UNIVERSITY OF MINNESOTA
Extension
SERVICE

March 31, 2004

Bart Hewitt
Partnerships/POW
Cooperative State Research, Education, and Extension Service
U. S. Department of Agriculture
1400 Independence Avenue, SW, Stop 2214
Washington, DC 20250-2214

Dear Mr. Hewitt:

I am pleased to transmit to you electronically the files for our 2002-03 Accomplishments and Results Report. This document is in Microsoft Word format. We have followed the reporting guidelines and are reporting only those programs where we have evidence of outcomes and impact.

I understand that our 2002-03 Accomplishments and Results Report will be reviewed by the same CSREES national programs leaders this year that reviewed our 2001-02 report and that we can expect a response from your office no later than May 31, 2004. I look forward to receiving correspondence from the reviewers regarding our latest accomplishments and results report.

Sincerely,

Charles H. Casey

Charles H. Casey
Dean and Director

University of Minnesota Extension Service

2002-03 Accomplishments and Results Report

April 1, 2004

St. Paul, Minnesota 55108

University of Minnesota Extension Service
2002-2003-Federal (AREERA) Accomplishments and Results Report

EXECUTIVE SUMMARY

In 2003, the University of Minnesota Extension Service took bold steps to assure that quality links between University research and the critical issues of Minnesota will be maintained and enhanced. Two major challenges were passed to Extension this year—from the State of Minnesota which faced unprecedented budget deficits and from county administrators and commissioners faced with cuts in local aid. In response, county administrators and commissioners began to request alternative funding models so that they could reduce their budgets and maintain some level of Extension programming to address their constituents' needs. The new structure allows us to remain committed to effective connections with communities and the application of quality research to respond to critical issues despite a $7.3 million reduction in county and state dollars.

On January 1, 2004, after close consultation with stakeholders, we instituted Phase 2 of our Change Plan to address alternative funding. Federal and state dollars were allocated to the development of 18 regional centers committed to provide relevant services throughout the state. Meanwhile, a pricing plan for counties (and other interested funders) made Extension specialists available to each county. In 2003, we prepared our stakeholders for this change, worked with them to help them choose how to partner with us in the new system, and realigned Extension to accommodate the change.

Because of the 2003 efforts, the Change Plan has already been implemented. Through contractual agreements, each of Minnesota's 87 counties retained a local Extension presence and regional centers are providing services to groups and residents statewide.

In this time of change, data indicates that Extension continued to serve a significant number of Minnesota citizens. More than 309,000 Minnesotans participated in our educational programs last year–in workshops, seminars, 4-H activities, and group events, as well as one-on-one consultations and visits. In addition, the Extension web site was used by 2.4 million people for 6.4 million visits. Info-U, our automated telephone/Fax-back answering system, logged 669,470 visits to web documents and 28,000 phone inquiries. Non-English speakers (Spanish and Somali) made 2,400 calls (8.6%).

Nearly $2.2 million was invested in direct program costs last year, offset by more than $2.3 million in fees charged to participants and groups that could afford to pay. Faculty and Extension educators also brought in more than $3.1 million in grants, gifts, contracts and in-kind contributions last year. Over 20,000 volunteers contributed their time to Extension programs and activities, with commitments ranging from advisory committee participation to on-farm demonstrations to 4-H leader and Master Gardener. The value of Master Gardener volunteer time alone (over 88,000 hours last year) is more than $1.4 million, based on the average non-agricultural wage rate in Minnesota plus 20% for fringe benefits. The over 146,000 hours of time donated by adult 4-H volunteers are worth more than $3 million a year.

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Preface

I. PROGRAMS

GOAL 1. An agricultural system that is highly competitive in the global economy.

Overview:

In keeping with the instructions to report only those programs where we have outcomes and impacts to report, we have programs related to four key themes under Goal 1 this year. They reflect eight specific programs that our faculty and Extension educators delivered and reported last year. Many of the Extension themes could also readily be termed integrated research and Extension efforts because they do draw upon a research base although it may not be Hatch/MRF-funded research.

In some cases, we have provided URLs for websites that provide more information about a specific program.

We believe that the research and Extension efforts presented under Goal 1 are truly attempting to accomplish that goal in Minnesota—developing an agricultural system that will keep Minnesota agriculture competitive in the global economy by reducing production costs, identifying new crops and products, and finding new, value-added uses for Minnesota's agricultural products. A major portion of research and Extension funds in Minnesota is expended on Goal 1 research projects and educational programs.

Inputs and outputs: Extension faculty and educators reported that more than 56,000 farmers, commercial fruit and vegetable growers, agribusiness people, and green industry operators and employees were involved in Goal 1 Extension educational programs during 2002-03. Professional time invested totaled more than 16.4 full-time equivalents (FTEs) and program costs came to nearly $602,700. However, these costs were offset by close to $492,000 collected in fees for services and more than $864,000 received in grants, contracts, and the value of in-kind contributions.

Delivery methods varied from program to program, but in general, Extension staff reported using a mix of group sessions of different kinds and one-on-one consultations. Electronic delivery is being used more frequently but a good deal of effort still is used to write or revise publications and teaching materials and to disseminate information via newspapers, agricultural magazines, and newsletters.

Outcomes: Outcomes varied by program, but all programs indicated some degree of success in terms of changes made by program participants—in acquiring and using new crop and livestock production techniques, diversifying and adding alternative crops and livestock enterprises, adding value to existing crops and livestock or products, acquiring and using marketing skills, and using new technologies to boost efficiency and effectiveness. In most cases, Extension educators indicated that from 25% to 75% of their clientele had either indicated a willingness to adopt/adapt the information they had received or had actually begun using new skills and practices to improve their profitability.

Impacts: Specific impacts are difficult to measure without evaluative research on specific educational programs. Extension educators reported that many of their program participants did ultimately make changes that resulted in positive economic, environmental, and social impacts on themselves, their families, and their communities but precise measurement across the variety of programs represented under Goal 1 is very difficult to determine. Some specific impacts are cited in the various key theme statements.

Accomplishments: The University of Minnesota Extension Service has made significant changes in our stakeholder involvement, program development, and structure since 2002—all with the goal of continuing to be of maximum service to the citizens of Minnesota with reduced resources from federal, state, and county sources. We are trying very hard to respond directly to the most critical economic, environmental, and social needs of Minnesotans by continuing to invest most of our effort in providing cutting-edge technical information and advice where it is most needed.

Key Theme: Agricultural Competitiveness (JOINT)

MAES Plan of Work: GOAL 1, Programs 1, 2, 3, and 5

a. Description

The Center for Farm Financial Management at the University of Minnesota has a long history of working with farm management associations in Minnesota and other states. The center also has the most comprehensive and up-to-date set of software tools for farm management associations. One of their MAES sponsored projects is to build a national comprehensive internet-based farm financial and production management database from actual farm data and make it readily available to all producers. They are cooperating with other farm management programs in nine states to develop this uniform farm management database.

b. Impact

As a result of this project the online FINBIN database has been expanded and refined to allow producers and agricultural professionals to search and query actual farm data from more than 3,200 farms representing more than 2.4 million acres of crop land, over 64,000 dairy cows, nearly 20,000 sows, and over 630,000 grow/finish pigs. Approximately 3,000 Minnesota farmers annually directly benefit and use the software and database associated with this project. Many other Minnesota producers benefit indirectly from this project by being able to benchmark and learn about the strengths and weaknesses of their farm business by accessing the online database.

c. Source of funding: Hatch and McIntire-Stennis

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

a. Description

More than 400 dairy heifers were used in a three-year study on a commercial livestock operation in central Minnesota to compare feedlot confinement versus management intensive grazing. Researchers were looking at both economics and heifer performance in a typical alfalfa/corn/soybean rotational system. Over the three years, the management intensive grazing system had lower daily costs between $0.20 and $0.60 per heifer. There were no differences in heifer average daily weight gain between the two systems.

b. Impact

The completed studies provide information towards development of economically viable systems for raising dairy heifers

c. Source of funding: Hatch and McIntire-Stennis

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

a. Description

Researchers investigated the importance of an emerging hay market to the dairy industry. They assessed the costs and benefits of hay maceration, a relatively new technology that allows faster drying of hay. The benefits assessment was based on forage production modeling using University of Wisconsin software and the University of Minnesota Machinery Economic Cost Estimates. The work showed that the potential benefits of improved hay quality can be greater than the increased cost of the maceration equipment.

b. Impact

The assessment of hay production technologies and markets provides dairy producers and hay producers with alternatives that can enhance their farming operations.

c. Source of funding: Hatch and McIntire-Stennis

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

a. Description

There are many ingredient and manufacturing conditions involved in manufacturing processed and natural cheese. In an industrial setting, these cheeses are produced on a very large scale. As an example, the batch size for Cheddar and Mozzarella cheeses is 35,000 lbs. These constraints have limited research on natural and process cheese because the cost of conducting research using industrial scale equipment is prohibitive. Food science researchers have developed two small-scale manufacturing systems that can be used to conduct research on natural and process cheese.

b. Impact

With this small-scale system, the researchers developed a modified process cheese formulation that allowed a local manufacturer to use a new ingredient that will result in an annual savings of $250,000. They have also developed new manufacturing procedures for cottage and Mozzarella cheeses that will also be valuable for the cheese industry.

c. Source of funding: Hatch and McIntire-Stennis

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

a. Description

One applied economics project is helping farmers plan and adjust for the future by identifying and interpreting the impact of the complex forces affecting farming, monitoring trends in farm financial performance, and evaluating potential alternatives for farms to improve their viability. As part of this work, a new farm management textbook was published in 2003, which includes strategic management, quality management and new techniques and tools in production and operations management. A companion website has additional materials including virtual field trips (complete with video and audio) and links to other pertinent sites. Other research focuses on specific producer groups. For example, a farm and market survey for Hmong specialty crop farmers in the Twin Cities metropolitan area found that most had farm product sales between $3,000 and $9,000. An analysis of the economic impact of reducing organophosphate use in seed potato production by scouting and treating only field borders for aphids (versus the entire field) show a possible cost reduction of about $24 per acre.

b. Impact

This work is useful to farmers, bankers, students, and policy-makers for both management decisions and policy analysis.

c. Source of funding: Hatch and McIntire-Stennis

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

a. Description

Currently 20 to 30 % of hogs are marketed under some type of contract arrangement with packers. Applied economics researchers have done a study of the economics of risk management and marketing contracts in swine.

b. Impact

With 100,000 head marketed per year and an average value per head of about $100, the potential total value of hog marketings affected is about $2 billion. However, the marginal value is probably only 1 to 2 % of that figure, or about $20 million. This is assuming that every hog producer with a contract makes a decision based on the information, which is unlikely. Probably 2 to 5 % of growers would use contracts for about $400,000-worth of sales. The researchers have also done specific analyses worth multi-millions in value.

c. Source of funding: Hatch and McIntire-Stennis

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

a. Description

A study has been conducted on inducing genetically unrelated twins in postpartum suckled beef cows. Six Angus cows at MAE's North Central Minnesota Research Center were diagnosed to be pregnant with twins (TWIN) via ultrasound after receiving one embryo seven days following TAI. Following delivery of two live calves, these cows were matched with cows delivering single calves and their progress was compared. A major advantage of the TWIN treatment is the potential of increasing the overall calves produced with a similar number of cows. As a result, managing cows pregnant with twins can be achieved earlier by identifying cows destined to have twins with ultrasound. These cows can be managed separately and calving can occur with little or no extra input.

b. Impact

There are approximately 16,000 beef producers in Minnesota with a total of 400,000 cows. By inducing twins, producers could potentially increase the pounds weaned per cow by 100 pounds which would increase their incomes by $400,000. In addition, estrous synchronization improves uniformity, genetic potential, and pregnancy rates. Increasing the percentage of cattle estrous synchronized from 7 % to 20 % will increase producers' income over $1 million, considering that the improvements in production for estrous synchronized cows results in a minimum of $20 per cow additional income.

c. Source of funding: Hatch and McIntire-Stennis

d. Scope of impact: Multistate Integrated Research and Extension

a. Description

Reproductive efficiency in female turkeys is low when compared to chickens, mainly because the onset of incubation behavior results in an early termination of egg laying. Researchers have established that vasoactive intestinal peptide (VIP) contributes to this behavior in turkeys and VIP-immunized turkeys reduce incubation behavior and lay more eggs.

b. Impact

Improvements in reproductive performance of turkeys as a result of this research are significant. The incidence of incubation is reduced from 51 % to 8 %, representing an increase of almost 33 eggs per hen in a 27 week reproductive season. This reduces the cost of market production and leads to increased productivity from fewer animals.

c. Source of funding: Hatch and McIntire-Stennis

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

Extension Plan of Work: GOAL 1, Agriculture, Food, and Environment Capacity Area--
Dairy Modernization Program

a. Description

Minnesota is the nation's sixth largest milk-producing state. In 1934, Minnesota farmers reported having nearly 1.9 million cows. Ever since, cow numbers have been trending downward. According to *Minnesota Agricultural Statistics*, cow numbers are currently 475,000 on 6,112 dairy farms. Nevertheless, the dairy industry in Minnesota continues to be a $2.7 billion segment of the state's economy and the largest agricultural enterprise, accounting for more than 16% of the total value of agricultural production. In 2000 the dairy industry supported nearly 53,700 jobs in Minnesota. The University of Minnesota is working to modernize the dairy industry via research and Extension education. The Extension Dairy Modernization Program is educating dairy producers and industry professionals about the best herd management practices to maximize profitability, maintain herd health, and protect the environment. The goal is to end the reduction in cow numbers and increase milk production and profitability.

b. Impact

During 2003 educators focused on "Quality Count$," a major effort on improving milk quality by lowering somatic cell counts (SCC). Dairy specialists estimate that higher than average SCCs reduce Minnesota dairy producers' income more than $53 million annually. Farmers with low SCCs (300,000 or less) can earn as much as $2 more per hundredweight of milk. During the last seven months of 2003, DHIA statistics indicated that the average SCC of cows on DHIA was about 25,000 to 50,000 units lower than the 2000-2002 average. This change resulted in higher milk production, increased premiums for higher quality milk, and a safer product for consumers. The average decrease in SCC was 0.15 linear score. Research has shown that a decrease in SCC of one linear score improves profitability $86/cow/year so this drop improved profitability per cow by $12.90 last year. With 475,000 cows currently in production in Minnesota, an increase in profitability of $12.90 per cow equates to over $3 million in additional dairy farm income during the last half of 2003.

Farm business management records for Extension's Central Minnesota Dairy Profit Team showed that producers in this group increased their return over the cost of labor and management by $177.75 per cow on average. These producers were milking 17,801 cows so the increased profitability generated more than $3.2 million in additional income for them. The 110 producers in this region that also participated in Extension Feed Management Schools decreased feed cost and waste to save 10 cents/cow/day, earning them an additional $36.50 per cow.

For additional information: http://www.ansci.umn.edu/dairy/index.html

c. Source of funding: Smith-Lever 3b&c, state, county, grant/contract/income

d. Scope of impact: Multi-state Extension (IA, IL, ND, NE, SD, WI)

Key Theme: Managing Change in Agriculture (EXTENSION)

Extension Plan of Work: GOAL 1, Agriculture, Food, and Environment and Natural Resource and Environment Capacity Areas—2002 Farm Bill Education and Farm Bill Conservation Programs

a. Description

Extension educators have long been charged with helping Minnesota farmers learn the details of new federal farm legislation so that they can use this information to make more informed decisions and increase their profitability. Educators also train other agricultural professionals and agribusiness managers to enable them to also assist farmers with whom they work. In addition to commodity programs, educators are assisting farmers in learning about Farm Bill conservation programs and how to use them to conserve soil and water, as well as benefit financially from participation in them. During 2003, Minnesota Extension educators worked directly with 4,565 agricultural producers in workshops and individual consultations and trained 220 agricultural professions who, in turn, worked with other farmers. 79 agricultural and natural

resource professionals were trained in Farm Bill conservation program provisions and 331 landowners assisted in learning how to apply these provisions to their property.

b. Impact

Educators estimated that, on average, farmers who participated in workshops or sought individual consultations in making Farm Bill commodity base and yield option decisions will earn an additional $1,573 annually during the six years the program is in effect. FSA in Minnesota estimated that operators of 3,225 farms in the state used Extension assistance and materials. This means that Extension's assistance can be estimated as worth more than $5 million in additional farm income each year—or more than $30 million in additional farm income/economic impact over the six years the commodity program is in effect—not counting the producers assisted by the agriculture professionals that Extension trained! Educators reported that they used 2,160 hours (slightly more than 1 full-time equivalent) of professional time offering assistance. The average educator hourly rate (including the value of fringe benefits) is currently $30.58 an hour so the value of Extension staff time used in Farm Bill education is estimated at $66,050. Educators reported that they spent $11,295 in direct costs associated with delivering the program so the total cost is estimated at $77,345. This means that taxpayers are getting a return of $38.79 for each tax dollar that Extension invested in the Farm Bill Education Program—a benefit/cost ratio of 38 to 1.

It is too early yet to estimate the longer-term impact of the Conservation Security Program, but one educator estimated that his work with farmers in his region had already helped to prevent 600 tons of soil loss from erosion and approximately 12 tons of nitrogen and 30 tons of phosphorus from contaminating ground and surface water.

c. Source of funding: Smith-Lever 3b&c, state, county

d. Scope of impact: State Specific

Key Theme: Plant Production Efficiency (JOINT)

<u>MAES PLAN OF WORK:</u> GOAL 1, Programs 7, 12 and 13

a. Description

Precision agriculture gives producers the tools to use variable rate fertilizer spreaders at rates specifically targeted for individual fields. Research has focused on the accuracy of this equipment. Spreader tests conducted on one farm showed that the machines often missed the rate that was desired by as much as 50 percent. The spreaders are better at delivering high rates of material (greater than 150 pounds per acre) and they have difficulty giving repeatable lower rates.

b. Impact

Based on average nitrogen application rates of 130 pounds per acre (for corn only) and a fertilizer cost of $211 per ton, nationwide savings could be $464 million with more accurate fertilizer application. Currently, the estimated net loss in production due to inaccurate fertilizer rates and reduced yields ranges from $12 per acre to as much as $100 per acre, depending on how poorly fertilizer is distributed.

c. Source of funding: Hatch and McIntire-Stennis

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

a. Description

Farmers perceive risk associated with integrated weed management in terms of yield, economic returns, and time and labor management. A key component to developing successful integrated weed management systems lies in the ability of the crop producer to align individual time and labor management with existing biological time limits. To aid this process, researchers are using a team approach to communicate the need for the adoption of integrated weed management practices--creating learning groups, each consisting of 10 to 15 people from all sectors of the farming community who meet on a regular basis.

b. Impact

Implementing integrated weed management programs reduces farmers' exposure to the short-term economic risks that result from poor timing of weed control practices and the longer-term risks that result from shifts in weed species such as the development of herbicide resistant weeds.

c. Source of funding: Hatch and McIntire-Stennis

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

a. Description

Research on canola, niger, and rye as cover crops focused on both conventional and alternative production systems. Wheat, oat, and soybean varieties were evaluated under organic production practices. By comparing yields of 2-year and 4-year crop rotations for four management strategies, research showed that soybeans were more responsive than corn to the expanded rotation length and documented the beneficial yield effects of the expanded crop rotation, which were masked by external inputs in certain management strategies.

b. Impact

Based on this research, producers have information about alternative crops and production practices. Producers' canola variety selection is closely tied to herbicide choice and the results of

this research offers producers non-biased comparisons of a number of products. Based on this research, producers can fine-tune their production practices in managing rye as a cover crop.

c. Source of funding: Hatch and McIntire-Stennis

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

Extension Plan of Work: GOAL 1, Agriculture, Food, and Environment Capacity Area, Soybean Production, Soybean Aphid, Alternative/Specialty Crop, and Organic, Alternative, and Specialty Production Programs

a. Description

Minnesota produces over 5% of the world's soybeans. As a result, soybeans consistently rank as one of Minnesota's top three commodities in terms of cash receipts. Soybean sales brought in nearly $1.2 billion to the state's agricultural economy in 2001. In the past two years, Minnesota farmers have planted more acres of soybeans than any other crop. To continue to be competitive in the world market, Minnesota producers need to constantly adapt to new varieties, new production and marketing techniques, and new usages. Current challenges to Minnesota producers include iron chlorosis and the soybean aphid.

b. Impact

Educators are focusing on improving soybean producers' selection of more productive varieties, pest management—especially of the soybean aphid, soil fertility and water management, soil erosion control, and other important agronomic practices to improve the profitability and reduce the environmental impact of soybean production in Minnesota. They evaluated 29 varieties of special use soybeans in field trials during 2003. Educators estimated that producers can earn an average of $1.25 a bushel more for these varieties. At an average yield of 40 bushels/acre and 10,000 acres of special use soybeans planted in 2003, this premium added about $500,000 to these producers' cash receipts.

One educator in Southwest Minnesota reported that producers in his region have switched up to 80% of their acreage to SCN resistant soybean varieties. Another educator in the central part of the state estimated that 75% of the soybean acres in his region were sprayed for soybean aphid during 2003. Growers that did not spray for aphids lost an estimated 8.8 bushels/acre in yield. At $6/bushel, this is a loss of $52.80/acre. The regional educator in West Central Minnesota reported that there were 45,000 acres in his area sprayed at a cost of $9/acre or $405,000. Producers who sprayed increased their yield an average of 5 bushels. At $6.50 a bushel, spraying earned these producers an additional $1.5 million—an estimated net return of well over $1 million. In South Central Minnesota, almost every acre of soybeans—a total of 125,000 acres--was sprayed for aphids. The increased yield was estimated at an average of 12 bushels/acre, boosting farm income in this region by over $10 million.

c. Source of funding: Smith-Lever 3b&c, state, county, grant/contract

d. Scope of impact: State specific

Key Theme: Risk Management (EXTENSION)

Extension Plan of Work: GOAL 1, Agriculture, Food, and Environment—Winning the Game Program

a. Description

On average, net returns for the major grain crops—corn, soybeans, and spring wheat—are negative for many Minnesota producers. Therefore, Extension makes a major effort to teach farmers how to use marketing strategies that will enable them to get higher prices for their grain. 1,478 people participated in marketing workshops during 2003. Many of them learned to use *Marketeer*, the marketing software developed by the Center for Farm Financial Management to assist farmers in gaining confidence in developing and implementing marketing plans. In addition, over 1,600 marketing information newsletters and more than 700 publications on grain marketing were distributed to Minnesota producers.

b. Impact

Educators surveyed producers who had participated in *Winning the Game 2: Launch Your Marketing Plan* grain workshops during 2002. Twenty workshops were held in Minnesota and one in North Dakota. A total of 618 producers participated. The survey was sent out six months later, after the producers had marketed their grain. They were asked several questions related to their pre-harvest marketing practices after they completed the Extension training. More than 85% indicated that they had developed a pre-harvest marketing plan for their 2003 crop(s) after attending a *Winning the Game 2* workshop. 78% of those producers who completed a pre-harvest marketing plan had also implemented it. As a result, these producers pre-harvest marketed over 15% more of their corn, more than 21% more of their soybeans, and an additional 17% plus of their spring wheat using their 2003 marketing plan than they had of their 2002 crops without a marketing plan.

Using the increased grain marketing figures reported by program participants, historical records of additional income from pre-harvest marketing, and average state yield data, educators estimate that the producers who made and implemented grain marketing plans averaged an additional $4,279 in income from their 2003 grain crops. They also estimate that producers spent an average of 15 hours developing, implementing, and tracking their marketing plans. So, producers "earned" over $285 an hour for their extra grain marketing effort!

Educators also estimate that the 21 workshops cost $49,624 or about $80 per participant, including the value of their program development and delivery time, support staff time, travel, printing, postage, and supplies. However, much of this outlay was offset by fees charged workshop participants by local sponsors and funds donated by the Minnesota Soybean Research and Promotion Council. Support for program costs totaled $39,804, so the net cost for

Extension was $9,820 or $15.89 per participant. The estimated average benefit per producer that carried out their marketing plan, $4,279, divided by the average $80 per participant cost of the program, indicates a benefit/cost ratio of over $53 for each dollar spent on the program.

c. Source of funding: Smith-Lever 3b&c, state, county, grant/contract/income

d. Scope of impact: Multi-state Extension (NC, ND, NE, SD)

GOAL 2. A safe and secure food and fiber system.

Overview:

We are reporting on two programs under one theme under Goal 2 this year—Food Safety (JOINT).

Much of our food security effort that includes food safety under Goal 2 is carried out through our Food Stamp Nutrition Education Program (FSNEP) and Expanded Food and Nutrition Education Program (EFNEP). The outcomes and impacts for these programs are reported separately to USDA's Food and Nutrition Service and the Minnesota Department of Human Services.

Inputs and outputs: Extension educators invested a little over 2.5 FTEs of professional time delivering Food Safety for Food Service and Wildlife Sport Food Safety training last year. Food Safety for Food Service Program costs totaled $27,243 but income from fees charged for programs came to $93,130. The cost of providing the Wildlife Food Safety Program was estimated at a little over $9,400 but fees from participated totaled $2,465 and grant of $4,000 helped to offset downlink expenses.

Extension faculty also consulted with food industry managers and staff, wrote or revised and distributed publications and newsletters, placed information on websites, and trained Extension educators.

Outcomes: Food safety outcomes generally mean fewer outbreaks of food poisoning, rather than economic, environmental, and/or social gains. Raising the consciousness of food managers and employees and volunteers in nonprofit organizations is means to accomplish this end. Educators often indicated a good deal of success in raising the consciousness levels of the audiences that they worked with. The degree of success depended on the specific audience and their motivation to change—whether desirable in terms of quality and/or safety, or required by law, as in the case of the food industry people.

Impacts: These are difficult to determine, especially when the intent of the programs is largely preventive. Given the kinds of potential disruptions—illnesses, lost time from school or work--even deaths from outbreaks of food poisoning and transmission of disease via contaminated or improperly processed foods, the potential impacts of food quality and safety programs are very likely to be sizeable, but little attempt has been made to precisely measure them.

Accomplishments: A wide variety of research work is dealing with current food quality and safety issues. Extension educational programs are offered to a wide spectrum of audiences. Program participants have indicated that they do gain awareness and understanding of the importance of using food handling and processing methods that will maintain quality yet avoid the danger of contamination with or growth of dangerous substances that threaten their health and perhaps even their lives. Given public concern about the quality and safety of food and the high proportion of meals eaten away from home, these programs are addressing significant issues.

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

Chronic Wasting Disease (CWD) was detected in a captive bull elk in Aitkin county Minnesota in August 2002. While there is no evidence for CWD being transmissible to humans, hunters and consumers of wild game are concerned because of the association between bovine spongiform encephalopathy and a variant of human Creutzfeldt-Jacob disease. Ongoing surveillance is, therefore, important to assess potential risks. Using funding from the MAES, USDA, the Minnesota Department of Natural Resources, and private industry, a world class transmissible spongiform encephalopathy laboratory was built, equipped, and USDA accredited within two months. The Veterinary Diagnostic Laboratory has now tested more than 15,000 Chronic Wasting Disease samples.

b. Impact

The CWD response helped save the 2003 deer hunting retail and tourism season vital to Minnesota's rural economy. The laboratory is now being used to expand BSE "Mad Cow Disease" surveillance in Minnesota, helping to ensure a safe and wholesome foods supply and restoring and maintaining markets for U.S. beef and dairy exports.

c. Source of funding: Hatch and McIntire-Stennis

d. Scope of impact: State specific

a. Description

Lactic cultures can combat the growth of spoilage or pathogenic microorganisms by producing bacteriocins, which are small proteins that can kill other bacteria. The fact that they are proteins and readily digested by humans differentiates them from antibiotics. Perhaps the best known bacteriocin is nisin. Purified nisin could be considered a food ingredient and would therefore require specific approval by the FDA. Currently, it is only approved in the U.S. as an ingredient for processed cheese. However, the use of culture fermentates from nisin-producing lactococci is a very effective way of extending the shelf life and safety of foods. This is permitted by the FDA. To ensure consistent production of nisin by the culture, it is necessary to understand all the nuances involved in its production. Researchers have uncovered ways in which the culture switches production on and off. Understanding these mechanisms is providing the information to fine tune the fermentation to maximize production. Only a select few strains of *Lactococcus lactic* can produce nisin, and this limits the use of this antimicrobial compound. Engineering other cultures that are used in different foods to produce nisin would expand the uses for this effective compound.

b. Impact

Researchers were able to accomplish the engineering of other cultures, the first time that a bacterium other than *L. lactis* produced nisin. Understanding how the nisin gene systems function is enabling researchers to improve production and expand the avenues of use for this versatile protein.

c. Source of funding: Hatch and McIntire-Stennis

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

a. Description

A field study on mastitis resistance to enhance dairy food safety was completed, describing the effect of infusion with an internal teat sealant when used with a long-acting antibiotic at dry off. This was the first study performed in North America to evaluate the efficacy of an internal teat sealant for the prevention of new intramammary infections during the dry period. Study results shows that use of this product resulted in a significant reduction in new infections during the dry period

b. Impact

This study has been published in the *Journal of Dairy Science* and the sealant has since been approved for use and is being marketed in the U.S. and Canada. This product offers dairy producers with a useful new tool to help reduce mastitis in dairy herds that should help to improve animal health, dairy enterprise profitability, and food quality.

c. Source of funding: Hatch and McIntire-Stennis

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

a. Description

Cooking can destroy pathogenic microorganisms prior to marketing meat to consumers; however, this process has not been used because it develops a warmed-over flavor that consumers reject. Research demonstrated that the development of warmed over flavor could be suppressed in ground beef by lowering fat and adding starch and fiber. Meat not ground provided a greater challenge. Researchers tried vacuum tumbling in various types of brines that include starch, fiber and antioxidants and these demonstrated some improvement in resistance to warmed-over flavor while modestly improving nutrient content. Researchers also studied rinsing and chilling, which enhanced resistance to warmed over flavor, and improved the quality of meat. In addition, a significant reduction in cholesterol content was noted, further enhancing the

functional food properties of beef. Combining vacuum tumbling with rinsing and chilling increased the effectiveness of the technique.

b. Impact

This project's results have developed a number of approaches designed to solve some of the most nettlesome problems in the meat industry, especially the beef industry. Precooking of meat is now a possibility and affords the processor a means of protecting consumers from diseases carried by meat. Lowering cholesterol content was thought to be virtually impossible, but has been accomplished by this research.

c. Source of funding: Hatch and McIntire-Stennis

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

a. Description

With new regulations in the meat and poultry industry for the testing of Listeria in ready-to-eat foods, 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 developed a rapid detection assay for Listeria. They have developed a media that allows the rapid recovery of Listeria from the samples, while inhibiting other contaminating organisms. They have been testing this assay and media with samples collected from meat and poultry facilities for analysis and evaluation in order to obtain AOAC approval.

b. Impact

The use of this assay for Listeria will help the food industry efficiently and economically control potential food borne outbreaks associated with this pathogen. With the knowledge and techniques gained from this research, work is continuing on the development of a similar assay and media for the rapid detection of E. coli.

c. Source of funding: Hatch and McIntire-Stennis

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

Extension Plan of Work: GOAL 2, Agriculture, Food, and Environment Capacity
Area—Food Safety for Food Service and Wildlife Sport Food Safety Programs

a. Description

Minnesota families spend about half of their food dollars on meals away from home—putting them at risk for food borne illnesses. The majority of food borne illnesses reported in Minnesota are related to improper handling of food in restaurants and other food service businesses. An estimated 6.6 million diarrhea (including food borne) illnesses occur every year in Minnesota. Of those persons affected, 515,000 seek medical care, 48,900 visit an emergency room, and 30,500 are hospitalized. The Minnesota Department of Health estimates that 71% of recently reported food borne outbreaks is food service related. In addition, food borne illnesses can cost a retail food establishment more than $75,000 in lost income and additional expenses.

Extension's Food Safety for Food Service Program offers four training courses on food safety for the food industry. *ServSafe* was developed by experts in the food service industry to meet mandatory Food Manager Certification requirements. *Serve It Up Safely* is a food manager certification renewal course developed by Extension. It includes information on emerging trends, such as food allergies, food irradiation, and food recalls and since July 2003 is offered online, as well as in workshops. The *Safety and Service* course is geared toward food service personnel (workers rather than managers). And *Occasional Quantity Cooks* is designed to teach volunteers and non-profit organizational workers food safety for community events.

The Wildlife Sport Safety Program was a satellite downlink of *It's No Game: Safe Food Handling From Field to Table.* This program was very significant to Minnesota where fishing and hunting contribute $2 billion to the economy each year. During 2003, the spread of chronic wasting disease among large game was a major issue.

During 2003, 1,877 food managers and workers participated in the three food industry safety courses. 223 people who hunt and fish saw the *It's No Game* program at 17 satellite downlink locations.

b. Impact

Ninety-six % of the food managers completing the *ServSafe* Program became certified. Ninety-two % of those who responded to a follow-up program evaluation indicated that they had applied at least one recommended practice to improve food safety. Thirty-five % said they had shared/taught what they learned to employees and co-workers. A recent Minnesota Department of Health analysis of food service inspection reports indicated an 18.5% reduction in critical violations in establishments with a certified food manager.

One-hundred, forty-three people participated in *Occasional Quantity Cooks* training during 2003. All participants indicated that they intended to apply at least one safe food handling practice. 82% indicated later that they had applied their new knowledge—for example, cleaning and sanitizing food preparation surfaces, keeping hands clean, calibrating thermometers correctly,

cooking foods to the correct temperatures, cooling foods properly, and holding foods at the appropriate hot or cold temperatures.

It's No Game participants indicated on post-training evaluation that they substantially increased their ability to make safe food handling decisions about field dressing and storage of game and fish, as well as their understanding of current fish and game regulations.

For further information: http://www.extension.umn.edu/foodsafety/index.html

c. Source of funding: Smith-Lever 3b&c, state, county, grant/contract/income

d: Scope of impact: Multi-state (IA, ND, SD, WI)

GOAL 3. A healthy, well-nourished population.

Overview:

We are reporting against one key theme this year—Human Health (JOINT)—but reporting results of four specific programs, as indicated by the titles following the key theme and mentioned in the report.

Extension faculty and educators indicated they reached more than 6,700 people directly with nutrition and health information during 2002-03 (not counting the nearly 41,700 people reached via the Food Stamp Nutrition Education Program (FSNEP) and Expanded Food and Nutrition Education Program (EFNEP)). They invested 2.02 FTEs of professional time and a little more than $3,200 in program expenses but received more than $75,000 in grants.

Outcomes: Outcomes varied with the specific program but consistently indicated success in getting substantial numbers of people to change their health and nutrition behaviors and in training other professional nutritionists to offer current information in their programs. It is particularly important that programs targeting both youth and elders were successful in getting significant numbers of these groups to eat more fruits and vegetables and get more exercise. Encouraging good health habits in youth will reduce their longer-term risk of disease and health care costs. The same impact occurs for elders but with less longer-term economic impact.

Accomplishments: Continuing to provide credible research information and Extension programming in nutrition and health is extremely important. Health care costs are rising much faster than inflation—good nutrition has been shown to be one of the best and most economical ways to prevent long-term health problems. For this reason, the connection between campus-based faculty and tribal colleges in Minnesota, North Dakota and Wisconsin is critical in opening the door to providing courses and degree programs for Native Americans in nutrition and health, thus enabling them to better address critical issues, such as the high incidence of diabetes, in the cultural context of the Native American community.

Key Theme: Human Health (JOINT)

MAES Plan of Work: Goal 3--Through research and education on nutrition and development of more nutritious foods, enable people to make health-promoting choices

a. Description

Woodlands Wisdom is a collaborative effort with Tribal Colleges since 1998, addressing chronic health issues in Native American communities through culturally-based food and nutrition programs. These communities suffer from disproportionately high incidences of diabetes, heart disease, obesity, and other chronic diseases. Efforts by external professionals to offer help have met with limited success, due in part to a lack of appreciation for differing world views and culture. Part of the research related to this program has been on traditional native foods. Antioxidant analysis was conducted on ten different indigenous bean varieties. Each of them

tested higher in antioxidant capacity than corresponding market varieties. The *Woodlands Wisdom* project continues to explore cross cultural perspectives of research into food and nutrition issues. Other research to examine the nutritional status and dietary behavior of Native American youths has used focus groups with Native American youth to identify ways to increase physical activity and modify their diet.

b. Impact

As an overall result of this program, six Tribal Colleges now have faculty, programs and students in food and nutrition. The research described here involves integration of knowledge from marginalized communities. Nutrient analysis of a select sample of heirloom varieties of beans, corn, squash, and wild rice indicate that these crops are of high nutritional value and may be useful as food sources in reducing risk of diabetes, heart disease, and obesity. This work gives hope to many community members who look to their own cultural traditions as part of the solution to contemporary health problems. Research with Native American youth resulted in increased physical activity by the youth in the study and taught them how to make healthier food choices.

c. Source of funding: Hatch and McIntire-Stennis

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

a. Description

The body weights of Americans have increased dramatically over the past decade. University of Minnesota nutrition research to understand and control obesity has made progress in several areas. A study of dietary carbohydrates has shown that humans preferentially burn carbohydrates and therefore, the reasons why overeating carbohydrates leads to obesity are more complex that previously thought. Another project on food choices studied variables such as how hungry people are when they eat and what they believe about their diet and health status. Findings were that increasing the interval between meals by 30 minutes led to a 2 % increase in the percent of calories consumed from fat. This effect leveled off after 6.5 hours between meals. Eating in a sit-down restaurant led to consuming 3.5 percent more calories from fat than eating at home; eating in a fast food place increased the percent of calories from fat by 6 percent. In other research on defining a desirable dietary fiber intake, research has shown that dietary fibers isolated from oats and barley significantly lower serum lipids and should help protect against cardiovascular disease. Tests with a chemically-modified barley glucan fraction appear to have more potent physiological effects on serum lipids. This suggests that these isolated fibers can help prevent cardiovascular disease. These isolated fiber fractions were well accepted in human subjects since only small amounts (6 grams per day) are needed to lower serum lipids.

b. Impact

This dietary research is contributing to an understanding of obesity and other health-related problems and is providing help to those who give nutrition and health advice. It is also influencing the design of nutrition educational programs.

c. Source of funding: Hatch and McIntire-Stennis

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

a. Description

The effect of three different dietary fat sources—corn oil, beef tallow, and palm oil—is examining the development of atherosclerotic lesions. This work is significant because it extends the study of the effects of dietary fat on atherosclerosis from the use of intermediate markers such as cholesterol to a disease endpoint. This is giving a much clearer picture of the effect of different dietary components in general, and dietary fats in particular, on development of atherosclerosis.

b. Impact

This study has allowed researchers to establish a powerful method for the study of how diet affects the development of atherosclerosis. This method is far superior to the currently used intermediate markers such as serum cholesterols. With this method researchers can examine a number of different dietary interventions to determine their impact on risk of atherosclerotic diseases such as heart disease and stroke. This will improve our ability to make accurate dietary recommendations to decrease the risk of heart disease and stroke.

c. Source of funding: Hatch and McIntire-Stennis

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

a. Description

The field of probiotics is an important emerging sector of the dairy foods industry with tremendous growth potential. It involves including probiotic cultures in dairy products to modulate consumers' intestinal flora for improved intestinal and overall health. Researchers have identified a specific probiotic culture that is associated with more positive effects on the large intestine than any other species and has the ability to breakdown many dietary carcinogens. They also have identified and isolated a strain and deciphered the complete genomic sequence. The goal is to use this sequence to uncover probiotic relevant genes, but the sequence analysis has already revealed some interesting features. The most surprising was the extent of chromosome rearrangement within the two strains who share less than 98 percent sequence identity.

b. Impact

The inclusion of probiotic cultures in dairy products for the purpose of improving peoples' overall health is perhaps the sector of the dairy foods business with the highest growth potential.

But to maximize this potential, it is imperative that the cultures used have scientifically validated probiotic attributes, which this work is establishing.

c. Source of funding: Hatch and McIntire-Stennis

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

a. Description

A group of researchers have been working for the past three years on cancer-preventing compounds in cruciferous vegetables, such as watercress and cabbage. The goal has been to increase the level of these compounds in these vegetables by controlling the conditions under which the plants are grown and to develop a regime with commercial applicability. Research has found that gluconasturtin content increased in plants grown under long days, in plants supplemented with red light, and in plants treated with a brief red light period at the end of the day.

b. Impact

This research has led to a new concept of a line of branded produce certified to be high in disease-preventing compounds. This has potential for providing increased economic opportunities in rural Minnesota, as well as improving the health of all Minnesotans.

c. Source of funding: Hatch and McIntire-Stennis

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

a. Description

Getting sufficient calcium during adolescence helps make sure there is adequate mineralization of the skeleton to ensure bone health later in life. Recent dietary intake data showed that calcium intake is below recommended levels for preadolescent girls. Intake of milk accounts for about half of the calcium intake for adolescent girls and only 60 % are receiving the recommendation for servings from the dairy product group of the Food Guide Pyramid. Research is focusing on what determines dietary intake of dairy and calcium-rich foods in Minnesota's Hmong youth and families. The study has shown that practices parents use to make calcium-rich food available and cultural expectations of parents do have an influence on their children's calcium consumption.

b. Impact

Little research was previously available regarding what influences on calcium intake by preadolescent girls and parental factors affecting that intake. This research revealed that effective interventions may include tasting sessions, development of asking skills so children can

influence the availability of well-like foods both at home and school, and the promotion of regular eating habits to ensure that meals are not skipped. The goal is to design effective, culturally appropriate nutrition interventions for urban children and families. Improving children's dietary patterns will result in prevention of obesity and protection from chronic diseases later in life.

c. Source of funding: Hatch and McIntire-Stennis

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

Extension Plan of Work: GOAL 3, Family Development Capacity Area—Color Your Plate Healthy With Fruits and Vegetables Learning Circle, Healthy Behaviors and Lifestyles: Eat and Be Fit Together, Healthy Behaviors and Lifestyles: Fun with Food and Fitness, and Research Updates Series for Professionals Programs

a. Description

Obesity in the U. S. is reaching epidemic proportions. The growing incidence of obesity among school-age children is a special concern of nutritionists, health care professionals, teachers, parents and grandparents. Extension is reaching out to these groups with current information on nutrition targeted to youth and older adults and to health care and education professionals and encouraging action at the community level. More than 6,700 youth and adults participated in these programs during 2003.

b. Impact

The *Color Your Plate Healthy with Fruits and Vegetables* Program targeted older adults (age 55+). Program participants averaged three key behavior changes each as a result of the information received. 56% of the program participants indicated they were subsequently trying to eat 5 to 9 servings of fruits and vegetables daily. 36% indicated that they now realize that eating at least five servings of fruits and vegetables daily reduces their long-term risk of cancer, heart disease, etc. 28% subsequently were aware that fruits and vegetables provide them with vitamins, minerals, fiber, and protective factors (phytochemicals) and 48% had learned that the deeply colored fruits and vegetables are the richest in protective factors. 28% now wash produce with water, rather than soap or bleach.

The *Healthy Behaviors and Lifestyles: Eat and Be Fit Together* Program was designed for high school athletes. Over 600 participated in this program in 2003. All of them planned to make dietary changes subsequent to the program. 93% reported eating better snacks before sports events and drinking more water during them. Other youth athletes reported more frequent washing of hands before preparing and eating food, reading nutrition labels, eating breakfast every day, eating vegetables every day, and trying new foods.

One Minnesota elementary school was a pilot site for the new JIFF (Jump into Food and Fitness) curriculum developed by the Michigan Cooperative Extension Service for kids age 9 to 12. This

curriculum focuses on healthy lifestyles for kids with nutrition education and physical activities. Nine adults and youth were trained in the curriculum content and presented six two-hour sessions to kids enrolled in the Summer School Child Care Program. Kids liked the JIFF activities so much that 100% improved on post testing of their knowledge of nutrition and the need for physical activity. 100% also said they tried new foods during JIFF that they would eat again—for example, summer squash, sugar snap peas, whole-wheat bread, star fruit, and craisens. More than half of the JIFF kids also reported sharing the take-home activities with their parents. The JIFF Program proved so popular that school officials asked that it be continued there.

The *Research Updates Series for Professionals* attracted over 1,300 health and nutrition specialists and parents and grandparents. Two conferences were held in Minnesota during 2003, one of them, "Overweight Issues in Childhood: Role of Environment and Community," in collaboration with Iowa State. 100% of the participants rated the 5-hour conference as excellent, very good, or good and all planned to use the information in their professional outreach. More than half of the conferees indicated they were interested in a future conference focused on best practices for addressing obesity in children for families, communities, and schools. The second conference was entitled "Minnesota Takes Action for Healthy Kids: What Families and Communities Can Do." The 82 professionals, parents, and grandparents at this conference rated it excellent or very good. Over half planned to teach what they'd learned to others and to take action to improve the lifestyles of children and families in their workplaces, schools, or communities—such as questioning school lunch options, vending machine options, increased physical activities, etc.

As a result of these conferences, health and nutrition specialists are more aware of the health and nutrition resources that Extension has to offer and the role that Extension educators can play. The local media have requested more information on childhood obesity. Professionals who attended the two conferences last year have reported that they are using the information they received. School nurses in one county reported that they have added time to their meeting agendas to discuss strategies for reducing child obesity by changing the foods available and the physical activities in their schools. One school formed a Healthy Lifestyle Task Force to take action on cafeteria and vending machine food options.

For further information: http://fscn.che.umn.edu/nutrinet/

c. Source of funding: Smith-Lever 3b&c, state, county, grant/contract

d. Scope of impact: State specific

GOAL 4: Greater harmony between agriculture and the environment.

Overview:

We are reporting on one joint theme this year under Goal 4—Agricultural Waste Management. This theme reflects a number of our MAES research projects and our Agriculture, Food, and Environment Capacity Area's Manure Management Education Program. We are also reporting on two Extension themes--Natural Resources Management (Shoreland Education (two) Programs) and Water Quality (Wastewater Treatment Education (three) Programs). All of these programs are addressing critical agricultural and environmental issues related to the care of Minnesota's best known natural resource—her 10,000+ lakes and streams.

Extension faculty and staff devoted 7.11 FTEs of professional time to dealing with these natural resource-related issues last year. More than 8,400 people participated in these six programs that cost $48,700 to deliver. These costs were offset by nearly $25,400 in income from participant fees and $91,830 in grants, contracts, and in-kind contributions.

Outcomes and impacts: By reducing the nutrients seeping from feedlots, agricultural waste management education is having a significant effect on surface and underground water quality in Minnesota. It also contributes to farm profits by teaching producers to properly use livestock nutrients to enhance soil fertility. These environmental and economic impacts have not been formally measured but educators report noticeable changes in the lakes and streams bordered by cultivated farmland and by livestock facilities.

The increasing number of Minnesotans and new residents from out of state who are buying or building vacation and retirement homes bordering lakes and streams also is having a significant negative impact on water quality in Minnesota. Natural resource educators are targeting lakeshore associations and teaching lakeshore volunteers the benefits and techniques of revegetating lakeshores to minimize the runoff of lawn residues and fertilizers and chemicals used on landscapes around homes and to re-establish wildlife habitat. Having lakeshore volunteers to help "spread the word" is multiplying Extension's outreach, especially critical in times when Extension's resources are declining.

Key Theme: Agricultural Waste Management (JOINT)

MAES Plan of Work GOAL 4--Program 6, Animal Waste Management

a. Description

Odor emitting from open manure storage facilities has been a problem for livestock producers and their neighbors for years with no cost effective methods available for farmers to use. Producers are beginning to use advanced techniques to treat liquid animal wastes in order to meet the increasingly tighter environmental regulations and solid-liquid separation and aeration have drawn the greatest attention. This method concentrates the organic solids and nutrients, making it possible to apply the nutrient-rich fraction to crops during the growing season.

Research on controlling swine manure odor through effective use of solid-liquid separation and aeration from open storage facilities has delivered specific and useful information.

b. Impact

Producers have seen the benefit of using separation and aeration to treat manure for odor control, but combining separation with aeration has not been sufficiently studied to determine levels and combinations of separation and aeration. This research determined that reducing manure solids content prior to aeration treatment is critical in reducing the potential for odor generation during the subsequent storage period. The results obtained from the project have paved the way for swine producers to address the odor problem at an affordable cost. The project not only provides evidence and confidence that swine manure odor can be reduced to a satisfactory level with the combined treatment of solids-liquid separation and aeration, but also offers key information in terms of how to select the equipment and design the system to minimize the capital outlay. An evaluation of an aerator running on the lagoon of a cooperating farmer's farm revealed that it would take 3 months of continuous operation to achieve odor free storage. The aeration cost per pig produced is about $0.76.

c. Source of funding: Hatch and McIntire-Stennis

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

a. Description

In a two year project, five Minnesota counties were selected to evaluate the OFFSET (Odor from Feedlot Setback Estimation Tool) method on commercial farms in these counties. Regarding all observations, the observed odor intensity was significantly higher than the predicted intensity.

b. Impact

The results of the OFFSET project is aiding in the improvement and use of this siting tool to establish objective setback distances between livestock production sites and local residents and businesses. Producers are also gaining important information from OFFSET on the impact of odor control technologies on their production facilities.

c. Source of funding: Hatch and McIntire-Stennis

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

a. Description

University of Minnesota researchers have been studying the use of anaerobic (methane or biogas) digesters for generating electricity, reducing odor, and providing other benefits on dairy farms. A digester on an 800-cow farm in Minnesota is being studied. Improvements in digester

design, electricity supply problems, and a lack of other good odor control solutions for large livestock operations are three factors that are generating increased interest in this technology. Research is identifying electricity generation performance and pricing, and subsidies and incentives from government sources and utilities. Possible non-energy benefits on weed control and crop response to manure nutrient availability were factors being studied in a 3-year monitoring project completed in 2003.

b. Impact

There are two dairy farm digesters in operation in Minnesota at this time and at least two others in the planning stage. Seventy-one digester systems were installed on commercial U.S. farms between 1970 and 1990 as rising oil prices triggered interest in farm-scale energy production. Thirty farm digesters have been slated to receive subsidies under the energy provisions of the most recent farm bill.

c. Source of funding: Hatch and McIntire-Stennis

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

a. Description

Improper handling of milk house wastewater can negatively impact environmental quality. Many small and mid-sized dairy operations in Minnesota need to upgrade their milk house and wastewater handling systems to comply with Minnesota Feedlot Rules that prohibit discharge of milk house wastewater with no treatment. Producers need systems that perform reliably, meet environmental regulations, fit their management practices, and are economical to install and operate. Researchers have been evaluating alternative systems for handling milk house wastewater.

b. Impact

Based on USDA data, small and mid-sized dairy producers, those with less than 200 cows, account for about 88 percent of all dairy operations in Minnesota. This research is providing these producers with installation and operating cost information, as well as performance and management information. The evaluation is giving this producer group the necessary tools to choose the best system. A multi-agency collaborative effort guided and funded the research. Outreach efforts are providing producers, engineers, Extension educators, and technical staff with practical and technical information on the systems used in the study. Performance, cost, and management information gathered is being disseminated statewide.

c. Source of funding: Hatch and McIntire-Stennis

d: Scope of impact: State specific

Extension Plan of Work: GOAL 4, Agriculture, Food, and Environment Capacity Area
--Manure Management Education Program

a. Description

Livestock production is a major segment of agriculture in Minnesota. In addition to dairy, Minnesota farmers are major producers of beef, swine, turkeys, broilers, and laying hens. The manure generated has the potential to negatively impact air and water quality in the state. Federal, state, and local regulations are designed to protect natural resources. Livestock producers are required to develop and implement manure management plans. Research continues on ways to better utilize animal waste in order to reduce air and water pollution. Extension educators provide group sessions on properly disposing and utilizing animal wastes, as well as extensive one-on-one assistance to individual producers developing manure management plans.

b. Impact

Educators continued working with livestock producers to bring them into compliance with federal, state, and local manure management regulations. State feedlot officers are reporting that many more Minnesota farmers now have completed plans. Educators reported working with more than 5,400 livestock producers on manure management in 2003. Many producers participated in workshops and small group sessions where they learned the BMPs of nutrient and manure management, including training on manure sampling, interpretation of test results, and proper calibration of manure disposal equipment. One educator reported also providing producers in his region with a notebook of manure management resource materials. These materials included: "Land Application of Manure: Tools and Resources," "Planning and Record Keeping Guide for Land Application of Manure," "Minimum State Requirements Checklist for Manure Management Plan Components," "Applying Manure in Sensitive Areas," "Fertilizing Corn in Minnesota," "Livestock Manure Sampling," "Calibrating Manure Spreaders," 'Soil Sampling as a Basis for Fertilizer Application," "Certified Manure Testing Laboratories," and "Fertilizer Recommendations for Agronomic Crops." One educator alone helped 126 individual producers prepare manure management plans. Campus-based faculty provided several individual consultations on installing methane digesters on dairy farms. Economic projections helped to convince several producers that taking this step was not in their best interests.

Manure Management Workshop participants all reported that they are now sampling for N, P, and K on a regular basis. One regional educator conducted a nitrogen field plot study with five local producers to determine the optimum level of N application. N was applied at 0, 60, 90, 120, 150, and 180 pounds per acre. The optimal economic rate turned out to be 90-120 pounds. Yields did not improve significantly at higher rates. The results of this field study were shared with other producers in the region.

c. Source of funding: Smith-Lever 3b&c, state, county, grant/contract

d. Scope of impact: State specific

Key Theme: Natural Resources Management (EXTENSION)

Extension Plan of Work: GOAL 4, Natural Resources and Environment Capacity Area—
Shoreland Education: Shoreland Revegetation and Shoreland Volunteer Programs

a. Description

Many Minnesotans enjoy the state's lakes and streams and share a concern that their water resources are managed carefully to sustain their health and beauty. In their natural state, shorelines are diverse and sensitive areas that help protect water quality, provide critical habitat for many species of plants and animals, and give pleasure to people.

Extension's Shoreland Education Program provides information, skills training, practical experience, and resources for Minnesotans interested in practicing and promoting shoreland stewardship. Property owners, lake association leaders, and local decision makers are among the people targeted to participate. Shoreland Program participants do get involved. They monitor lakes and rivers, restore shorelines, sponsor educational events, create presentations and exhibits, and teach youth.

Some people interested in the preservation and revegetation of shorelands become Shoreland Volunteers. Shoreland Volunteer Workshops bring together people with expertise in revegetating and managing shoreland with shoreland property owners who need that expertise. Revegetation Workshops address property owner expectations, environmental functions, and shoreland regulations—a holistic approach that results in sound shoreland management decisions and revegetation projects.

During 2003, 386 people participated in Shoreland Revegetation Workshops--344 of them were trained to teach others what they learned. 184 Shoreland Volunteers were actively involved in Shoreland Education—acquiring knowledge and tools to assist others and taking action in specific education, revegetation, and land/water use planning efforts.

b. Impact

Educators indicated that 184 participants in the Shoreland Revegetation Workshops changed their behavior and/or skills in the following areas: (1) Improved personal shoreland property management; (2) increased shoreland restoration/monitoring/plant identification skills; (3) greater involvement in plant monitoring; (4) greater involvement in lake associations and local land/water use planning; (5) delivery of educational shoreland presentations; (6) education of neighbors on shoreland and water quality issues; (7) reduced native vegetation removal; and (8) implementation of shoreland revegetation projects on public and private property. Overall, their involvement led to increased collaboration and cooperation between and within natural resource agencies and private citizens and more local land/water use planning. As a result, new land/water use ordinances were passed in several Minnesota counties. In addition, the impacts of invasive alien species were minimized due to preventive actions, early detection, and appropriate follow-up treatment. 112,000 square feet of Minnesota shoreland was revegetated last year,

resulting in decreased shoreland erosion and nutrient and sediment inputs to surface water, as well as increased numbers and sales of native plant nurseries in rural Minnesota.

c. Source of funding: Smith-Lever 3b&c, state, county

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

Key Theme: Water Quality (EXTENSION)

Extension Plan of Work: GOAL 4, Natural Resources and Environment Capacity Area—Wastewater Treatment Education: Septic System Operation and Maintenance, Wastewater Alternatives, and Small Community Wastewater Solutions

a. Description

Pressure on Minnesota's water resources is growing rapidly as more people build seasonal and permanent homes on rural lakeshores and streams. The Wastewater Treatment Education Program, Septic System Operation and Maintenance, is targeted to individual homeowners and septic system contractors to teach them about the use and maintenance of septic systems. Due to unique weather conditions during the Winter of 2003, many Minnesota homeowners experienced frozen septic systems. As a result, there was even more demand for this educational program last year.

Wastewater Alternatives is targeted primarily to septic system pumpers and addresses the issue of applying septage to the land in rural areas.

Small community Wastewater Solutions works with individual residents, community organizations, and community leaders in "unsewered" communities, as well as local and state government employees and wastewater industry professionals, to understand their options for wastewater treatment and disposal.

There are an estimated 600,000 septic systems in operation in Minnesota. Nearly 1,300 individuals participated in the Septic System Operation and Maintenance Program in 2003 and 431 of them were trained to teach this program's content to others. There were 300 participants in the Wastewater Alternatives Program and 989 in the Small Community Wastewater Solutions Program last year. 41 of the latter participants were trained to teach the program content to others.

b. Impact

Participants in the Septic System Operation and Maintenance Program now (1) better understand how their septic systems work, (2) know "best management practices" regarding water and product use, (3) know how to maintain their systems, (4) save money on repairs and longer system life, and (5) are protecting their families' health and the environment. As the result of these outcomes for septic system owners who have participated in septic system workshops, (1)

ground and surface water in their localities is cleaner and healthier, (2) property values are protected and increased, (3) local government units are adopting policies and procedures that pay more attention to the proper maintenance of septic systems, and (4) residents and community leaders are using the information to formulate more comprehensive land use plans that include wastewater management as a integral component. In addition, the frozen septic system problem last year led to planning a septic system contractors' workshop for 2004 that will include a session led by contractors, discussing what they learned about preventing and thawing frozen systems and the longer-term maintenance issues.

The major outcome for participants in the Wastewater Alternatives Program is understanding that land application of rural septage is an acceptable management option, providing they follow federal EPA and state MCPA guidelines. One educator reported that prior to the Wastewater Alternatives Workshop, all of the septic pumpers in his county were out of compliance with federal and state regulations and in danger of being shut down. He estimates that they are all now in compliance.

The Small Community Wastewater Solutions Program focuses on having residents, members of community organizations, and community leaders in unsewered communities learn about wastewater disposal options so that they can make informed decisions and implement plans using their best options. The program increases their knowledge of treatment technologies—centralized and decentralized—for their situations and the management needed to meet their long-term goals and needs in a cost-effective manner that also protects human health and the environment. Educators reported that three communities and three lakeshore associations had taken action during 2003 to assess their systems and to develop wastewater plans, in cooperation with local government units.

c. Source of funding: Smith-Lever 3b&c, state, county

d. Scope of impact: State specific

GOAL 5. Enhanced economic opportunity and quality of life.

Overview:

We are reporting four key themes this year—all of them related to Extension programs. There are six programs under the Community Development theme, three under the Leadership Training and Development theme, and two each under the Promoting Housing Programs and Tourism themes—a total of 13 related efforts to enhance economic opportunity and quality of life in Minnesota.

Inputs and outputs: Faculty and Extension educators put 5.61 FTEs of effort into these programs during 2002-03 and 8,770 individuals participated in them. Program costs are estimated at $234,775, but offset by over $330,000 in grants, contracts, and in-kind contributions and more than $204,000 in participant fees.

Outcomes: Outcomes for these programs are often social as well as economic. Even the economic outcomes are often long-term and difficult to estimate in the short-run. Nevertheless, program participants made significant progress in building social capital in communities and customer service in local businesses, applying leadership skills to local, state, and national issues, and in making homeownership and rental decisions. All of these positive gains contribute to enhanced economic opportunity and quality of life in Minnesota's communities.

Impacts: Impact is harder to capture. During 2003, a longitudinal study was completed of *U LEAD* Program graduates from 1997 to 2002, using an evaluative survey developed and validated by Dr. Kenneth Pigg at the University of Missouri. The results of this research provide evidence of significant changes in *U LEAD* grads' leadership attitudes, skills, behaviors, and commitment to their communities, as well as indications that leadership actions were subsequently taken subsequent to the training. Additional research is needed to more fully capture the impact of these outcomes.

Accomplishments: We have made greater effort this year to collect data on inputs, outputs, outcomes, and at least anticipated impacts for all of the programs in our Plan of Work. We will continue this effort in the future and also put greater emphasis on using the logic model to design programs so that we can better evaluate them in the future. Although we aren't able to report specific impacts for some the programs represented under Goal 5 key themes, the information that we do have is indicating that many of these efforts are building toward accomplishment of major economic and social impact on Minnesota citizens and their communities.

Key Theme: Community Development (EXTENSION)

Extension Plan of Work: GOAL 5, Community Vitality Capacity Area–Community Economics Programs (*Business Retention and Expansion Strategies, Business Retention and Expansion Certification, Rural Health Works, Minnesota Rural Health Works, Community Economic Analysis, and Retail Sales Analysis*)

a. Description

Community economics programs engage residents in making informed decisions related to retaining and expanding local business and industries. These programs are anchored by the *Business Retention and Expansion (BR&E) Visitation* program. BR&E trains volunteer teams to conduct face-to-face surveys with local businesses. Social capital is instrumental to local economic development. It is enhanced through the relationships built in the training, the survey work, and the strategic planning efforts that are part of BR&E. Based on survey results, community plans are developed. These plans have a higher chance of being implemented because of the social capital built during the BR&E research project.

In 2003, five program teams introduced new initiatives to support community economic development. Each team informs local decision-making with economic data, surveys of local businesses, and community discussions. *Rural Health Works* focuses community attention on the health care industry. *Small Stores Success Strategies* focuses attention on small retail competitors.

b. Impact

454 Minnesotans were engaged in BR&E programs this year. Four new programs were started and five begun prior to 2003 were still active. A total of 259 community leaders were trained to conduct surveys and conducted them. A total of 88 organizations were involved. 78 BR&E workshops or meetings were conducted and 21 consultations took place. As a result, ten communities put economic development plans in place and five successfully implemented priorities within their plans. Follow up projects implementing priorities relate to technology education, tourism development, youth and senior retention and attraction, transportation, education and workforce issues. At least 17 projects were underway in various BR&E programs during 2003. There are very visible impacts that demonstrate how building social capital in a community can lead to action, such as

1) Four businesses chose to expand facilities and employment in one community and three in another.
2) One community identified strategies to welcome immigrant-owned businesses.
2) Four apartment buildings and four homes were built in yet another community.
3) Beautification efforts were undertaken in several communities. In one community 17,000 new plants were installed.
4) In another locality, a contest was conducted to rally communities around city strengths.
5) In one county, BR&E constituents rallied against county budget cuts that would diminish economic development objectives.

In addition, 12 persons (3 minorities) were certified to conduct BR&E programs.

Other community economics efforts reached 618 Minnesotans. Presentations about local health care economics led to an unprecedented inclusion of health care in economic development plans in one county. After a retail sales survey was conducted in one city, a retail committee was formed within the Chamber of Commerce to explore collaborative strategies to enhance sales on Main Street.

c. Source of funding: Smith-Lever 3b&c, state, county, grant/contract, and income

d. Scope of impact: Multi-state Extension (IL, ND, NE, and Saskatchewan, Canada)

Key Theme: Leadership Training and Development (EXTENSION)

Extension Plan of Work: GOAL 5, Community Vitality Capacity Area–Leadership and Facilitation Programs (*Civic Connections, U LEAD, and U FACILITATE*)

a. Description

Leadership and civic engagement programs strengthen the capacity of communities to make decisions effectively through education and consultation in leadership, facilitation and civic participation strategies. Through the *U LEAD Program* emerging, existing, and elected leaders build skills and confidence by examining their personal leadership styles and key elements of quality leadership and by examining information relevant to key issues. The *U Facilitate Program* offer citizens, workers and leaders skills and opportunities in making meetings and decision-making work more effectively. Educators provide both facilitator training and model quality facilitation techniques. The *Civic Connections Program* helps communities mobilize active and skillful individuals as assets to accomplish community goals.

b. Impact

These programs are in high demand across Minnesota. In 2003, over 7,000 hours of Extension professional time were committed to leadership and civic engagement programs in communities. As a result, 4,568 program participants gained knowledge and skills to improve their civic lives and 112 persons were trained to train others. The impact of these programs can be described in two ways—(1) changes in participants' leadership capacities and (2) examples of civic actions taken.

A longitudinal survey of over 500 graduates of *U LEAD* programs from 1997 to 2002 indicated numerous positive changes in knowledge, skills, and outcomes. Participants ranked the attitudes, skills, and behaviors that they had changed as a result of the program.[1] Five major outcomes for

[1] The evaluation tool for this survey was developed and validated by Dr. Kenneth Pigg of the University of Missouri's Excel program.

Minnesota's participants included: (1) Increased, effective civic participation; (2) personal growth and a greater sense of being able to make a difference. (3) strengthened commitment to make their communities better places in which to live; (4) greater community knowledge of needs, resources, and policies; and, (5) greater work toward shared visions and purpose. *U LEAD* participants specifically reported that they better understood how new ideas were adopted and what steps were needed to obtain broad-based support. They considered themselves well-qualified to take action on public issues and had a sense of mission in their lives.

Examples of civic actions taken:

- Soil and Water Conservation District leaders said that they had used tools provided in their sessions to assist them in making difficult ethical decisions.
- Convening a cohort group of elected officials resulted in joint hiring between larger and smaller cities and joint planning among contiguous cities.
- 28 agricultural leaders followed action plans developed in their *U Lead* program. Impacts include the protection of a rural water well field, development of a wind turbine farm, a successful community planning process, and providing input and support for numerous pieces of state and federal legislation.
- With Extension facilitation, one county feedlot ordinance revision task force set capacity limits and setbacks for new and expanding feedlots.

c. Source of funding: Smith-Lever 3b&c, state, county, grant/contract, and income

d. Scope of impact: State specific

Key Theme: Promoting Housing Programs (EXTENSION)

Extension Plan of Work: GOAL 5, Family Development Capacity Area—*Home Stretch* and *RentWise* Programs

a. Description

Home Stretch is a home buyer training program sponsored by the Minnesota Housing Finance Agency and taught by Extension faculty and staff members in local communities throughout the state. The program targets low-income individuals and families, especially immigrants, American Indians, and other people of color. Attendance is required by many lenders and regional affordable housing programs. The program teaches potential home buyers about the home buying process and gives them the information they need to make sound financial decisions and undertake the responsibility of home ownership. Completion of the program often also helps first time home buyers get lower mortgage interest rates.

RentWise is a tenant education program offered by Extension and ultimately targeted to low-income individuals and families. The focus is on training trainers in local agencies to give renters information about decisions and behaviors that will enable them to obtain stable,

adequate, affordable housing for themselves and their families and to develop positive tenant/landlord relationships.

b. Impact

1,802 people participated in *Home Stretch* during 2003—27 of them were people trained to teach the program to others. Educators reported that after completing the program, from 35 to 95% of their *Home Stretch* participants were able to buy homes during 2003. More are likely to complete purchases during 2004. Home ownership has a positive impact on local communities because owners are more stable and more likely to contribute to their community, in addition to paying taxes and buying goods and services locally.

367 people participated in the *RentWise* Program during 2003—197 of them were agency staff trained to teach their clients. Participants indicated on post-training evaluations that they had substantially increased their knowledge of tenant/landlord issues. They also indicated that after the training, they were more knowledgeable and skilled in accessing useful tenant education resources, such as legal and mediation services, the Attorney General's office, and the like. The long-term benefits of obtaining stable , adequate, and affordable housing for tenants and their families (and the communities in which they live) include less personal stress in their lives, savings in moving costs, greater stability for their children who do better academically, and greater likelihood that they will contribute to their communities of residence. These factors also increase the possibility that they may ultimately be able to buy homes in their communities of residence.

c. Source of funding: Smith-Lever 3b&c, state, county, grant/contract

d. Scope of impact: State specific

Key Theme: Tourism (EXTENSION)

Extension Plan of Work: GOAL 5, Community Vitality Capacity Area–Tourism Programs (At Your Service and Certified Festival Management)

a. Description

Tourism Center programs support the development of Minnesota's tourism industry. Workshops and individual consultations are offered to tourism business owners, employees, volunteers, and people interested in starting tourism businesses. Community consultation is done through the *Community Tourism Development* research program. Training of volunteers and events managers is accomplished through the *Certified Festival Management* program. The *At Your Service* program trains front line workers in customer service and integrates quality customer service training into the venue of other trainers.

b. Impact

The *Certified Festival Management* program certified 50 festival managers and organizers during 2003. 16% of these participants were minorities and contributed these skills to the growing number of cultural festivals being offered around Minnesota. Because these managers are largely volunteers, this program also helped to improve the social fabric of communities through quality volunteerism.

At Your Service programs provided research-based customer service training to 302 participants and enabled five trainers to reach more constituents. 35% of these participants were persons of color, with special outreach to Minnesota's growing Asian workforce. End of workshop evaluations indicated that participants had significantly improved their customer service skills. 92% of respondents at one recent session agreed or strongly agreed that the exercises in the program helped them understand how they can improve their own customer service skills and 85% felt the skills are valuable or very valuable for use on the job. Superior customer service positively impacts the economic base of a community. Special effort was placed this year on developing a research-based adaptation of the curriculum to help participants improve service to customers from diverse cultures and lifestyles. This change will be important as the diversity of Minnesota's population continues to grow.

c. Source of funding: Smith Lever 3b&c, state, county, grant/contract, income

d. Scope of impact: Multistate Extension (ND and Alberta, Canada)

II. Stakeholder Input Process Update

A. Actions taken to seek stakeholder input that encourages their participation.

In our 2001-02 report, we described the implementation of an integrated approach to program promotion and community assessment. This integrated approach assigned County Extension Directors to program promotion and to encouraging key stakeholders in counties to respond to program offerings in the context of community need.

Adjustments and enhancements have been made to this process which will continue to improve the stakeholder input process in the coming years.

- Extension's new structure allows counties to designate which programs are available in their county. This provides a direct link between county priorities and use of their county's fiscal contribution to Extension. It also provides a more direct link between educators and campus specialists who work in their area of expertise.
- Program teams were convened in 2003 and will continue to meet over the next two years. The charge of these program teams is to develop and implement program business plans for their area of expertise. Program teams formally convene educators, campus specialists, and research staff members to review the knowledge model and business model of programs. In the process of developing the program business plan, teams conduct environmental scans, analyze trends, review literature, gather secondary data, and talk to target audiences.
- County Extension Directors have been replaced by Regional Extension Directors who manage regional centers, promote Extension programs, and act as a liaison to stakeholders in the region. Because they are covering multiple counties, educators also reach out to key constituencies.

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

The chart below describes our stakeholder input process:

Group	**Process for collecting input**	**Who is responsible?**	**Documentation**
Statewide Extension Citizen Advisory Committee (A representative group of volunteers from Minnesota's various geographies and diverse interests.)	o Three meetings per year o Conference calls two – three times a year o Regular distribution of memos and reports	Dean and Director	Agenda Minutes Meeting summaries Correspondence
Local Fiscal Partners; e.g., county commissioners and Extension committees	o Regular review of programs at County Extension meetings o One-on-one meetings with commissioners o Attendance of local partners at program	Regional Extension Directors Liaison to the Association of Minnesota	Written MOUs which align local positions to priorities. Written summary of County Extension Committee meetings

	showcases, Extension gatherings, etc.	Counties	Needs assessments
Current program participants	o Participant satisfaction surveys o Repeat interest in Extension programs	Regional educators and program leaders	Program business plans that include information about past participation and program adjustments
Targeted program audiences and constituents	o Getting acquainted meetings o Surveys and feedback forms at program showcase events	Regional Educators and Regional Directors	Program outreach materials that address key concerns of the target audience Program business plans that incorporate feedback into an outreach plan for the audience
Regional educators and campus staff	o Regular program meetings that design research-based programs	Area Program Leaders and Capacity Area Leaders	Program Business Plans Individual Work Plans
Legislators and Higher Ed Committee	o Personal Meetings and Committee Presentations	Dean Casey	Updates in Extension Weekly

C. Statement of how the collected input was considered.

Input from stakeholders guides program teams and capacity areas as they design program business plans that address stakeholder priorities. Stakeholder input is considered as we answer questions such as:

- Where will staff be placed?
- What fees will be charged, for which services, at what price points?
- How should research-based education be delivered? (Long-term consultation, workshop format, on-line course, assessment, one-on-one consultation, etc.)
- What other resources do stakeholders turn to? Do these intermediaries need research-based information? Are we duplicating a service? What is our program niche?
- What do stakeholders know about Extension programs? How do they hear about our services?
- Has our past service and research been satisfactory? How might it be changed?
- What new research should shift how we deliver programs?

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

As Extension has established program specialization, regional centers, and county purchase of services, stakeholder input is more integrated into our organizational design. The extent to which programs continue and how they evolve relies upon customer satisfaction, positive feedback, and investment from stakeholders.

Each program business plan and capacity area work plan includes input from external scans, stakeholder input, and secondary data that feed the strategic planning process. It will directly influence the use of resources and the direction of these programs.

III. Program Review Process Update

A. What is our process?

Since 2002, we have defined and refined our program review process to support priorities in each of our five capacity areas: (1) Agriculture, Food, and Environment; (2) Community Vitality; (3) Family Development; (4) Natural Resources and Environment; and (5) Youth Development.

Stage I (July 20 – August 8, 2002):
In stage I, we conducted ten comprehensive program audits of Extension's most prolifically disseminated programs. Through this process, we (1) created internal guides for program audits; (2) experimented with program finance incentives to encourage program evolution; (3) fine-tuned components for program business planning guides and program team development; and, (4) identified system-wide issues that could be addressed across capacity areas.

Stage II (September, 2002 – September, 2003):
Using elements of the program audit modeled in Stage I, capacity area leaders worked with specialists and educators to determine whether programs meet standards of relevance, niche, sustainability and research-based content. Subsequently, some programs were "sunsetted" or their content was folded into other programs. As a result of this process, the number of Extension programs was reduced from 208 programs in 2002 to 71 now. The final list of programs has been featured as outcome-driven programs available to counties as they establish priority concerns.

Also during this time, program support funds were granted by capacity areas to program leaders who made a case that program and research investments were needed. Internal grants focused on addressing concerns that arose from development of the program business plans, including new research, outreach material development, market surveys, curriculum development or staff development.

Stage III: (October 2004 – current):
As regional staff members were assigned to capacity areas, formal program teams were established and began the work of developing program business plans. Business plans are being reviewed in 2004 within capacity areas. External consultants have been identified to comment upon these plans.

From 2004-06, peer review of these program business plans within capacity areas will validate and align resources to needs identified by program teams.

B. Have there been any significant changes in it during 2002-2003?

The implementation of a program business plan development process is a significant change. In 2003, elements of "program business plan" thinking were infused into program development strategies. We expect to get formal written program business plans from fifty of the 71 programs by July 1, 2004, and we expect to get plans from every program over the coming year.

As noted previously, funding has been aligned to provide incentives for program improvements as internal audits revealed steps needed to improve program viability. Once business plans are fully integrated, we'll move incentives to evaluation plans and outcome analysis.

IV. Evaluation of the Success of Multi-State and Joint Activities

A. Did the planned programs address the critical issues of strategic importance, including those identified by the stakeholders?

The stakeholder input process implemented in 2002 was intended to insure that the programs that we deliver are addressing critical issues of strategic importance to our stakeholders, as well as being ones that utilize research-based information and do not duplicate programs offered by other organizations and agencies. In addition, the substantial amount of external financial support received for many programs also indicates that they are based on critical issues of major interest to stakeholders who sometimes provide or assist in the search for external funding.

B. Did the planned programs address the needs of under-served and under-represented populations in Minnesota?

We have a number of programs that are targeted specifically to minority groups and new immigrants--nutrition education, immigrant farmer training, urban youth programs, for example. We also track the involvement of under-served/under-represented groups in terms of numbers of persons participating in our programs. These statistics indicate that during 2002-03, nearly 17.8% of the people who participated in our programs were non-white. The current proportion of non-white persons in Minnesota's population (2000 Census) is 11.8%.

C. Did the planned programs describe the expected outcomes and impacts?

Yes they did but we need to do a better job of specifying indicators of expected outcomes and impacts at the state level and collecting evaluative data as evidence of them. We are planning to provide more staff development in program evaluation but these efforts were side-tracked in 2002-03 by the re-structuring of the program planning process and the establishment and staffing of our regional centers.

D. Did the planned programs result in improved program effectiveness and/or efficiency?

The new program planning process described earlier has enabled us to "sunset" some programs and combine other smaller but related efforts into more comprehensive programs. The substantial reduction in the total number of programs now offered has improved program efficiency and should also contribute substantially to their effectiveness.

E. Was research integrated in the Extension activities?

The University of Minnesota Extension Service and the Minnesota Agricultural Experiment Station have long had a close working relationship. Most campus-based faculty members in academic departments, especially those in the College of Agricultural, Food, and Environmental Sciences, have joint research-Extension appointments. Subject-matter staff development for Regional Extension Educators (REEs) typically includes updating on research activities and research faculty are members of capacity area teams that also include Extension specialists with joint appointments and REEs.

V. Multi-State Extension Activities (See Form CSREES-REPT 2/00)

We deliberately set our Multi-State Extension Activities target low because (1) we did not have FY97 data on which to base a target and more importantly (2) we are not sure that what we consider to be "Multi-State Extension Activities" meet your definition of such, in other words, are not being conducted with formal agreements in place with other states. Much of what is being done between or among states is collegial in nature, i.e., not documented by formal memoranda of agreement between institutions indicated as necessary proof for an audit.

Many of our campus-based faculty do work in other states or collaborate with their colleagues in other Extension Services. A good many of our Extension educators, especially those in "border" counties adjacent to Wisconsin, Iowa, North and South Dakota, and the Canadian Provinces of Manitoba and Ontario, work with their colleagues across borders, sharing information about programs, inviting each other and each other's clientele to programs, etc. But there is still the question of whether such sharing meets the legal definition in federal regulations and would be so considered in an audit of such activities.

Each year, we ask our staff to report any multi-state activities and which states were involved, so we do have some data on who is involved and what states are involved. But the problem remains that these arrangements are rarely documented, at least not to the extent that you have indicated is necessary to meet the definition of multi-state activities.

VI. Integrated Research and Extension Activities (See Form CSREES REPT 2/00)

We believe that most of our Extension programs do show evidence of the input of research information. We cannot show a research-Extension connection for all Extension programs because MAES does not conduct research on some of the issues on which we program—research is used where available, but from sources other than Hatch-funded research.

University of Minnesota Extension Service

2002-03 Federal Accomplishments and Results Report Financial Data

Sources of Funding and Staff Time Used

	Smith-Lever 3b&c	State	County	Grant/Contract	Hatch/MRF	Total	Staff FTEs
Goal 1 Themes:							
Ag. Comp. (J)	$51,818	$240,530	$40,129	$528,535	$316,951	$1,177,963	4.10
Man. Chg. In Ag. (E)	21,137	28,403	16,513	0	0	66,053	1.05
Plant Prod. Eff. (J)	65,055	656,388	50,824	267,288	49,004	$1,088,559	8.70
Risk Mgmt. (E)	21,867	265,961	3,303	13,200	0	$304,331	2.90
Total	$159,877	$1,191,282	$110,769	$809,023	$365,955	$2,636,906	16.75
Goal 2 Theme:							
Food Safety (J)	$20,550	$178,850	$16,054	$12,000	$40,300	$267,754	2.51
Goal 3 Theme:							
Human Health (J)	$46,756	$104,015	$14,839	$75,011	$74,630	$315,251	2.02
Goal 4 Themes:							
Ag. Waste Mgmt. (J)	$17,787	$106,697	$9,816	$30,230	$64,057	$228,587	1.53
Nat. Res. Mgmt. (E)	37,836	58,600	29,560	42,000	0	167,996	1.96
Water Quality (E)	33,056	192,485	25,825	19,600	0	270,966	3.62
Total	$88,679	$357,782	$65,201	$91,830	$64,057	$667,549	7.11
Goal 5 Themes:							
Com. Dev. (E)	$48,034	$61,320	$15,643	$86,650	0	$211,647	1.36
Lead. Tr. & Dev. (E)	52,647	70,744	41,130	227,538	0	392,059	2.59
Prom. Housing (E)	18,622	43,536	14,548	5,955	0	82,661	1.13
Tourism (E)	11,418	25,507	6,200	10,125	0	53,250	0.53
Total	$130,721	$201,107	$77,521	$330,268	0	$739,617	5.61
Grand Total	$446,583	$2,033,036	$284,384	$1,318,132	$544,942	$4,627,077	34.00

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GOAL 2 Theme						
Food Safety	40,300	20,550	178,850	16,054	12,000	2.51
GOAL 3 Theme						
Human Health	74,630	46,756	104,015	14,839	75,011	2.02
GOAL 4 Theme						
Ag Waste Mgmt	64,057	17,787	106,697	9,816	30,230	1.53
Total	$544,942	$201,966	$1,286,480	$131,662	$913,064	18.86

University of Minnesota Extension Service

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

Institution University of Minnesota
State Minnesota

Check one: ____ **Multistate Extension Activities**
____ **Integrated Activities (Hatch Act Funds)**
__X__ **Integrated Activities (Smith-Lever Act Funds)**

	Actual Expenditures				
Title of Planned Program/Activity	**FY 2000**	**FY 2001**	**FY 2002**	**FY 2003**	**FY 2004**
See Joint Themes Financial Data following	$930,761	$957,640	$929,456	$936,569	
Total	$930,761	$957,640	$929,456	$936,569	

Charles H. Casey — **Director**
3/31/04 — **Date**

Form CSREES-REPT (2/00)

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

Institution University of Minnesota
State Minnesota

Check one: X **Multistate Extension Activities**
____ **Integrated Activities (Hatch Act Funds)**
____ **Integrated Activities (Smith-Lever Act Funds)**

	Actual Expenditures				
Title of Planned Program/Activity	**FY 2000**	**FY 2001**	**FY 2002**	**FY 2003**	**FY 2004**
Goal 1, Program 5, Crop Production	$58,500	$336,571	--	--	
Program 8, Food Crops	93,267	--	--	--	
Goal 1, Agriculture, Food, & Environment			$92,946	$93,657	
Total	$151,767	$336,571	$92,946	$93,657	

Charles H. Casey — **Director**
3/31/04 — **Date**

Form CSREES-REPT (2/00)