behaviors. The findings suggest that many Minnesotans are not prepared to take personal responsibility and make decisions about financing long term care. Dissemination of the findings to practitioners and policymakers included presentations to a State of Minnesota financing long term care policy direction conference; a Care Providers Association statewide conference presentation; and

training University of Minnesota and University of Wisconsin extension educators; as well as sharing the findings at the Gerontological Society of American national conference.

b. Impact

A Minnesota department of Human Services report to the Minnesota Legislature in January 2005 cited the research in this project as a basis for recommendations, and project related educational resources as models to be used statewide.

c. Source of funding: Hatch

d. Scope of impact: State and Multi-State

a. Description

A multi-state research project to evaluate the quality of life of low-income rural residents has focused on the stability of employment in rural Minnesota. The results of this longitudinal study has shown that having medical insurance and working more than 30 hours were key contributing factors to employment stability.

b. Impact

A University of Minnesota Extension Service project has used the findings to build a program that deals with understanding how culture and resources are used across various ethnic groups. Findings have also been used to support programs that link information about working and Earned Income Tax Credits for rural poor families.

c. Source of funding: Hatch

d. Scope of impact: State and Multi-State

a. Description

Child care assistance provides an important support to low-income working families for whom child care costs might otherwise consume a sizeable portion of the family budget. Research in Minnesota tracked the employment and earnings of families who received child care assistance and found average earnings gains of about $2,000 over a three-year period.

b. Description

This research has informed state policymakers about the role of child care assistance in the Minnesota economy. The study tracking families' outcomes over time has provided state and county program managers with much needed information on families' need for assistance over time and allows for improved expenditure forecasts.

c. Source of funding: Hatch

d. Scope of impact: State

Extension Plan of Work: Goal 5, Program 5:

a. Description:
Current studies document the need for community-based training in financial literacy. From 1990 to 2000, the rate of personal bankruptcy in the United States rose by 69 percent. It appears this trend will continue, supported by recent statistics showing a 19.2 percent increase between 2000 and 2001. High school seniors taking part in a 2002 national survey of financial knowledge scored an average of 50.2 percent—a failing grade. Scores have been declining since the first survey was administered in 1997. The United States reportedly has the lowest individual savings rate in the industrialized world. In 2001, an AARP survey of older baby boomers (age 51-59) showed that nearly 40 percent were not confident about a secure retirement. (National Endowment for Financial Education, 2002)

- The Community Educator Mentorship Program was designed to build an infrastructure of financial literacy in community social service and educational settings where low- and moderate-income individuals and families can be reached "where they're at." In doing so, Family Literacy educators are solving a problem of both quantity and quality for financial literacy information in communities. Curricula passed on to community partners by Extension cover a wide variety of topics.

b. Impact

Behavioral Change for Financial Literacy Program Users:

U of MN Extension's 2004 report outlined the impact of its fiscal literacy programs on program participants. For example, 280 participants developed spending plans to manage ongoing income and expenses. Program participants reviewed social security statements, identified later life financial goals, saved and invested money, created spending plans and kept track of where money is spent. These Extension curricula and training successfully reach non-English speaking residents in American systems. In a representative sampling of 352 immigrants participating in financial literacy programs, 88% were able to assess how much credit they could afford, 93% reported they knew how to get a credit report and what was in it, 78% knew ways to build a credit history, 97% reported knowing how to open a bank checking or savings account, and 25% of those who didn't have an account got one after the program. Additionally 96% reported understanding cost-saving ways to transfer money internationally.

Improvement in the Quality and Quantity of Community-Based Financial Literacy Programming: The train-the-trainer system uses Extension's effective tools to increase both the quality and quantity of financial literacy available in Minnesota communities. In a study of 24 participants of the train the trainer program delivered, a resulting 94 classes had reached 950 students. Outcome studies conducted with the community-based educators demonstrate that financial literacy train-the-trainer programs helped community-based practitioners to:

- Integrate personal finance education into their ongoing program offerings.
- Establish coalitions that bring additional personal finance resources and opportunities to neighborhoods and individuals.

- Spawn the development of personal finance clubs among program participants. These finance clubs help low and moderate income families and individuals stay abreast of resources and financial information.
- Stimulate communication about financial literacy among family members so that changes were made to enhance a family's financial health.

c. Source of funding: Smith-Lever 3b&c, state, contracts with communities
d. Scope of impact: Multi-state and Extension (CT, FL, IA, KS, LA, MI, MN, MO, ND, NY, VA, WI and four Canadian provinces)

Key Theme: Parenting (*Joint*)

MAES Plan of Work: Goal 5

a. Description
The Family Formation Project is a research project on the transition to fatherhood. This is a demonstration project aimed at finding ways to support the relationships of urban unmarried new parent couples who aspire to form a stable family and who say that marriage is a goal for their relationship. Community leaders were recruited as stakeholders in the project through forming a Partnership Group and mentor couples were recruited to work with new couples.
b. Impact
Researchers found that an eight-session educational intervention for new parent couples was successful in enhancing father involvement and skills when interacting with their infants. This finding is significant because it previously had not been known whether a relatively brief educational intervention for non-risk fathers could enhance their involvement and skills. Educators and health professionals now have an effective educational tool for their work with expectant and new parent couples. The Family Formation Project has also shown that it is possible to mobilize lay and professional leaders around the goals of promoting healthy marriages in low income communities. More involved and skilled fathers have a positive impact on the social and economic outcomes of their children. The formation of more stable, healthy marriages in low income communities has widespread positive impact on the social and economic fortunes of families and communities.
c. Source of funding: Hatch
d. Scope of impact: State

EXTENSION Plan of Work: Goal 5, Program 6

a. Description

Research on children's adjustment following divorce assesses what conditions create a risk for child maladjustment, and what creates resilience among children in divorcing families. A summary of that research notes this implication for practice:

> *Interventions are more likely to benefit children from divorced families if they seek to contain parental conflict, promote authoritative and close relationships between children and both of their parents, enhance economic stability in the post-divorce family and, when appropriate, involve children in effective interventions that help them have a voice in shaping more individualized and helpful access arrangements (Kelly, 2002).*

Parents Forever is a twelve-hour educational program for parents going through divorce with a goal of helping families reduce risk and create resilience among the children of divorce. It encourages parents to negotiate divorce decisions without putting their children in the middle of their issues or forcing the children to choose one parents over the other. The program is delivered by Extension educators and also by trainers trained for delivery by Extension staff. *Parents Forever* is mandated by judges when families in divorce court appear to be posing high risk for children. Others participate voluntarily.

b. Impact

Post-program evaluations of parent behaviors indicate that the program creates change in how parents handle divorce. Specifically:

	Lowest % of behavior change within studied *Parents Forever* workshops	Highest % of behavior change within studied *Parents Forever* workshops	Average behavior change – all workshops
Parents eliminated conflict in front of their children.	45%	100%	73%
Parents were working towards putting the best interest of their child first.	75%	92%	82%
Parents were working toward permitting children access to both parents.	60%	92%	82%
Parents were working to avoid putting their children in the middle.	45%	83%	65%

Report on Stakeholder Input Process

Actions taken to seek stakeholder input that encourages their participation

MAES seeks stakeholder input in a variety of venues, to reach a broad spectrum of stakeholder groups. All of the five colleges that receive MAES funding: The colleges of Agricultural, Food and Environmental Sciences (COAFES), Human Ecology (CHE), Natural Resources (CNR), Biological Sciences (CBS), and Veterinary Medicine (CVM) have process in place to provide stakeholder input into research direction, selection and review.

The planned merger of two colleges that receive MAES funding—the College of Agricultural, Food and Environmental Sciences, and the College of Natural Resources—provided the opportunity this year as well as the need to gather stakeholder input into this structural change which has implications for Experiment Station research. It will allow easier collaboration among researchers, but has raised concerns among some stakeholder groups that their research interests may be diverted or diluted. Communication between those groups and the deans of the two colleges as well as their advisory groups was instigated to meet those concerns and describe the benefits of this re-organization to mutual research goals.

Other University changes are merging the College of Human Ecology into the College of Education and Human Development and the College of Architecture and Landscape Architecture. This is providing access to new stakeholder groups and informing MAES's research in family systems and design and housing in important new ways.

Advisory committees for each of MAES' Research and Outreach Centers connect research to the specific needs of the region and provide a mechanism for citizen input into the research agenda.

In the College of Natural Resources, a program and budget review workshop is held each spring. The College of Human Ecology Advisory Council meets twice a year. The Department of Food Science has an Advisory Council that meets annually. The School of Social Work has a Welfare Advisory Board that meets twice a year for planning with policy makers and social service agencies. The Center for Advanced Studies in Child Welfare Advisory Board meets twice each year with representatives from the legislature and policy makers. The Institute on Domestic Violence in the African-American Community has an eight member all African American board.

The University of Minnesota Center for Animal Health and Food Safety stresses collaboration on issues of animal health and food safety across academic, government, industry and other concerned organization, and services as a facilitator for stakeholders interested in animal health and food safety.

Brief statement of the process used to identify individuals and groups who are stakeholders and to collect input from them.

Stakeholders are identified in many ways—college advisory councils, mailings lists from Experiment station and college publications, mailing lists for under-represented/underserved populations, departmental and faculty contact lists, web site contacts.

Statement of how the collected input was considered

The deans and associate deans for research in the five colleges meet as an Experiment Station Executive Council to identify research priorities, set research policies, plan programs, and discuss stakeholder input for inclusion in the policy and planning decisions.

Statement regarding the usefulness of the stakeholder input process in refocusing and reaffirming priorities or in identifying emerging issues.

The stakeholder input process is a continuing process of feedback and response that often leads to new research focus. For example, responding to soybean growers' concern about the threat of soybean rust has lead to new research to prepare for the potential arrival of the pathogen. Dairy farmers concerns about the profitability of their enterprises have led to research focus on strategies for small dairies. Minnesota vintners lobbied the state legislature for funding to support research on cold hardy wine grape varieties, partly as a result of good communication between University researchers and Minnesota grape growers.

Another good example of how stakeholder input is used to refocus priorities or identify emerging issues is through the use of the Rapid Agricultural Response Fund—a fund established by the Minnesota State Legislature and managed by MAES to support research on critical and emerging agricultural issues. All proposals for funding must seek stakeholder input and contain letters of stakeholder support. A plan to bring the results of the proposed research back to those stakeholder groups is also required.

Update on Program Review Process

The review process for Hatch supported projects has not changed since the original Plan of Work was written and updated. With the college mergers and changes described in the Report of Stakeholder Input Process, there are changes in advisory groups and research review. These changes do not apply to the research described in this Accomplishment Report, but they are informing the program review for MAES' next Plan of Work, which will be submitted jointly with the University of Minnesota Extension Service.

Evaluation of the success of multi-state, multi-institution, and multidisciplinary activities, and joint research and extension activities.

Success of multi-state, multi-institutional and multidisciplinary activities

Faculty in the Minnesota Agricultural Experiment Station participated in 129 multi-state projects and committees this reporting year. CRIS progress reports have been filed to document Minnesota's participation in the projects, and this Accomplishment Report has described some of that work, including multi-state collaborative research on potato aphid and soybean rust.

Three colleges (COAFES, CBS, and CNR) are working together to develop an integrated teaching, research, and outreach program in ecosystem science and sustainability. The aim is to provide fundamental scientific knowledge about the environment and hands-on learning about research on ecosystems and sustainability.

The Multi-state Mississippi River Basin initiative has led to the Green Lands, Blue Water project, and a long-term comprehensive effort to support a new generation of agricultural systems in the Mississippi River Basin. A multi-state consortium of land-grant instructions in the Mississippi Basin, non-profit organization and governmental agencies are responsible for overall project planning and monitoring. The total budget is $105 million over 10 years.

The Data-Linkage Project, in the School of Social Work, is a partnership between the School, CHE, the University and state and local governments. Data have been collected which documents issues of child welfare, aging, chemical dependency, metal health, and developmental disabilities, and a broad array of data from the Minnesota Department of Health.

The University of Minnesota is uniquely positioned as a national leader in food and health promotion, being one of only two U.S. universities to integrate five key components on one campus: agriculture, human ecology, medicine, public health, and veterinary medicine. This has led to the multi-disciplinary University of Minnesota Obesity Prevention Center.

Information generated from multi-disciplinary genome projects in COAFES, CBS and CVM is fuel for fundamental advances in life sciences in the 21st century. The understanding of gene function and regulation obtained from genomic approaches is leading to research with impacts on human, animal and environmental health, agricultural practices, food safety and production of biomaterials. As one example, Experiment Station animal genomics research has led to the development of bioinformatics hardware and databases including Locusmap, Pedigraph and MiniInbred. These tools are used internationally by researchers mapping the genetics of many species.

Success of joint research and extension activities

Extension connection to Experiment Station research is confirmed by the fact that all Extension programs, following an organization-wide review, are required to demonstrate the research

connection for their outreach efforts. One hundred and forty specialized regional educators are at work throughout Minnesota, while partnerships with five colleges fund 118 faculty members and forge a strong link between research and outreach.

The University of Minnesota Extension Service defines and refines its program review process to support priorities in each of the five capacity areas: (1) Agriculture, Food and Environment; (2) Community Vitality; (3) Family Development; (4) Natural Resources and Environment and (5) 4H and Youth Development. Yearly audits of program status are done by program teams which consist of educators and campus specialists. From these audits, program business plans are developed.

Specific example of progress in integrating research and Extension activities are described in the join themes sections of this report.

U.S. Department of Agriculture
Cooperative State Research, Education, and Extension Service
Supplement to the Annual Report of Accomplishments and Results
Actual Expenditures of Federal Funding for Multistate Extension and Integrated Activities
(Attach Brief Summaries)

Fiscal Year:_2005_____

Select One: □ **Interim** **x Final**
Institution: U of M Agricultural Experiment Station
State: Minnesota

	Integrated Activities (Hatch)		**Multistate Extension Activities (Smith-Lever)**		**Integrated Activities (Smith-Lever)**	
Established Target %	25%	**%**		**%**		**%**
This FY Allocation (from 1088)	4.672,549.00					
This FY Target Amount	1,168.137.00					
Title of Planned Program Activity						
Agricultural Risk Management	$18,244					
Beef Production	60,304					
Commercial Vegetable and Fruit Production	68,915					
Commodity Crop Production	247,004					
Community Economics	78,703					
Dairy Modernization	114,479					
Environmental Safety and Management	31,729					
Family Resource Management	$8,567					
Farm Business Management	864					
Food Safety	37,571					
Health and Nutrition Education	80,116					
Landscape Design	89,556					
Master Gardener	70,765					
Natural Resources Management and Utilization	122,139					
Nursery and Plant Health	$28,842					
Parent Education	9,374					
Poultry Production and Health	111,784					
Precision Agriculture	5,341					
Swine Production Technology	23,417					
Water Resources Management Policy	40,861					
Total	$1,248,575					
Carryover						

Certification: I certify to the best of my knowledge and belief that this report is correct and complete and that all outlays represented here accurately reflect allowable expenditures of Federal funds only in satisfying AREERA requirements.

Beverly R. Durgan

Director

3/31/2006
Date

AREERA
Fiscal Year 2004/2005 DETAIL OF EXPENDITURES

Goal / Theme	Project	Hatch	MRF	McIntire Stennis	Animal Health	State Funds	Other Federal	Other Non-Fed	Total Funds	FTE's
Goal 1										
Agricultural Competitiveness	13-030	112,148	0	0	0	174,533	213,721	131,259	631,661	9.5
	14-052	169,395	0	0	0	103,828	0	151,833	425,056	2.2
		281,543	**0**	**0**	**0**	**278,361**	**213,721**	**283,092**	**1,056,717**	**11.7**
Agricultural Productivity	14-022	10,773	0	0	0	59,119	19,920	3,267	93,079	0.5
	14-034	10,673	0	0	0	77,124	15,541	5,666	109,004	0.9
	25-057	38,070	0	0	0	337,679	25,860	99,270	500,879	4.0
		59,516	**0**	**0**	**0**	**473,922**	**61,321**	**108,203**	**702,962**	**5.4**
Green Agriculture	21-024	0	1,055	0	0	0	0	0	1,055	0.0
	21-049	28,299	0	0	0	73,458	0	104,222	205,979	4.9
		28,299	**1,055**	**0**	**0**	**73,458**	**0**	**104,222**	**207,034**	**4.9**
Plant Health	13-019	81,364	0	0	0	210,970	13,894	258,098	564,326	7.2
	17-039	0	1,050	0	0	13,699	0	11,076	25,825	0.2
	17-040	0	15,995	0	0	21,096	0	15,841	52,932	0.6
	17-042	57,376	0	0	0	221,279	43,279	18,053	339,987	2.8
	22-026	3,342	0	0	0	221,575	0	65,655	290,572	3.4
	22-029	0	258	0	0	5,766	0	2,562	8,586	0.0
	22-043	0	1,199	0	0	0	54,029	0	55,228	1.1
		142,082	**18,502**	**0**	**0**	**694,385**	**111,202**	**371,285**	**1,337,456**	**15.3**
Goal 1 Total		**511,440**	**19,557**	**0**	**0**	**1,520,126**	**386,244**	**866,802**	**3,304,169**	**37.3**
Goal 2										
Food Safety	62-017	14,932	26,912	0	0	105,474	0	0	147,318	1.7
		14,932	**26,912**	**0**	**0**	**105,474**	**0**	**0**	**147,318**	**1.7**
Goal 2 Total		**14,932**	**26,912**	**0**	**0**	**105,474**	**0**	**0**	**147,318**	**1.7**
Goal 3										
Human Health	16-025	0	358	0	0	27,843	0	28,169	56,370	1.2
	18-055	27,992	0	0	0	137,789	0	61,210	226,991	2.3
	54-020	1,586	0	0	0	0	44,725	77,376	123,687	0.6

AREERA
Fiscal Year 2004/2005 DETAIL OF EXPENDITURES

Goal / Theme	Project	Hatch	MRF	McIntire Stennis	Animal Health	State Funds	Other Federal	Other Non-Fed	Total Funds	FTE's
Human Health	54-026	12,335	0	0	0	27,369	92,956	8,392	141,052	1.5
	54-058	18,062	0	0	0	44,790	0	173,357	236,209	3.5
		59,975	**358**	**0**	**0**	**237,791**	**137,681**	**348,504**	**784,309**	**9.1**
Goal 3 Total		**59,975**	**358**	**0**	**0**	**237,791**	**137,681**	**348,504**	**784,309**	**9.1**
Goal 4										
Agricultural Waste Management	12-084	39,572	34,889	0	0	254,409	66,317	160,343	555,530	5.6
	16-064	33,268	0	0	0	286,876	777	286,060	606,981	10.1
		72,840	**34,889**	**0**	**0**	**541,285**	**67,094**	**446,403**	**1,162,511**	**15.7**
Water Quality	12-040	12,393	0	0	0	111,849	8,012	46,010	178,264	2.3
	12-055	0	24,285	0	0	136,611	215,192	94,162	470,250	5.2
	14-029	58,726	0	0	0	106,589	0	0	165,315	0.7
	25-058	0	315	0	0	18,432	0	8,284	27,031	0.4
	42-037	29,321	0	0	0	72,657	41,458	161,713	305,149	3.7
		100,440	**24,600**	**0**	**0**	**446,138**	**264,662**	**310,169**	**1,146,009**	**12.3**
Wildlife Science and Management`	41-070	51,442	0	0	0	159,133	39,246	106,224	356,045	3.7
		51,442	**0**	**0**	**0**	**159,133**	**39,246**	**106,224**	**356,045**	**3.7**
Goal 4 Total		**224,722**	**59,489**	**0**	**0**	**1,146,556**	**371,002**	**862,796**	**2,664,565**	**31.7**
Goal 5										
Family Resource Management	14-082	0	52,243	0	0	96,630	9,268	23,210	181,351	4.7
	52-055	3,482	0	0	0	58,963	0	0	62,445	0.5
	52-080	2,678	0	0	0	64,430	0	0	67,108	0.4
	53-073	21,456	0	0	0	57,346	0	85,431	164,233	1.6
		27,616	**52,243**	**0**	**0**	**277,369**	**9,268**	**108,641**	**475,137**	**7.2**
Goal 5 Total		**27,616**	**52,243**	**0**	**0**	**277,369**	**9,268**	**108,641**	**475,137**	**7.2**
Grand Total		**838,685**	**158,559**	**0**	**0**	**3,287,316**	**904,195**	**2,186,743**	**7,375,498**	**87.0**

Faculty with Joint Appointments (Research/Extension)

Fiscal Year: ***2005***

College / Department	Research	Extension	Teaching	Total
AGRICULTURAL,FOOD,ENVIRONMENTAL SCIENCES				
NWROC - CROOKSTON				
Hollingsworth,Charla R	70.00	30.00	0.00	100
Macrae,Ian Vance	54.00	46.00	0.00	100
WCROC - MORRIS				
Johnston,Lee Jay	80.00	20.00	0.00	100
Rudstrom,Margaretha V	67.00	33.00	0.00	100
NCROC - GRAND RAPIDS				
Lamb,Graham Clifford	77.00	23.00	0.00	100
SROC - WASECA				
Fritz,Vincent A	70.00	30.00	0.00	100
Zhu,Jun	80.00	20.00	0.00	100
Baidoo,Samuel Kofi	80.00	20.00	0.00	100
BIOSYSTEMS AND AGRICULTURAL ENGINEERING				
Jacobson,Larry Dean	25.00	75.00	0.00	100
Shutske,John M	25.00	75.00	0.00	100
Wilcke,William F	50.00	50.00	0.00	100
Sands,Gary Robert	35.00	65.00	0.00	100
AGRONOMY AND PLANT GENETICS				
Gunsolus,Jeffrey L	30.00	70.00	0.00	100
Peterson,Paul Richard	25.00	75.00	0.00	100
Hicks,Dale Ray	8.00	92.00	0.00	100
Becker,Roger Lee	25.00	75.00	0.00	100
DURGAN, BEVERLY R.	26.00	71.00	3.00	100
NAEVE, SETH L.	25.00	75.00	0.00	100
APPLIED ECONOMICS				
Hurley,Terrance Michae	40.00	50.00	10.00	100
Kalambokidis,Laura TJachim	32.00	58.00	10.00	100
Taff,Steven James	50.00	50.00	0.00	100
Lazarus,William Frankl	35.00	65.00	0.00	100
Fruin,Jeremiah E	50.00	50.00	0.00	100
Buhr,Brian L	50.00	29.00	21.00	100
Parliament,Claudia	13.00	50.00	37.00	100
Olson,Kent D	33.00	25.00	42.00	100
Stinson,Thomas F	46.00	44.00	10.00	100
ANIMAL SCIENCE				
Endres, Marcia Ines	25.00	75.00	0.00	100
Linn, James Gary	15.00	75.00	10.00	100
Noll, Sally	15.00	75.00	10.00	100
DiCostanzo, Alfredo	19.00	71.00	10.00	100
Roeber, Deborah L.	50.00	50.00	0.00	100
Shurson, Gerald C	5.00	30.00	65.00	100
ENTOMOLOGY				
Hutchison,William Dale	66.00	34.00	0.00	100
Ostlie,Kenneth R	40.00	60.00	0.00	100
Ragsdale,David Willard	64.00	10.00	26.00	100
Krischik,Vera	35.00	65.00	0.00	100

Thursday, March 30, 2006

College / Department	Research	Extension	Teaching	Total
Spivak,Marla S	59.00	13.00	28.00	100
COAFES - FOOD SCIENCE AND NUTRITION				
Feirtag,Joellen	3.00	94.00	3.00	100
Schafer III,Henry W	3.00	95.00	3.00	101
HORTICULTURAL SCIENCE				
Erwin,John E	70.00	30.00	0.00	100
Meyer,Mary H	15.00	85.00	0.00	100
Tong,Cindy Bow San	50.00	50.00	0.00	100
Horgan, Brain P	40.00	60.00	0.00	100
Hoover,Emily Esther	17.00	24.00	59.00	100
SOIL, WATER, & CLIMATE				
Anderson,James L	1.00	88.00	11.00	100
Seeley,Mark W	21.00	79.00	0.00	100
Rosen,Carl Jay	30.00	70.00	0.00	100
Rehm, George	18.00	79.00	3.00	100
Lamb, John	55.00	20.00	25.00	100
Moncrief,John F	40.00	60.00	0.00	100
COLLEGE OF HUMAN ECOLOGY				
FAMILY SOCIAL SCIENCE				
Bauer,Jean W	28.00	52.00	20.00	100
Danes,Sharon M	40.00	60.00	0.00	100
Stum,Marlene Sue	29.00	71.00	0.00	100
DESIGN, HOUSING, & APPAREL				
Bruin,Marilyn J	30.00	60.00	10.00	100
CHE - FOOD SCIENCE AND NUTRITION				
Reicks,Marla M	22.00	69.00	8.00	99
Hassel,Craig Alan	26.00	63.00	11.00	100
SOCIAL WORK				
Quam,Jean Kathleen	20.00	7.00	73.00	100
COLLEGE OF NATURAL RESOURCES				
FISHERIES AND WILDLIFE				
Perry II,James A	93.00	7.00	0.00	100
Blair,Robert B.	13.00	87.00	0.00	100
Oberhauser,Karen S	23.00	77.00	0.00	100
BIO-BASED PRODUCTS				
Ramaswamy,Sridharan	75.00	5.00	20.00	100