Annual Report of Plan of Work

Wisconsin Agricultural Experiment Station

College of Agricultural and Life Sciences
University of Wisconsin, Madison

Federal Fiscal Year 2000
Research Activities

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Certification: Margaret Dentine, Executive Director, Wisconsin Agriculture Experiment Station

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Foreword

Choice of reporting

The Wisconsin Agricultural Experiment Station, as an 1862 Land Grant Institution, has chosen to file a report on research activities for the Plan of Work at the University of Wisconsin (UW). University of Wisconsin-Extension will be reporting in a separate document on extension activities. Institutions involved with research work include the University of Wisconsin-Madison (College of Agricultural and Life Sciences, School of Veterinary Medicine and School of Human Ecology) and the University of Wisconsin- Stevens Point. Programs included in this annual report of accomplishments are those funded by formula funds provided by Hatch Act, McIntire-Stennis Cooperative Forestry Research Program, and Animal Health and Disease Research Program.

Point of contact

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Additional sources of reporting

Reporting of project titles and objectives as well as human resources have been filed in the CRIS system at USDA by means of the AD-416 and AD-417s. Expenditure data and human resources have been filed with the USDA in the CRIS system by means of the AD-419s. Annual progress reports (including impacts) and final reports have been filed with the USDA-CRIS system using the AD-421s. Impact statements for FY00 have been filed by the Wisconsin Agricultural Experiment Station with the USDA-CSREES Impact database and are included here where appropriate.

Access to the CRIS system of reporting and search capabilities is available at
http://cris.csrees.usda.gov/

The original Plan of Work for Wisconsin's research activities was filed July 15, 1999 and is available in pdf format at

http://www.cals.wisc.edu/research/PlanofWork.pdf

Highlights of research, extension and education programs are available at the following websites or print copies have been included with this report

1998-1999 Science Report
http://www.cals.wisc.edu/media/news/98sci_rept/index.html

2000-2001 Science Report – included as Appendix A
Title: "At Work in Wisconsin"
Selected stories at
http://www.cals.wisc.edu/media/news/00_sci-rept/

CALS Quarterly, 4 issues from 1999-2000, included in Appendix A

News releases and stories:
http://www.cals.wisc.edu/media/news/

Background

Structure

The Director of the Experiment Station is Dean Elton Aberle of the College of Agricultural and Life Sciences (CALS) who has designated an Executive Director, Margaret Dentine (Associate Dean, Research Division, CALS) to be responsible for research operations. An Associate Director, Kevin McSweeney is responsible for the Mcintire-Stennis Program and other research involved in natural resources. The CALS Research Division is responsible for reviewing proposals, making funding decisions and administering grants in cooperation with the University of Wisconsin-Madison School of Veterinary Medicine, the University of Wisconsin-Madison School of Human Ecology and the University of Wisconsin-Stevens Point College of Natural Resources.

CALS is composed of 21 departments with a large number of intra-college and inter-college centers, institutes and programs. CALS' mission is to improve the quality of life by discovering, critically analyzing and sharing knowledge in food and agriculture, the life sciences, natural resources and environmental stewardship, and rural community development and to offer strong, research-based education that is responsive to public needs and social, economic and environmental concerns. Additional information on the organization and personnel of UW-CALS is available on the college website at

http://www.cals.wisc.edu/

Within the College of Agricultural and Life Sciences, the Research Advisory Committee, a faculty committee of 12 members appointed by the Associate Dean for Research with ex-officio members of the Assistant Dean for Research and the Director of the School of Natural Resources meets regularly to discuss research issues. This committee recommends research policy guiding distribution and use of formula funds and is the primary peer review committee for Hatch and McIntire-Stennis proposals. The committee recommends policies and procedures that have been implemented to distribute formula funds on a competitive process.

Operating Philosophy

The Wisconsin Experiment Station is committed to the concept of investigator-driven and peer-reviewed research activities. The general philosophy in allocating formula funds is to provide support for specific reviewed projects rather than to distribute block amounts to faculty or departments. At the University of Wisconsin, faculty appointments are funded with state appropriations thus releasing nearly all formula funding for project support. Expenditures are allowed under a series of guidelines annually reviewed by a faculty committee. Matching funds come primarily from state support of salaries for investigators and research staff.

Formula funds are distributed to approved projects with yearly budgets. Approximately 200 projects are funded with formula funds each year with budgets that include personnel (mainly graduate students) and supplies. Funding of capital equipment items, some of which may be shared by several projects, are prioritized by departments and funded in a separate exercise. Travel to multi-state research meetings is provided for the official representative from a central pool of funds.

Integrated Research and Extension

Extension has its own Chancellor and is a separate “campus” within the University of Wisconsin System. CALS faculty with Extension specialist appointments are housed at the Madison campus with an annual Extension transfer of funding for portions of their appointments. These faculty are fully integrated into CALS departmental teaching and research programs and can apply for research project support under the formula-funded competitions listed above. County-based Extension faculty members are participants in research teams, but are not principal investigators for projects supported by formula funds. Thus the funding of integrated research-extension efforts is accomplished largely through salary support of Extension faculty and project support from competitive awards of research formula funds. In the following tables, the indication of integrated research /extension activities is based on projects where one or more of the principal investigators has an official extension appointment.

Multistate Research

We have adopted by reference the national Coordinated Multi-state Research Framework for fulfillment of our obligations to the AREERA's multistate and multidisciplinary activities. More details are available on the WWW at

http://www.agnr.umd.edu/users/NERA/workshop/RPAFramework.html

Reporting of Station accomplishments and impacts from multi-state projects are included in federal filing of the SAES-422 reports on these projects available on the CRIS system. Listing of states cooperating on these projects have already been filed with USDA Partnership office following the peer and merit review and approval by the Regional Directors multistate committees. In the following listings under the Goal headings, these projects are designated as multi-state and their regional project designations are given. Financial statements of expenditures are directly from the Wisconsin station reports filed as AD-419s.

Program Evolution

Programs in the Wisconsin Research Plan of Work were composed of a number of projects with individual review and reporting. Program duration may be extended for multiple years, but the contributing projects are a constantly shifting portfolio that can be quickly redirected. Projects have been approved for periods of one to five years with the majority on a four-year cycle. Proposals for new projects require a discussion of the results from previous formula fund support which is used as part of the criteria for ranking proposals and for evaluating the ability of the team to complete the research project successfully. Although some multi-state projects have been continuing for more than 10 years, revised proposals are required for review and approval at least every 5 years. Each year, approximately 25 percent of the research portfolio is shifted in new directions.

This process of continual re-examination of our portfolio allows us to address short-term, intermediate term and long-term issues. A small number of approved projects may be started at mid-year as new faculty members are hired or emerging problems trigger an early start at the discretion of the Associate Dean for Research. These processes ensure that projects are pertinent to the CSREES national goals and focus on current state research needs. In the project listing under the goals, projects that have been added to the portfolio are marked with an asterisk (*) and printed in bold to highlight the new additions since filing of the Plan of Work. Projects that have been completed are no longer listed.

Research Activity in Support of National Goals and Themes

The five sections that follow relate a portion of the Wisconsin Agricultural Experiment Station research effort to the five national goals established by the U.S. Department of Agriculture for the national planning and reporting process. Between 500 and 600 research projects are underway in the College during the course of a year, ranging from the most basic of scientific studies to those that are highly applied. The report that follow concentrates on those studies that are done as part of formula funded research (Hatch, McIntire-Stennis, and Animal Health). Most of these studies are of a more applied nature, and are significant sources of new science-based information for Wisconsin Cooperative Extension programs. Of the $80 million in expenditures made through the College's research division, these formula funded research projects represent about $5 million of the total.

In using the nationally devised goals and themes as the reporting framework, it also should be noted that research projects frequently do not fit neatly and exclusively into one and only one category. In many (perhaps most) instances, a research project relates to multiple goals and themes. Because of this difficulty, the assigning of a project to a particular goal is somewhat artificial. Research projects, like the agricultural, natural resource and community issues they address, are frequently at the intersecting points of disciplines and interests. We view this interdisciplinary nature of our research efforts as a strength.

Of the studies selecting for reporting in this document, the largest portion (123) relate to the goal of "An agricultural system that is highly competitive in the global economy." This included 26 projects that were multi-state interdisciplinary projects and 27 that were integrated research/extension projects. The concentration of projects in this goal area is expected for two reasons –1) the nature of the research funding sources being reported are directed toward such problem areas, and 2) the state's agricultural economy is large (between $5 billion and $6 billion cash farm receipts a year, with total economic impact near $20 billion a year) and dependent on new research knowledge to keep it competitive not only with international traders but with other regions of the United States producing similar food and fiber commodities. Among the research titles presented in this section are a broad array of studies that address the extreme breadth of Wisconsin agriculture. We have a highly diverse livestock and plant agriculture that stresses limited research resources to the limit.

The second largest number of research projects is reported under the goal of "Greater harmony between agriculture and the environment." There are 42 project reported here, with six of them being multi-state, interdisciplinary studies, and 11 integrated research/extension projects. Producing agricultural commodities in ways that are sustainable and protective of the natural resource base and the broader environment is one of the largest challenges facing Wisconsin farmers. The state's cash farm receipts derive overwhelmingly from livestock enterprises, with dairying being by far the most important. Managing livestock wastes and cycling them safely and productively through the various cropping systems is the most urgent challenge. Non-point pollution regulations are crowding in from both the state and federal levels. A large number of

studies in this reporting section relate to the handling of waste streams from livestock and other state industries. Beyond the waste stream challenge are many other environmental challenges relating to proper use of chemical fertilizers and reduced pesticide use. Because Wisconsin has a huge tourist industry that relies heavily upon quality land, water, air, landscapes, and fish and wildlife populations, the impacts of environmental protection through proper agricultural production practices go well beyond agriculture.

Under the goal of "Enhanced economic opportunity and quality of life for American" there are a total of 23 projects reported – the third largest number under a goal heading. Six of these were multi-state, interdisciplinary projects, and four were integrated research/extension projects. Although most of these studies are reported under Objectives 5.1 (increasing capacity of communities and families to enhance their own economic well-being) and 5.2 (increasing capacity of communities, families and individuals to improve their own quality of life) a project not assigned to a particular objective heading is noteworthy. This project is a north central regional project that looks at agricultural research funding trends and impacts of those trends on agenda. One of its major conclusions is that as public sources of research funding (particularly in the agricultural sector) experience no real growth or declines in terms of inflation corrected buying power, researchers turn increasingly to non-governmental (industry and other private sources) funding.

Under the goal of "A healthy, well-nourished population" are reported 11 projects, and under the goal of "A safe and secure food and fiber system" are reported 5 projects. If this report covered College research projects beyond those funded with formula research funds, there would be a much larger number of projects with relevance to human nutrition. About half of the federal competitive grant funding coming to the College is provided by the National Institutes of Health, and a large portion of those studies relate to human nutrition and health. The food safety issue is also of great importance to the College in spite of the small number of research projects reported here. Much of the food safety research is funded through the College's Food Research Institute, and nearly all of the Institute's funding derives from private sources. Again, because this report concentrates on formula funding sources, this privately funded research effort is not captured here.

Finally, this report does not attempt to sort all of the research activity into key reporting themes. Instead, examples of research impacts are offered, and relevant themes addressed by the examples are listed.

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

Executive summary

Under this goal, there were 123 projects including 26 that were multistate interdisciplinary projects, 8 were McIntire-Stennis projects, 6 were Animal Health projects and 27 were integrated research/extension projects. Although the largest number of projects under the goals are classified as Goal 1, many of these projects address other goals as well. For instance, a newly added project, WIS04344, "Environmental and economic impacts of nutrient management on dairy forage systems", will be looking at the interface of agriculture and the environment and will also address Goal 4. New requirements for nutrient management plans lends urgency to research in this area.

Wisconsin is committed to continually changing its portfolio of research. Nine new projects have been added in areas of turfgrass genetics, cranberry/insect interactions, management of dairy cows, reproductive techniques for livestock, dairy forage systems, plant genetic structure, poultry product quality issues, plant fiber for human nutrition, and fermented milk products. Meetings with our stakeholders have emphasized the needs of the green industry, alternatives to dairy expansion, problems for meat processors, nutritional aspects of foods and economic analysis for alternatives in agriculture. Newly added projects indicate that faculty are responding to stakeholder needs.

Updated project list for FY00

New projects are marked with an asterisk (*) and printed in **bold**. Note that recent reclassification of projects has moved some projects into goals different from those previously listed in the Plan of Work. Some projects address several goals but are listed in only one.

1: An Agriculture Production System that is Highly Competitive in the Global Economy								
	Objective 1.1: To produce new and value-added agricultural products and commodities							
VIS01599	Hartel, R. W.	IMPROVEMENT OF THERMAL PROCESSES FOR FOODS (NC-136)	**X**	**X**				
VIS02756	Smith, R. R.	FORAGE CROP GENETICS AND BREEDING TO IMPROVE YIELD AND QUALITY (NE-144)	**X**	**X**				
VIS03843	Roper, T. R.	MULTIDISCIPLINARY EVALUATION OF NEW APPLE CULTIVARS (NE-183)	**X**	**X**			**X**	
VIS03932	Damodaran, S.	ELUCIDATION OF MOLECULAR FACTORS AFFECTING EMULSIFYING PROPERTIES OF FOOD PROTEINS	**X**					
VIS04020	Casler, M. D.	CELL WALL CONCENTRATION AND COMPOSITION IN REGULATING BROMEGRASS NUTRITIONAL VALUE AND FUNGAL DISEASE	**X**					
VIS04032	Parkin, K. L.	LIPID MODIFICATRION MEDIATED BY POTATO LIPOLYTIC ACYL HYDROLASE (PATATIN)	**X**					
VIS04033	Steele, J. L.	TYRAMINE ACCUMULATION IN CHEDDAR CHEESE: MECHANISM OF CONTROL	**X**					
VIS04034	Wendorff, W. L.	DEVELOPMENT OF THE PROCESS TECHNOLOGY FOR IMPROVED SHEEP MILK PRODUCTS	**X**				**X**	
VIS04165	Young, R. A.	ENHANCED UTILIZATION OF WOOD FIBERS AND POLYMERS THROUGH PLASMA MODIFICATION			**X**			
VIS04178	Osborn, T.	ALFALFA POPULATION IMPROVEMENT USING NOVEL GERM PLASMA	**X**					
VIS04291	Gunasekaran, S.	RHEOLOGIC AND THERMAL PROPERTIES OF MIXED BIPOLYMERS GEL SYSTEMS	**X**					

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch	Hatch Multistate	McIntire/ Stennis	Animal Health	Integrated research/ extension	Tota Formul Fund
S04239*	**Claus, J. R.**	**INHIBITION OF THE PINK DEFECT IN COOKED, UNCURED POULTRY PRODUCTS**	**X**					
S04363*	**Lucey, J. A.**	**INVESTIGATION INTO IMPROVING THE TEXTURE AND FUNCTIONALITY OF FERMENTED MILK PRODUCTS**	**X**					
S04394*	**Plhak, L. C.**	**IMMUNOCHEMICAL APPROACH FOR THE STUDY OF PLANT LIGNANS**	**X**					
		Total:	**$241,371**	**$25,277**	**$22,924**	**$0**	**$20,602**	**$289,57**
	Objective 1.2: To increase the global competitiveness of the U. S. Agricultural production system							
VIS00726	Bitgood, J. J.	ADVANCED TECHNOLOGIES FOR THE GENETIC IMPROVEMENT OF POULTRY (NC-168)	**X**	**X**				
VIS01892	Palmer, R. W.	MANAGEMENT SYSTEMS FOR IMPROVED DECISION MAKING AND PROFITABILITY OF DAIRY HERDS (NC-119)	**X**	**X**			**X**	
VIS02229	Greaser, M. L.	MOLECULAR MECHANISMS REGULATING SKELETAL MUSCLE GROWTH AND DIFFERENTIATION (NC-131)	**X**	**X**				
VIS02363	Wiltbank, M. C.	METHODS TO INCREASE REPRODUCTIVE EFFICIENCY IN CATTLE (NC-113)	**X**	**X**				
VIS02366	Roper, T. R.	ROOTSTOCK AND INTERSTEM EFFECTS ON POME AND STONE	**X**	**X**			**X**	

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		FRUIT TREES (NC-140)						
VIS03094	Czuprynski, C. J.	BOVINE RESPIRATORY DISEASE: RISK FACTORS, PATHOGENS, DIAGNOSIS AND MANAGEMENT (NC-107)	X	X				
VIS03113	Tracy, W. F.	PLANT GERMPLASM AND INFORMATION MANAGEMENT AND UTILIZATION (NC-7)	X	X				
VIS03170	Armentano, L. E.	METABOLIC RELATIONSHIPS IN SUPPLY OF NUTRIENTS FOR LACTATING COWS (NC-185)	X	X			X	
VIS03204	Duke, S. H.	REGULATION OF PHOTOSYNTHETIC PROCESSES (NC-142)	X	X			X	
VIS03270	Albrecht, K. A.	FORAGE PROTEIN CHARACTERIZATION AND UTILIZATION FOR CATTLE (NC-189)	X	X				
VIS03442	Stoltenberg, D. E.	BIOLOGICAL AND ECOLOGICAL BASIS FOR WEED MANAGEMENT DECISION SUPPORT SYSTEMS TO REDUCE HERBICIDE USE (NC-202)	X	X				
VIS03455	Wedberg, J. L.	ECOLOGY AND MANAGEMENT OF EUROPEAN CORN BORER AND OTHER STALK-BORING LEPIDOPTERA (NC-205)	X	X			X	
VIS03648	Dentine, M. R.	GENETIC IMPROVEMENT OF CATTLE USING MOLECULAR GENETIC INFORMATION (NC-209)	X	X				
VIS03717	Palta, J. P.	FREEZE DAMAGE AND PROTECTION OF FRUIT AND NUT	X	X				

Wisconsin roject No.	Principal Investigator	Title of Project	Hatch	Hatch Multistate	McIntire/ Stennis	Animal Health	Integrated research/ extension	Tota Formul Fund
		CROPS (W-130)						
VIS03861	Stimart, D. P.	GENETIC & PHYSIOLOGICAL ANALYSIS OF POSTHARVEST CUT FLOWER LONGEVITY	X					
VIS03897	Maxwell, D. P.; Nienhuis, J.	GENETIC IMPROVEMENT OF BEANS (PHASEOLUS VULGARIS L.) FOR YIELD, DISEASE RESISTANCE AND FOOD VALUE (W-150)	X	X				
VIS03911	Bamberg, J. B.; Spooner, D. M.; Simon, P.	INTRODUCTION, PRESERVATION, CLASSIFICATION, DISTRIBUTION AND EVALUATION OF SOLANUM SPECIES (NRSP-6)	X	X				
VIS03919	Kaeppler, S.	MOLECULAR, GENETIC AND AGRONOMIC ANALYSIS OF SEED SIZE IN MAIZE	X					
VIS03920	Kaeppler, H. F.	INCORPORATION OF RUST RESISTANCE GENES INTO OAT (AVENA SATIVA L.) VIA GENETIC TECHNIQUES	X					
VIS03921	McManus, P. S.	BIOLOGICAL CONTROL OF MONILINIA OXYCOCCI, CAUSAL AGENT OF COTTONBALL DISEASE OF CRANBERRY	X				X	
VIS03927	Barclay, S. L.	CELL SURFACE ANTIGENS OF CRYPTOSPORDIUM THAT ARE ESSENTIAL FOR ESTABLISHING INFECTION	X					
VIS03928	Grummer, R.	THE ROLE OF MICROSOMAL TRIGLYCERIDE TRANSFER PROTEIN IN THE ETIOLOGY OF	X					

Wisconsin roject No.	Principal Investigator	Title of Project	Hatch	Hatch Multistate	McIntire/ Stennis	Animal Health	Integrated research/ extension	Tota Formul Fund
		FATTY LIVER IN DAIRY CATTLE						
VIS03930	Jeanne, R. L.	AN ANALYSIS OF ATTRACTION TO FOODS BY THE GERMAN YELLOWJACKET	X					
VIS03933	Barton, M. K.	MOLECULAR GENETIC ANALYSIS OF GROWTH CONTROL IN THE SHOOT APICAL MERISTEM OF ARABIDOPSIS THALIANA	X					
VIS03934	Binning, L. K.	SHADING EFFECTS OF VEGETABLE CROPS ON COMMON ANNUAL WEEDS	X				X	
VIS03935	Jiang, J.	MOLECULAR CYTOGENETIC ANALYSIS OF THE POTATO GENOME	X					
VIS03936	Vierstra, R. D.	IDENTIFICATION OF FACTORS RESPONSIBLE FOR SELECTIVE PROTEIN DEGRADATION IN PLANTS	X					
VIS03937	Yandell, B. S.	MARKOV CHAIN MONTE CARLO (MCMC) INFERENCE FOR MULTIPLE QTLS IN PLANT AND ANIMAL GENOMES	X					
VIS03938	Stanosz, G. R.	MANNER OF PERSISTENCE AND RELEASE FROM LATENCY OF AN AGGRESSIVE CONIFER PATHOGEN	X					
VIS03939	Rouse, D. I.	IMPACT OF ALFALFA MOSAIC VIRUS ON ALFALFA PERSISTENCE	X					
VIS03948	Letchworth, G. J.	CYTOKINES REQUIRED FOR SWITCH RECOMBINATION OF IGA IN THE BOVINE MUCOSAL IMMUNE RESPONSE	X					

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch	Hatch Multistate	McIntire/ Stennis	Animal Health	Integrated research/ extension	Tota Formul Fund
WIS03949	Palmenberg, A. C.	CARDIOVIRUS-INDUCED ANTIGENIC RESPONSES AS REPLICATION INDICATORS FOR LIVE, ATTENUATED VACCINES	X					
WIS03987	Darien, B. J.; Backstrom, L.	PRIMING AND CHANGE IN RESPIRATORY TRACT OF PIGS AFTER EXPOSURE TO DUST, ENDOTOXIN AND B-1,3-GLUCAN				X		
WIS03995	Andrews, J. H.	ADHESION OF YEASTS TO LEAF SURFACES	X					
WIS04018	Oplinger, E. S.	IMPROVEMENT OF SOYBEAN PRODUCTION EFFICIENCY IN A REDUCED-TILLAGE ENVIRONMENT	X				X	
WIS04019	Coors, J. G.	GENETIC EFFECTS IN SELECTED MAIZE POPULATIONS	X					
WIS04021	Kirkpatrick, B. W.	BOVINE-HUMAN COMPARATIVE MAPPING THROUGH RADIATION HYBRID MAPPING	X					
WIS04022	Landick, R. C.	RECOGNITION OF PAUSE AND TERMINATION SIGNALS BY DIVERSE BACTERIAL RNA POLYMERASES	X					
WIS04023	Chambliss, G. H.	MICROBIAL DEGRADATION OF NITROGLYCERIN	X					
WIS04025	Nibert, M. L.	HOW DO MAMMALIAN REOVIRUSES SELECTIVELY PACKAGE AND REPLICATE THEIR 10 RNA GEONOME SEGMENTS.	X					
WIS04027	Hoffman, P. C.	THE EFFECT OF FORAGE SPECIES	X				X	

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		ON MILK PROTEIN PRODUCTION IN LACTATING DAIRY COWS						
WIS04028	Shaver, R. D.	INFLUENCE OF THE PHYSICAL FORM OF CORN SILAGE ON UTILIZATION BY LACTATING DAIRY COWS	X				X	
WIS04035	Connell, T. R.	DEVELOPMENT OF BIOLOGICALLY BASED SITE-SPECIFIC MANAGEMENT SYSTEMS FOR VEGETABLE CROP PRODUCTION	X				X	
WIS04036	Goldman, I. L.	ONION PHYTOPHARMACEUTICAL ACTIVITY: GENETIC CONTROL, AND TEMPORAL MORPHOLOGICAL DISTRIBUTION	X					
WIS04037	Allen, C.	DEVELOPING POTATO SOMATIC HYBRIDS RESISTANT TO BROWN ROT CAUSED BY PSEUDOMONAS SOLANACEARUM	X					
WIS04038	Handelsman, J.	RESISTANCE TO ZWITTERMICIN A	X					
WIS04045	Bockheim, J. G.	SOIL ACIDIFICATION, BASE-CATION CYCLING, AND SUSTAINABILITY OF NORTHERN MESIC FOREST ECOSYSTEMS	X					
WIS04052	Gower, S. T.; Mackay, D. S.	COUPLING FOREST ECOSYSTEM MODELS TO GROUNDWATER MODELS:GUIDE TO NATURAL RESOURCE MANAGEMENT IN WISCONSIN			X			
WIS04056	Young, D.	A COMPREHENSIVE STUDY OF THE SCARABAEOID BEETLES OF	X					

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch	Hatch Multistate	McIntire/ Stennis	Animal Health	Integrated research/ extension	Tota Formul Fund
		WISCONSIN (COLEOPTERA: SOARABAEOIDEA)						
VIS04130	Shook, G. E.; Weigel, K. A.	GENETIC ENHANCEMENT OF HEALTH AND SURVIVAL FOR DAIRY CATTLE (S-284)	X	X				
VIS04167	Lorimer, C.	MANAGEMENT OF EASTERN HEMLOCK FORESTS BY SINGLE TREE AND GROUP SELECTION METHODS			X			
VIS04169	Bockheim, J.; David, C.	TIMBER HARVEST IN A SOIL COMPACTION AND ASPEN GROWTH IN THE UPPER GREAT LAKES REGION			X			
VIS04171	Czuprynski, C. J.	INVESTIGATION OF GROWTH HORMONE AND PROLACTIN ON THE INTRACELLULAR MULTIPLICATION OF MYCOBACTERIUM				X		
VIS04177	Lauer, J.	IMPROVEMENT OF SILAGE YIELD AND QUALITY IN WISCONSIN CORN PRODUCTION SYSTEMS	X				X	
VIS04179	Doll, J.	WIRESTEM MUHLY BIOLOGY AND COMPETITION	X				X	
VIS04180	Gianola, D.	BAYESIAN ANALYSIS OF LONGITUDINAL MODELS FOR PRODUCTION, DISEASE AND PROLIFICACY DATA IN ANIMAL BREEDING	X					
VIS04181	Wentworth, B.	REPRODUCTIVE EFFICIENCY OF TURKEYS (S-285)	X	X			X	

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch	Hatch Multistate	McIntire/ Stennis	Animal Health	Integrated research/ extension	Tota Formul Fund
WIS04183	Gourse, R.	PROMOTER IDENTIFICATION AND CHARACTERIZATION IN DIVERSE BACTERIA	X					
WIS04184	Reznikoff, W.	C-TERMINAL ANALYSIS OF TRANSPOSON TN5 TRANSPOSASE	X					
WIS04185	Amasino, R.	MODIFICATION OF FLOWERING TIME IN HIGHER PLANTS	X					
WIS04186	Sheffield, L.	CELL SIGNALING IN MAMMARY GLAND DEVELOPMENT	X					
WIS04187	Goodman, W. G.	MOLECULAR REGULATION OF HEMOLYMPH JUVENILE HORMONE BINDING PROTEIN EXPRESSION	X					
WIS04189	Kermicle, J.	GENE ACTION IMPRINTING IN CORN	X					
WIS04190	Stier, J.	MECHANISMS OF COLD TOLERANCE IN TURFGRASSES	X				X	
WIS04222	Fricke, P.	IMPROVING REPRODUCTIVE EFFICIENCY IN GRAZING-BASED DAIRY SYSTEMS	X				X	
WIS04237	First, N. L.	CELLULAR & GENOMIC REPROGRAMMING OF VARIOUS CELL TYPES OF BOVINE BY DIFFERENT METHODS OF NUCLEAR TRANSFER	X					
WIS04241	Benevenga, N.	QUANTITATIVE ASPECTS OF LYSINE METABOLISM IN THE PIG	X					
WIS04244	Grau, C. R.	ENDOPHYTIC MICROORGANISMS AND LATENT PATHOGENS AS POSSIBLE AGENTS MODIFYING	X				X	

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		SOYBEAN HEALTH AND PRODUCTIVITY						
VIS04290	Bohnhoff, D. R.	LOAD DISTRIBUTION IN METAL-CLAD WOOD-FRAME DIAPHRAGMS	X					
VIS04292	Shinners, K. J.	INTEGRATION OF HAY AND FORAGE EQUIPMENT INTO SITE SPECIFIC FARMING SYSTEMS	X					
VIS04293	Bavister, B. D.	MAINTENANCE OF MEIOTIC ARREST IN CATTLE OCOCYTES BY PHYSIOLOGICAL MECHANISMS	X					
VIS04294	Splitter, G.	BRUCELLA GENES INDUCED OR SUPPRESSED WITH INTRACELLULAR INVASION	X					
VIS04297	Boerboom, C. M.	VARIABLES INFLUENCING WEED INTERFERENCE ON CORN AND SOYBEAN YIELD	X				X	
VIS04298	Stoltenberg, D. E.	ECOPHYSIOLOGICAL CHARACTERIZATION AND MODELLING OF WEED-CROP COMMUNITIES	X					
VIS04299	Tracy, W. F.	RUST RESISTANCE IN SWEET CORN: VEGETATIVE PHASE CHANGE AND SOURCES OF RESISTANCE (NE-124)	X	X				
VIS04301	Parrish, J.	EFFECT OF SCROTAL INSULATION ON THE ABILITY OF BOVINE SPERM TO PENETRATE AND ACTIVATE OCCYTES, AND SUPPORT EMBRYO DEVELOPMENT	X					

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch	Hatch Multistate	McIntire/ Stennis	Animal Health	Integrated research/ extension	Tota Formul Fund
VIS04302	Thomas, D. L.	COMPARISON OF EAST FRIESIAN AND LACAUNE DAIRY SHEEP	X				X	
VIS04303	Downs, D. M.	THE ROLE OF YgfF IN THE METABOLISM OF SALMONELLA TYPHIMURIUM	X					
VIS04305	Clagett-Dame, M.	VITAMIN A AND SYMPATHETIC NEURONAL DEVELOPMENT	X					
VIS04308	Culbertson, M. R.	ROLE OF mRNA DECAY IN GENE EXPRESSION	X					
VIS04309	Laughon, A. S.	CIS-ELEMENT SELECTION: A TOOL FOR FUNCTIONAL GENOMICS	X					
VIS04310	Masson, P. H.	CHARACTERIZATION OF AN ARABIDOPSIS THALIANA GENE INVOLVED IN ROOT AND SHOOT MORPHOGENESIS	X					
VIS04311	Nienhuis, J.	CHARACTERIZATION AND UTILIZATION OF GENETIC RESOURCES IN PHASEOLUS VULGARIS	X					
VIS04312	Susman, M.R.	GENETIC MANIPULATION OF PLASMA MEMBRANE PROTEINS INVOLVED IN MINERAL TRANSPORT	X					
VIS04313	Czuprynski, C. J.	BHV-1 ENHANCEMENT OF CD11A/CD18 EXPRESSION; A POTENTIAL NEW MODEL FOR INCREASED SUSCEPTABILITY TO BOVINE PASTEURELLOSIS				X		
VIS04314	Lunn. D. P.	REGULATION OF EQUINE IMMUNE				X		

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch	Hatch Multistate	McIntire/ Stennis	Animal Health	Integrated research/ extension	Tota Formul Fund
		RESPONSES TO VIRAL RESPIRATORY INFECTION						
VIS04316	German, T. L.	EXPLOITING THE SPECIFICITY OF TOSPOVIRUS-THRIPS INTERACTIONS TO CONTROL VIRUS DISEASE AND INSECT DAMAGE	X					
VIS04318	MacGuidwin, A. E.	POPULATION ATTRITION OF THE SOYBEAN CYST NEMATODE IN THE ABSENCE OF A HOST (NC-215)	X	X				
VIS04319	Nibert, M. L.	RECOATING REOVIRUS AND BLUETONGUE VIRUS PARTICLES W/BACULOVIRUS-EXPRESSED VIRAL PROTEINS				X		
VIS04320	Splitter, G.	BOVINE HERPESVIRUS-1 TEGUMENT PROTEINS				X		
VIS04322	Karasov, W. H.	HYDROPHILIC TOXIN ABSORPTION BY MAMMALS AND ITS MODULATION	X					
VIS04323	Thomas, C.; Houghton, J.	ASSESSING THE EDUCATIONAL NEEDS OF WOMEN WHO OWN NON-INDUSTRIAL PRIVATE FOREST LAND IN WISCONSIN			X			
VIS04324	Rogers, R.; David C.; Harms, J.	FEASIBILITY OF USING A NEW TYPE OF BIODEGRADABLE CONTAINER FOR FOREST SEEDLING PRODUCTION			X			
VIS04325	Haney, A.	EVALUATION OF OAK SAVANNA RESPONSES TO RESTORATION AT SIX SITES IN WISCONSIN			X			
VIS05168	Albrecht, K.	INTEGRATED CROP, SOIL, AND	X	X				

Wisconsin roject No.	Principal Investigator	Title of Project	Hatch	Hatch Multistate	McIntire/ Stennis	Animal Health	Integrated research/ extension	Tota Formul Fund
	Schaefer, D.	ANIMAL MANAGEMENT SYSTEMS FOR UPPER MIDWEST UNGLACIATED SOILS (NC-157)						
VIS05218	Casler, M.; Stier, J.	SELECTION AND PRODUCTION OF TURFGRASS GERMPLASM FOR RESISTANCE TO SNOW MOLD	X				X	
VIS05220	Sheffield, L.; Armentano, L.	LEPTIN AND FEED INTAKE IN DAIRY CATTLE	X				X	
VIS05221	Powell, J.; Kelling, K.	MEASUREMENT OF PHOSPHORUS & NITROGEN AVAILABILITY FROM REPEATED MANURE APPLICATION	X				X	
VIS05222	Straub, R.	ADOPTION OF ALFALFA BIOFARMING TO ENHANCE RURAL ECONOMIC DEVELOPMENT	X				X	
VIS05223	Shook, G.E.; Collins, M. T.	GENETIC RESISTANCE TO PARATUBERCULOSIS IN DAIRY CATTLE	X					
VIS05229	Stanosz, G. R.; Kruger, E. L.	PLANT AND PATHOGEN INFLUENCES ON VARIATION IN SHADE TOLERANCE AMONG SPECIES IN NORTHERN HARDWOOD FORESTS			X			
S04279*	**Doebley, J.**	**MOLECULAR-GENETICS OF PLANT ARCHITECTURE IN MAIZE**	X					
S04344*	**Combs, D.**	**ENVIRONMENTAL AND ECONOMIC IMPACTS OF NUTRIENT MANAGEMENT ON DAIRY FORAGE SYSTEMS (NE-132)**	X	X				
S04361*	**Rutledge, J. J.**	**GERM CELL AND EMBRYO**	X	X				

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch	Hatch Multistate	McIntire/ Stennis	Animal Health	Integrated research/ extension	Tota Formul Fund
		DEVELOPMENT AND MANIPULATION FOR THE IMPROVEMENT OF LIVESTOCK (W-171)						
S04384*	**Ruegg, P. L.**	**BEHAVIORAL AND HEALTH EFFECTS OF TAIL DOCKING IN DAIRY COWS**	**X**				**X**	
S04400*	**Silbernagel, J. M.**	**PLANT-POLLINATOR LANDSCAPES: BUMBLEBEE FORAGING PATTERNS WITHIN SPATIALLY-HETEROGENEOUS NATURAL BOGS AND CULTIVATED CRANBERRY BOGS**	**X**					
S04406*	**Jung, G.**	**FINGERPRINTING OF CREEPING AND COLONIAL BENTGRASS CULTIVARS USING SCAR MARKERS**	**X**					
		Total:	**$2,259,907**	**$620,613**	**$257,242**	**$147,497**	**$828,138**	**$3,285,25**
	Objective 1.4: To improve decision-making on public policy related to productivity and global competitiveness of the U. S. agricultura production system							
VIS04176	Dobson, W.	AN ANALYSIS OF STRATEGIES FOR EXPANDING U.S. DAIRY EXPORTS	**X**				**X**	
VIS04288	Chavas, J. P.	A DYNAMIC ANALYSIS OF ASSET PRICES IN AGRICULTURE	**X**					
		Total:	**$46,923**	**$0**	**$0**	**$0**	**$23,917**	**$46,92**
		Total Goal 1:	**$2,548,201**	**$645,890**	**$280,166**	**$147,497**	**$872,657**	**$3,621,75**

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch	Hatch Multistate	McIntire/ Stennis	Animal Health	Integrated research/ extension	Tota Formul Fund

Impact Statements and Selected Results

Publications in refereed journals, books and extension bulletins have been reported on projects using the AD-421 annual reports in the CRIS system. A number of projects have are reported as impacts on agriculture or natural resources. Some of the projects had funding from Hatch, McIntire-Stennis and Animal Health; others were funded from competitive federal programs and industry gifts and grants. Outputs described in the original Plan of Work are illustrated by example from the past year in the following projects.

Scientists mine DNA in soil for antibiotics, other useful compounds.

Key themes: Biobased product, Plant health

The issue: Micro-organisms produce a vast array of chemicals that have found uses on the farm, in medicine and in industry. For example, soil microbes are one of our most important sources of antibiotics. Soil microbes also are the source of pesticides, immunosuppressants and compounds that inhibit tumor growth. Researchers might be able to discover a great many more useful compounds from bacteria and fungi but they have not been able to culture the vast majority of nature's microbes in the laboratory.

What's been done: Plant pathologists from the UW-Madison and a chemist from Cornell have developed methods to isolate the genetic instructions that microbes use to produce chemicals without having to culture the microbes themselves. Using the method, the scientists transfer those genetic instructions to other microbes that they can culture; those microbes then produce the new chemicals. Using the new method, the researchers have begun to make libraries of genetic information from yet-unknown soil microbes. The compounds can then be screened to determine if they are useful. Initial results suggest that the researchers may be homing in on a new antibiotic.

The impact: The relatively few soil microbes that can be grown in the laboratory have already yielded a host of helpful products. The researchers believe the technique may also be used to produce novel chemicals from microbes from lakes, oceans and those microbes associated with plants and animals.

Funding –- The National Institutes of Health, the UW-Madison University-Industry Research Fund, Ariad Pharmaceuticals, the David and Lucille Packard Foundation, and the McKinght Foundation

Additional information: A Hatch-funded project , #4038, “Resistance to Zwittermicin A”, addresses resistance genes to an antibiotic that is produced by one of these soil microbes, *Bacillus cereus.* A patent has been filed on the method of developing genomic libraries described above. This area of plant-microbe interactions holds promise for using biological controls for plant diseases.

WARF patent # P99322US, Method For Producing Genomic Libraries And Genomic Libraries Produced Therewith

Discovery may help farmers and consumers who want corn without genes from genetically altered varieties.

Key themes: Organic agriculture, Managing change in agriculture, Plant genomics

The issue: Some consumers and countries want to buy corn that does not contain non-corn genes. However, farmers who want to grow corn destined for those markets have difficulty ensuring that their corn does not contain genes from genetically engineered corn. In 2000 approximately 30 percent of U.S. corn acreage was planted to varieties that were altered to contain genes not native to corn. All current hybrid corn varieties readily cross-fertilize and wind can spread corn pollen for several hundred feet. Therefore, when farmers plant corn that has not been genetically engineered it may be pollinated by genetically altered hybrids in an adjoining field; therefore, the crop may contain genes from genetically altered varieties when it is harvested.
What's been done: A UW-Madison corn geneticist has discovered a genetic barrier in teosinte, a Mexican relative of corn. The barrier is encoded in a cluster of genes. The gene cluster allows teosinte to retain its genetic identity by keeping it from acquiring genes from cultivated corn. The gene-barrier technology is the subject of a provisional patent application by the Wisconsin Alumni Research Foundation and is being licensed to a number of companies. The genetic barrier is being transferred to hybrid corn using traditional breeding methods. Seed should be available for testing in 2002 and commercial quantities of seed may be available to farmers in 2003.
The impact: Commercially available hybrid corn with the barrier would allow farmers to grow corn that would not become cross-pollinated with genetically engineered corn. Farmers who grow such hybrid corn could compete effectively in markets that exclude genetically engineered grain.

Funding –- USDA Hatch project #3774. "Cross incompatibility genes in *Zea"*. This project ended in 1998, but a subsequent project , #4189, "Gene action imprinting in corn", is currently active. This subsequent project looks at the action of genes that differ depending on the parent of origin. This information will be important in the development of hybrid varieties and the identification of economically superior crosses.

Study identifies the genes that control flowering.

Key themes: Plant genomics, Plant production efficiency

The issue: Unlike annual crops -- such as corn and soybeans -- winter wheat, cabbage, sugar beet, carrot, and onion are biennial crops. They flower and set seed after a prolonged period of near-freezing temperatures. Farmers exploit the trait by planting winter wheat in fall so that it becomes established and grows rapidly early the next year. The trait also ensures that cabbage and sugar beet produce only leaves and roots their first growing season. Flowering in the first year would reduce the value of these crops by draining energy away from vegetative growth.
What's been done: UW-Madison researchers have identified, cloned and sequenced the forms of two genes that determine whether the cabbage relative Arabidopsis flowers the first year it is planted or must pass through a cold period before flowering. One gene blocks flowering and the other increases the expression of the first gene. The researchers are looking for similar genes in

cabbage, winter wheat, and sugar beet.
The impact: Understanding the nature of these genes could lead to improvements in farm crops. Greater control of when such plants flower could assure, for example, that crops such as sugar beet don't flower after a late spring cold period. It could also help plant breeders block flowering of crops such as alfalfa thus producing forages with higher yields.

Funding –- National Science Foundation and the USDA National Research Initiative.

Additional information: A Hatch-funded project, #4185, "Modification of flowering time in higher plants", addresses identification of these same genes in actual crop species such as canola and cabbage. This project moves closer to the application of the findings to commercially important species. The research project has confirmed that the crop gene has the same effect across species. A patent as been filed on the use of these genes associated with flowering time to accelerate or delay flowering in plants.

WARF patent #P00168US, Alteration Of Flowering Time In Plants

Research will help cattle producers control twinning.

Key themes: Animal genomics, Agricultural profitability, Animal production efficiency

The issue: The frequency of twinning is typically about 1 percent in beef herds and 4 percent in dairy herds. Many beef and dairy producers want to control twinning rates, which are largely determined by genetics. Twins often create problems for cows during pregnancy and calving. Twin calves are more likely to weigh less at birth and be stillborn more often than single calves. However, for beef producers with the skills to manage these concerns, twinning can increase profitability.
What's been done: Animal geneticist Brian Kirkpatrick is identifying genes that increase the incidence of double ovulation and twinning in cattle. He has now confirmed that there is a gene on cattle chromosome 19 that affects twinning and has strong evidence for genes with similar effects on two other chromosomes. He is developing new DNA tests that will allow producers to develop herds with a high or low frequency of twinning. Kirkpatrick also publishes a newsletter for those who desire more twin calves and his group has cooperated with producers to start a public breed registry for cattle with a high frequency of twinning.
The impact: With proper management beef producers are finding that twins can be an advantage. Beef cattle that consistently produces twins could lower production costs by 20 percent or more. Producers can use the initial test to check for one of the key genes that controls twinning. Both beef and dairy producers could use DNA tests to develop herds that produce more -- or fewer -- twin calves.
Funding –- USDA National Research Initiative; USDA Hatch Project #4021 "Bovine-human comparative mapping through radiation hybrid mapping"

Study helps farmers evaluate profitability of raising stocker cattle.

Key themes: Grazing, Diversified/alternative agriculture, Agricultural profitability

The issue: Farmers with underused pastures or other lands may increase their profits by raising calves for market. In southwestern and northern Wisconsin, grazing stockers can be more profitable than many other farm enterprises. However, the financial success of raising stockers on pastures depends on making good decisions about managing pastures and animals, and understanding production costs and markets.

What's been done: To help Wisconsin farmers make better decisions, a team of agronomists, animal scientists and economists has developed a tool farmers can use to determine if their stocker management strategies will turn a profit. The team modeled financial returns to farmers grazing beef and Holstein stockers using management-intensive rotational grazing. The budget model calculates costs and returns on a per-head and per-acre basis. It also determines the break-even points for both beef and Holstein stockers. Using this enterprise budget, the team developed tables to help farmers calculate how much they can pay for calves in spring and still make a profit in fall.

The impact: Wisconsin producers who understand their costs and rate of gain can use this simple management tool each year to determine if spring calf prices will allow them to make money in the fall. By using the tables and adjusting for assumptions in the enterprise budget and changing markets, producers can find a predicted break-even purchase price for stockers. In 2000, for example, the study found that break-even rates of gain for beef and Holstein stockers were 2.2 and 2.0 pounds per day, respectively. Management-intensive rotational grazing of Holstein stockers yielded profits ranging from $80 to $100 per head for that year while beef stockers were unprofitable.

Funding: Center for Integrated Agricultural Systems at UW-Madison, Multistate project #5168 (NC-157), "Crop and Ruminant Systems to Conserve Midwestern Unglaciated Soils and Water Quality"

The project NC-157 is an ongoing collaboration researching management systems for farms on the unglaciated soils in the Midwest. These soils are particularly prone to soil erosion. Most farms in this region are small crop/livestock units and many producers have incorporated grazing as a management option. In addition to the above results, the project has also been able to produce recommendations for use of kura clover or alfalfa as a living mulch. In a trial conducted at two of our Agricultural Research stations, use of living mulch was shown to produce equal outputs of grain and silage while providing reduced soil and nutrient loss.

Modified virus can protect zoo animals from lethal disease.

Key themes: Animal health, Emerging infectious diseases

The issue: EMCV (Encephalomyocarditis virus) kills many animal species in zoos and research institutions. There are nearly 100 species of animals -- everything from monkeys to elephants -- that may encounter this lethal virus. Mice transmit the virus to other animals that deliberately or

accidentally eat them. There is no effective way to treat animals infected with EMCV.
What's been done: To develop a vaccine for EMCV, UW-Madison virologists have removed part of the genetic code from Mengo virus, a closely related virus that also is typically lethal to mice. This change made the genetically altered Mengo virus incapable of causing disease. Tests with baboons, macaques, domestic swine and mice showed that inoculating them with the genetically engineered Mengo virus protected them against EMCV. The research created a live-virus vaccine that protects animals from EMCV. The scientists also have shown that they can add selected genes from other disease-causing microbes to the genetically modified Mengo virus, thus transforming it into a vaccine against other animal diseases.
The impact: The genetically engineered Mengo virus has been used to control an outbreak of EMCV in a colony of primates. Also, it has been tested on 24 species in zoos in New Orleans and Miami. Those tests indicated that there were no complications from the vaccinations. Blood tests indicated that the vaccinations would likely protect primates and many other animals from EMCV. Similar vaccines may one day be used in humans as well as animals. The scientists believe such vaccines would be many times safer than polio vaccines.

Funding –- National Institutes of Health, USDA Hatch project #3949, "Cardiovirus-induced antigenic responses as replication indicators for live attenuated vaccines"

WARF Patent application: P93087US Mengovirus is a New Vector for Expression of Foreign Polypeptides

Management guidelines to prevent insect tolerance to Bt toxin

Key themes: Managing change in agriculture, risk management

The issue: Use of crops that have been genetically modified to produce a natural insecticide, Bt toxin, has the potential to accelerate the evolution of insects that are resistant to this control mechanism.
What's been done: Wisconsin researchers, in a multistate effort, have worked with the Environmental Protection Agency to survey producers in several regional of the United States to ascertain their awareness and compliance with IRM (insect resistance management) plans.
The impact: National guidelines for using refuges to slow development of resistance in insects have been issued by USDA and EPA. Following the survey, members of the multistate team used the information to develop extension education materials including videos, brochures and slide presentations. A website has been set up with recommendations, background educational material, news updates and links to other sites discussing current issues with genetically modified crops. Since this is a multidisciplinary and multistate project, both EPA and USDA have utilized the expertise of the project members to evaluate options and provide economic estimates of utility for producers. With very quick adoption of these crops, this multistate project has been able to provide producers with high quality science and education to support their decision-making.

Funding (WI portion of multistate project NC-205): USDA Hatch project #3455, "Ecology and management of European corn borer and other stalk-boring lepidoptera"
Website address: http://www.biotech-info.net/NC_205.html

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

Executive summary

Under this goal, there were 5 projects including 2 that were multistate, interdisciplinary projects. Wisconsin is committed to continually changing its portfolio of research. The campus recently hired a cluster of faculty in food safety. Three new faculty have been hired, two of whom have projects starting in FY01.

Wisconsin has a strong livestock economy with the majority of milk producers selling milk for cheese manufacture and export from Wisconsin. A number of specialty cheese plants, small meat processors, and fresh market vegetable and fruit producers must address food safety concerns. New diagnostic tests such as those under study in project #4031, "Rapid detection of salmonella by flow cytometry" will be especially important to producers and consumers. Milk producers have indicated that their most pressing problems are support of the milk price and federal marketing structure in light of international pressures. Project #4174, "Analysis of interregional impacts of changes in U.S. and world dairy policy on the Wisconsin and U.S. dairy sectors" is a project that addresses this issue.

Updated project list for FY00

New projects are marked with an asterisk (*) and printed in **bold**. Note that recent reclassification of projects has moved some projects into goals different from those previously listed in the Plan of Work. Some projects address several goals but are listed in only one.

Wisconsin roject No.	Principal Investigator	Title of Project	Hatch	Hatch Multistate	McIntire/ Stennis	Animal Health	Integrated research/ extension	Tota Formul Fund
	Objective 2.1: To improve access to an affordable, healthful, and culturally relevant food supply							
VIS04089	Gould, B. W.	FOOD DEMAND, NUTRITION AND CONSUMER BEHAVIOR (S-278)	**X**	**X**				
VIS04174	Cox, T.	ANALYSIS OF THE INTERREGIONAL IMPACTS OF CHANGES IN U.S. AND WORLD DAIRY POLICY ON THE WISCONSIN AND U.S. DAIRY SECTORS	**X**					
		Total:	**$23,491**	**$0**	**$0**	**$0**	**$0**	**$23,49**
	Objective 2.2: To improve food safety by controlling or eliminating foodborne risks							
VIS04031	Johnson, E. A.; Brehm-Stecher, B. F.	RAPID DETECTION OF SALMONELLA BY FLOW CYTOMETRY	**X**					
VIS04188	Wong, A.	GENOTYPIC DIVERSITY IN HEMOLYSIN BL, A DIARRHEAL ENTEROTOXIN FROM BACILLUS CEREUS	**X**					
VIS07110	Chu, F. S.	FUSARIUM MYCOTOXINS IN CEREAL GRAINS (NC-129)	**X**	**X**				
		Total:	**$56,167**	**$20,237**	**$0**	**$0**	**$0**	**$76,40**
		Total Goal 2:	**$79,658**	**$20,237**	**$0**	**$0**	**$0**	**$99,89**

Impact Statements and Selected Results

Publications in refereed journals, books and extension bulletins have been reported on projects using the AD-421 annual reports in the CRIS system. A number of projects have impacts on food processors and consumers. Some of the projects had funding from Hatch, McIntire-Stennis and Animal Health; others were funded from competitive federal programs and industry gifts and grants. Outputs described in the original Plan of Work are illustrated by example from the past year in the following projects.

Helping Wisconsin companies offer flavorful specialty cheeses.

Key themes: Food quality, New uses for agricultural products

The issue: It's difficult for small cheesemakers to compete with large companies on major commodity types of cheeses, such as Cheddar. Many small Wisconsin cheesemakers remain competitive by marketing less familiar cheese types -- sometimes called specialty cheeses. They also look for cheese flavors that differentiate their cheeses from their competitors.
What's been done: Researchers at the Center for Dairy Research identified processes for making Havarti, aged Gouda, reduced-fat Cheddar, and reduced-fat Swiss. The Center is helping cheesemakers bring out the flavor and reduce bitterness of those and other cheeses, and can help cheesemakers develop cheese flavors that will appeal to the customers in their area.
The impact: Companies use the resources at the CDR to produce specialty cheeses and cheeses with unique flavors.

Funding -- Wisconsin Milk Marketing Board

A related Hatch project , #4033 "Tryamine accumulation in cheddar cheese: mechanism of control", addresses a quality issue in cheddar cheese. Another related Hatch project, #4363 "Investigation into improving the texture and functionality of fermented milk products" addresses other processes for milk products. Fermented products are popular in many cultures and are an increasing market and an important source of dietary calcium. Both of these projects are listed in goal 1, but address goal 2 as well.

E. coli genome discoveries will advance food safety.

Key themes: Food safety, Foodborne pathogen protection, Foodborne illness

The issue: The food-borne pathogen E. coli O157:H7 was discovered in 1982 after an outbreak linked to contaminated hamburger. It causes an estimated 75,000 illnesses a year in the United States, including numerous deaths, and is especially dangerous to children, the elderly and people with impaired immune systems. Preventing outbreaks is extremely important because there are no effective treatments for the bacterium and just a few E. coli O157:H7 cells can cause illness. Knowing the pathogen's genetic code would provide insights into how to fight it.
What's been done: A UW-Madison team completely sequenced the disease-producing bacterium's genes. They then compared it with the genome of E. coli K-12, a benign E. coli

strain sequenced in 1996 by UW-Madison Genome Center Director Fred Blattner. The two strains of E. coli share about 3,500 common genes. However, E. coli O157:H7 has 1,300 genes not found in E. coli K-12, and the benign strain has 530 genes not found in O157:H7. The team discovered "islands of pathogenicity" across the genome that viruses may have transmitted from other bacteria to O157:H7. The finding suggests that there may be a large bank of genes that are exchanged across an entire family of bacteria, including related organisms such as Salmonella, Shigella, the Plague-causing organism Yersinia, and the plant pathogen Erwinia.
The impact: The genomic sequence of E. coli O157:H7 reveals that the bacterium has a surprisingly wide range of genes that may trigger illness. These provide researchers with new genetic markers, which they can use to detect and monitor food-borne outbreaks. Comparing the benign and pathogenic genomes also gives scientists a set of targets for future work on drug treatments and human vaccines.

Funding: The National Institute of Allergy and Infectious Diseases; the Department of Energy; the National Science Foundation; and a variety of foundations devoted to biomedical research.

Quick assays for dangerous mold toxins

Key themes: Food safety, Foodborne illness

The issue: Molds in common foods can adverse effects on both humans and animals. Detection of these molds needs to be quick, sensitive and low cost in order to prevent entry of high levels of toxins into the food supply.
What's been done: Assays have been developed and applied to toxins in hay and forage, wheat, corn, and fruit juices. Preparation methods to automate testing have been developed and tests can be as quick as six minutes following preparation.
The impact: These tests have already been used on feed samples from 63 Wisconsin farms and have quantified the level of mold toxins. Assays have been shown to be highly sensitive in detecting spores in orange juice.

Funding: USDA Hatch project #7110, part of multistate project NC-129, "Fusarium mycotoxins in cereal grains".

Goal 3. A healthy, well-nourished population.

Executive summary

Under this goal, there were 11 projects including 2 that were multistate interdisciplinary projects, and 2 that were integrated research/extension projects. Some projects listed under Goals 1 and 2 also have relevance for Goal 3. For instance, project #4036, "Onion phytopharmaceutical activity: genetic control, and temporal morphological distribution" , examines the health benefits of compounds from onions. Producers have been very enthusiastic about research that quanitifies the health aspects of foods and identifies strains with particularly beneficial effects. New varieties of onions, beets and carrots have been released by the Wisconsin experiment station for use by producers.

Wisconsin is committed to continually changing its portfolio of research. One new project, #4389, " Development of the 13C2-retinol isotope dilution assay in the human and its application to dietary -carotene modification", develops an assay that will help in screening foods for -carotene properties to improve nutritional content. Not only will this assay have potential for identifying nutritional content of existing foods, but the procedure could be used to screen new varieties under development.

Updated project list for FY00

New projects are marked with an asterisk (*) and printed in **bold**. Note that recent reclassification of projects has moved some projects into goals different from those previously listed in the Plan of Work. Some projects address several goals but are listed in only one.

	Objective 3.1: To optimize the health of consumer by improving the quality of diets, the quality of food, and the number of food choic							
VIS02656	Elson, C. E.	ROLE OF N-3/N-6 POLYUNSATURATED FATTY ACIDS IN HEALTH MAINTENANCE (NC-167)	**X**	**X**				
VIS03951	Eisenstein, R. S.	ROLE OF LIVER REGULATORY PROTEIN AS A SENSOR OF IRON STATUS DURING INDUCTION AND RECOVERY FROM IRON	**X**					
VIS03967	Nitzke, S. A.	USING STAGES OF CHANGE MODEL TO PROMOTE CONSUMPTION OF GRAINS, VEGETABLES AND FRUITS BY YOUNG ADULTS (NC-219)	**X**	**X**			**X**	
VIS04192	Ney, D.	ANABOLIC EFFECTS OF INSULIN-LIKE GROWTH FACTOR-I AND GROWTH HORMONE DURING PARENTERAL NUTRITION	**X**					
VIS04193	Schoeller, D.	EFFECTS OF EXERCISE ON THE UTILIZATION OF DIETARY FAT	**X**					
VIS04221	Groblewski, G.	A PHOSPHORYLATION-DEPENDENT ROLE FOR CRHSP-28 IN PANCREATIC EXOCRINE SECRETION	**X**					
VIS04304	Attie, A. D.	BIOCHEMISTRY AND GENETICS OF INSULIN RESISTANCE AND DIABETES	**X**					
VIS04306	Ntambi, J. M.	CONJUGATED LINOLEIC ACID (cla) IN FAT CELL DIFFERENTIATION AND METABOLISM	**X**					
VIS04315	Smith, S. M.	FUNCTIONS OF VITAMIN A IN CARDIAC DEVELOPMENT AND FUNCTION	**X**					
*IS04389**	**Tanumihardjo, S. A.**	**DEVELOPMENT OF THE 13C2-RETINOL ISOTOPE DILUTION ASSAY IN THE HUMAN AND ITS APPLICATION TO DIETARY B-CAROTENE MODIFICATION**	**X**				**X**	
		Total:	**$225,417**	**$45,731**	**$0**	**$0**	**$42,839**	**$271,14**

	Objective 3.2: To promote health, safety, and access to quality health care							
WIS04240	Trumbo, C.	CLAIMS-MAKING AND POPULAR EPIDOMIOLOGY IN THE EXPRESSION OF COMMUNITY CONCERN OVER CANCER	**X**					
		Total:	**$19,577**	**$0**	**$0**	**$0**	**$0**	**$19,57**
		Total Goal 3:	**$244,994**	**$45,731**	**$0**	**$0**	**$42,839**	**$290,72**

Impact Statements and Selected Results

Publications in refereed journals, books and extension bulletins have been reported on projects using the AD-421 annual reports in the CRIS system. A number of projects listed under other goals have impacts on human health and nutrition. Some of the projects had funding from Hatch, McIntire-Stennis and Animal Health; others were funded from competitive federal programs and industry gifts and grants. Outputs described in the original Plan of Work are illustrated by example from the past year in the following projects.

Premature infants will benefit from research with newborn pigs.

Key themes: Infant mortality, Human health

The issue: Pediatricians commonly use dexamethasone to treat respiratory distress syndrome, a potentially life-threatening condition for premature infants. However, treatments with the steroid-type drug - which may last for as long as three weeks - slow the growth of infants while they receive it. Because researchers can't experiment on premature infants, they need to work with animals to learn how to offset the medication's side effects.
What's been done: By building on 20 years of UW-Madison research on improving the health of newborn pigs, College scientists were able to examine the growth-suppressing effects of dexamethasone on piglets. The study found that baby pigs and human babies respond similarly to the drug. The piglets built less muscle and lung tissue, and gained weight more slowly while on the drug. Newborn pigs treated with the drug for up to four days gained 15 percent to 30 percent less weight than untreated piglets. The study showed that during dexamethasone treatment the body uses amino acids for energy or to make fat rather than to build protein.
The impact: In Wisconsin, about one to two percent of premature infants receive dexamethasone treatment each year. The research on newborn pigs may soon help doctors counteract the drug's side effects and improve the way they care for premature infants. A Madison-area pediatrician, who is a professor and a part of the research team, hopes to apply the results in his practice.

Funding –- USDA Graduate fellowship, USD-NRI grant, USDA Hatch #4241 "Quantitative aspects of lysine metabolism in the pig", Meriter Hospital
Project is listed in goal 1 but implications for goal 3.

Increasing consumption of grains, vegetables and fruits

Key themes: Human nutrition, Human health

The issue: Redesign of the dietary recommendations (Food Guide Pyramid) emphasized the need to increase the dietary consumption of grains, vegetables and fruits for optimal health. Present rates of adoption of these guidelines are lower than ideal, but education methods have not been sufficiently successful in changing dietary choices. Diets of mothers and children are of particular concern.

What's been done: An assessment of the adoption of these guidelines is the central focus of a team of multistate researchers. Use of a survey form has been used with target audiences of young adults. Additionally, children in food-assistance programs, low income mothers and adults with diet-related chronic disease have been involved in assessment of adoption rates
The impact: Results have demonstrated that increased consumption of nutritious foods can occur without radically changing consumer habits. Since the surveys include questions about the ease of following guidelines and the food habits that were associated with increased intake of nutritious foods, the results are useful in designing educational materials for real change. For instance, low income women with children found that incorporating juice or fruit with breakfast was convenient and practical. Comparisons of mothers who had additional nutrition education to others of similarly low income without the additional instruction indicated the effectiveness of education in changing behaviors. Nutritional education programs have been designed around these findings. Some of these are available at

http://www.nutrisci.wisc.edu/uwex/uwex_main.html

Funding: USDA Hatch #3967, part of multistate project NC-219 " Using stages of change model to promote consumption of grains, vegetables and fruits by young adults"

Plant compounds suppress cancer growth

Key themes: Human nutrition, Human health, Nutricueticals

The issue: Although higher consumption of fruits and vegetables has been associated with decreases in cancer rates, the mechanism for protection has not been identified. Changing consumer dietary habits is difficult unless a clear advantage can be demonstrated.
What's been done: Screening of plant compounds called isoprenoids has resulted in identifying several compounds that show promising results at suppressing cancer cell growth in culture. Apparently, cancer cells are more highly sensitive to the growth suppression than non-cancerous cells. Screening methods using tumor cell suppression have shown that blends of individual isoprenoids have more effect than individual compounds. Thus a diet of varied fruits and vegetables may be more beneficial because of the large array of plant compounds present. Use of these compounds in cancer treatment may be possible since they may be less toxic to normal cells than other currently used therapies.
The impact: One compound is in a Phase II clinical trial for use as a cancer treatment ; several others are in pre-clinical evaluation. Screening of fruits and vegetables for cancer-limiting properties may identify particularly beneficial species or strains. Knowing the mechanism of action may convince more people to choose a diet with known health benefits.

Funding: USDA Hatch project #2656, part of multistate project, NC-167, "Role of N-3/N-6 polyunsaturated fatty acids in health maintenance"

WARF Patent application: P00349US. Method Of Suppressing Tumor Growth With Combinations Of Isoprenoids And Statins

Goal 4. Greater harmony between agriculture and the environment.

Executive summary

Under this goal, there were 42 projects including 8 that were multistate interdisciplinary projects, 6 were McIntire-Stennis projects, and 11 were integrated research/extension projects. Projects listed under Goal 1 have many aspects that address the interactions of agricultural production and protection of natural resources.

Wisconsin is committed to continually changing its portfolio of research. Two new projects have been added in areas of farmland conversion and pest management. Rural areas are struggling with many land use issues including the conversion of farmland to housing and retail businesses. Stakeholder meetings have emphasized the need for research to support the decision-making of local county boards and townships. Forage systems are integral to the Wisconsin natural resource conservation plans and runoff of pesticides and herbicides is of great concern to consumers. Newly added projects indicate that faculty are responding to these stakeholder needs.

Updated project list for FY00

New projects are marked with an asterisk (*) and printed in **bold**. Note that recent reclassification of projects has moved some projects into goals different from those previously listed in the Plan of Work. Some projects address several goals but are listed in only one.

Wisconsin roject No.	Principal Investigator	Title of Project	Hatch	Hatch Multistate	McIntire/ Stennis	Animal Health	Integrated research/ extension	Tota Formul Fund
4: Greater Harmony Between Agriculture and the Environment								
	Objective 4.1: To develop, transfer, and promote the adoption of efficient and sustainable agricultural, forestry, and other resource conservation policies, programs, technologies, and practices that ensure ecosystems integrity and biodiversity							
VIS02846	Lowery, B.	IMPACT OF ACCELERATED EROSION ON SOIL PROPERTIES AND PRODUCTIVITY (NC-174)	X	X				
VIS03879	Bundy, L. G.	CHARACTERIZING NITROGEN MINERALIZATION AND AVAILABILITY IN CROP SYSTEMS TO PROTECT WATER RESOURCES (NC-218)	X	X			X	
VIS03940	Helmke, P. A.	MINERALIZATION OF SOIL ORGANIC PHOSPHORUS BY PHOSPHATASES AND ITS RELATION TO PLANT NUTRITION	X					
VIS03942	Ribic, C. A.	EFFECT OF ROTATIONAL GRAZING ON THE TERRESTRIAL BIRD COMMUNITY IN RIPARIAN ZONES OF SW WISCONSIN	X					
VIS04046	Barak, P. W.	MICROSCALE ANALYSIS AND MODELING OF AGRICULTURAL LIMING	X					
VIS04047	Kung, K.; Samuel, J.	QUANTIFYING THE IMPACT OF PORE SIZE SPECTRUM ON FIELS-SCALE PREFERENTIAL FLOW	X					
VIS04053	Field, D. R.	LANDOWNERS AND LANDUSE			X			

Wisconsin roject No.	Principal Investigator	Title of Project	Hatch	Hatch Multistate	McIntire/ Stennis	Animal Health	Integrated research/ extension	Tota Formul Fund
		PRACTICES ADJACENT TO THE KICKAPOO RESERVE.						
VIS04072	Powell, J. M.	MANURE MANAGEMENT EFFECTS ON NUTRIENT CYCLING	X					
VIS04168	Guries, R.	FOREST TENURE DYNAMICS AT THE PUBLIC/PRIVATE LANDS INTERFACE			X			
VIS04175	Deller, S. C.	MODELING THE STRUCTURAL CHANGES OF WISCONSIN'S RURAL ECONOMY	X					
VIS04195	Norman, J. M.	CHARACTERIZING NITROGEN MINERALIZATION AND MICROBIAL ACTIVITY TO IMPROVE FERTILIZER APPLICATION	X					
VIS04197	Mathews, N	VERTEBRATE SPECIES MODELING: TESTING SENSITIVITY OF VERTEBRATE DISTRIBUTION MODELS IN UPPER MIDWEST	X					
VIS04300	Triplett, E. W.	ANALYSIS OF A TRIFOLITOXIN RESISTANCE MECHANISM CONFERRED BY RHIZOBIUM	X					
VIS05216	Ventura, S. J.; Summers, G.; Davis, T.	IMPLEMENTATION OF A MULTIPURPOSE LAND INFORMATION SYSTEM IN A COMPLEX INSTITUTIONAL AND CULTURAL SETTING	X					

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch	Hatch Multistate	McIntire/ Stennis	Animal Health	Integrated research/ extension	Tota Formul Fund
WIS05226	Cooperband, L.; Stone, A.; Stevenson, W. R.; MacGuidwin, A.E.; Staub, J.; Harrison, H.	VEGETABLE PRODUCTION WITH RAW OR COMPOSTED PAPER MILL SLUDGE: EFFECTS ON SOIL QUALITY IN WISCONSIN'S CENTRAL SANDS	X				X	
IS04390*	**Jackson-Smith, D. B.**	**FARMLAND CONVERSION IN WISCONSIN: SPATIAL LOCATION AND POLICY IMPLICATIONS OF DIFFERENT TYPES OF CONVERSION**	X					
		Total:	**$297,832**	**$130,128**	**$62,480**	**$0**	**$101,502**	**$490,44**
	Objective 4.2: To develop, transfer, and promote adoption of efficient and sustainable agricultural, forestry, and other resource polici programs, technologies, and practices that protect, sustain, and enhance water, soil, and air resources							
WIS03601	Goodman. R. M.	BIOCONTROL OF SOIL-BORNE PLANT PATHOGENS (NC-125)	X	X				
WIS03900	Binning, L. K.	EVALUATION AND DEVELOPMENT OF PLANT PATHOGENS FOR BIOLOGICAL CONTROL OF WEEDS (S-268)	X	X			X	

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch	Hatch Multistate	McIntire/ Stennis	Animal Health	Integrated research/ extension	Tota Formul Fund
WIS03910	Wedberg, J. L.	A NATIONAL AGRICULTURAL PROGRAM TO CLEAR PEST CONTROL AGENTS FOR MINOR USES (NRSP-4)	X	X			X	
WIS03926	Harvey, R. G.	USING INTEGRATED SYSTEMS TO PREVENT DEVELOPMENT OR SPREAD OF HERBICIDE TOLERANT OR RESISTANT WEEDS	X					
WIS03929	Strand, M. R.	IN VITRO REARING OF PARASITIC INSECTS FOR AUGMENTATIVE BIOLOGICAL CONTROL	X					
WIS03931	Lindroth, R. L.	PHYTOCHEMICAL RESISTANCE MECHANISMS IN ASPEN-GYPSY MOTH INTERACTIONS	X					
WIS04054	Raffa, K. F.	EFFECTS OF PLANT DEFENSE CHEMISTRY ON BIOLOGICAL CONTROL OF CHEMICALLY DEFENDED/UNDEFENDED PESTS			X			
WIS04166	McCown, B.	DEFINITION AND APPLICATION OF PEST RESISTANCE MECHANISMS IN THE TREE GENUS BETULA			X			
WIS04182	Goodrich-Blair, H.	THE ROLE OF SURFACE ATTACHMENT IN XENORHABDUS NEMATOPHILUS/NEMATODE SYMBIOSIS AND INSECT PATHOLOGY	X					
WIS04223	Cooperband, L.	EFFECTS OF COMPOST ON SOIL CHEMICAL/PHYSICAL/BIOLOGICAL PROPERTIES IN FIELD NURSERY CROP PRODUCTION	X				X	

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch	Hatch Multistate	McIntire/ Stennis	Animal Health	Integrated research/ extension	Tota Formul Fund
WIS04307	Wyman, J. A.	BIOLOGICAL REGULATION OF APHID POPULATIONS IN WISCONSIN POTATOES	X				X	
WIS04317	Goodman, R. M.	ANALYSIS OF A TRIFOLITOXIN RESISTANCE MECHANISM CONFERRED BY RHIZOBIUM	X					
WIS05224	Shepard, R. L.; Madison, F.	AN EVALUATION OF NUTRIENT MANAGEMENT PLANNING IN WISCONSIN	X				X	
WIS05225	Bland, W. L.; Barham, B. L.	INTEGRATED ASSESSMENT MODELING OF THE CENTRAL SANDS IRRIGATED VEGETABLE AGRICULTURAL SYSTEM	X				X	
IS04265*	**Hogg, D. B; Grau, C. R.; Undersander, D. J.; Doll, J. D.; Wedberg, J. L.**	**DEVELOPMENT OF PEST MANAGEMENT STRATEGIES FOR FORAGE ALFALFA PERSISTENCE (NC-226)**	X	X			X	
		Total:	**$261,593**	**$29,108**	**$46,721**	**$0**	**$144,565**	**$337,42**

Wisconsin roject No.	Principal Investigator	Title of Project	Hatch	Hatch Multistate	McIntire/ Stennis	Animal Health	Integrated research/ extension	Tota Formul Fund
	Objective 4.3: To improve decision-making on public policies related to agriculture and the environment							
VIS03946	Buongiorno, J.	FOREST PRODUCTS TRADE MODELING AND POLICY ANALYSIS			X			
VIS03954	Bland, W. L.	EFFECTIVENESS OF CLIMATE AND LANDSCAPE BASED MANAGEMENT TO REDUCE THE RISK OF PHOSPHORUS RUNOFF	X				X	
VIS03996	Converse, J. C.; Powell, J. M.; Holmes, B. J.	ANIMAL MANURE AND WASTE UTILIZATION, TREATMENT, AND NUISANCE AVOIDANCE FOR A SUSTAINABLE AGRICULTURE (S-275)	X	X			X	
VIS04048	Bleam, W. F.	OXIDATION AND REDUCTION PROCESSES IN SOILS AFFECTING THE SOLUBILITY OF CHROMIUM AND MERCURY.	X					
VIS04049	Kruger, E. L.	USE OF TREMBLING ASPEN AS A BIOINDICATOR OF OZONES POTENTIAL TO INJURE WISCONSIN FORESTS	X					
VIS04051	Kloppenburg, J. R.; Stevenson, G. W.	COMMODITIES, CONSUMERS, AND COMMUNITIES: LOCAL FOOD SYSTEMS IN A GLOBALIZING ENVIRONMENT (NE-185)	X	X				
VIS04105	O'Keefe, G. J.	ENVIRONMENTAL INFORMATION SOURCES PREFERENCES OF AGRICULTURAL PRODUCERS	X					
VIS04164	Stier, J.	THE ROLE OF FORESTLAND TAX			X			

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch	Hatch Multistate	McIntire/ Stennis	Animal Health	Integrated research/ extension	Tota Formul Fund
		PROGRAMS IN PROMOTING ECOSYSTEM MANAGEMENT						
WIS04173	Bishop, R.	INVESTIGATION OF THEORETICAL FOUNDATIONS OF COST SHARING: APPLICATION TO WISCONSIN WATERSHED PROGRAM	**X**					
WIS04196	Field, D. R.	CREATING A SOCIAL-DEMOGRAPHIC LAYER FOR LANDSCAPE SCALE ANALYSIS IN UPPER MISSISSIPPI RIVER FLYWAY	**X**					
WIS04289	Hickey, W. J.	MICROBIOLOGICAL AND BIO-PHYSICAL FACTORS CONTROLLING BIOAVAILABILITY AND BIODEGREDATION OF POLYNUCLEAR AROMATIC HYDROCARBONS (PAHS)	**X**					
		Total:	**$143,480**	**$21,523**	**$49,302**	**$0**	**$23,323**	**$214,30**
		Total Goal 4:	**$702,905**	**$180,759**	**$158,503**	**$0**	**$269,390**	**$1,042,16**

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch	Hatch Multistate	McIntire/ Stennis	Anima Healt

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch	Hatch Multistate	McIntire/ Stennis	Anima Healt

Impact Statements and Selected Results

Publications in refereed journals, books and extension bulletins have been reported on projects using the AD-421 annual reports in the CRIS system. A number of projects are listed in other goals but have impacts on agriculture or natural resources. Some of the projects had funding from Hatch, McIntire-Stennis and Animal Health; others were funded from competitive federal programs and industry gifts and grants. Outputs described in the original Plan of Work are illustrated by example from the past year in the following projects.

Potato growers move toward safer chemicals, biological pest control.

Key themes: Integrated pest management, Biological control

The issue: Wisconsin ranks third in the nation in potato production. The Food Quality Protection Act has prompted a review and possible elimination on many chemicals used to control diseases and insects that attack the traditionally pesticide-intensive crop. Growers are looking for new, environmentally sensitive ways to control pests and remain competitive.
What's been done: Three year's of UW-Madison research on Quadris -- a new fungicide that is less toxic and used in smaller amounts than previous compounds -- accelerated U.S. Environmental Protection Agency evaluation of Quadris, which it approved in 1999. Entomologists found that planting potatoes a quarter mile from the previous year's potato fields reduced Colorado potato beetle problems by 85 percent. They also showed that new, reduced-risk pesticides would control potato beetles while leaving beneficial wasps in place to control aphids that attack the crop.
The impact: The research has helped growers reduce chemical use, adopt less toxic compounds and rely more on cultural practices and biologically based methods to keep pests in check. In 1999, for example, the approval of Quadris allowed growers to control early and late blight while applying half as much fungicide as they use in 1998. With Quadris, Wisconsin growers got improved blight control -- which led to an increase in yield valued at $17 million statewide -- for almost the same cost as traditional fungicides. In Central Wisconsin, growers with fields scattered across tens of thousands of acres now minimize potato beetle problems by coordinating when and where they plant potatoes.

Funding –- Wisconsin Potato and Vegetable Growers Association; UW-Madison Pesticide Use

and Risk reduction Program, and University-Industry Relations Program;
USDA-CSREES and EPA Pest Management and Environmental Stewardship programs.

Identified need for more explicit incorporation of ecosystem management principles into forestland tax programs.

Key themes: Forest resource management, Natural resource management, Land use, Sustainability

The Issue: Forestland tax programs across the nation vary in the degree to which they incorporate ecosystem management principles into their design and implementation. None of the 62 programs incorporated an explicit statement of ecosystem management into its provisions or objectives, nor has any state tried to determine exactly what ecosystem management is or how it might be attained in any forestland tax program. Fifty-four programs in 40 states have, however, either explicitly or implicitly incorporated management principles that partially embody some of the criteria of ecosystem management (e.g., sustainability, natural ecosystem dynamics, and adaptive management). Because none of the tax programs adopt ecosystem management as an explicit goal they are limited in their ability to foster ecosystem management.
What's been done: A UW-Madison forest economist examined administrative rules and state publications relating to preferential state property tax programs for forestland for all states. It was found that the four most common indicators of management incentives were 1) the deferred tax of penalty, 2) the requirement for management plans, 3) required adherence to management practices and standards, 4) recognition of no-timber management goals. The researcher concluded that forestland tax programs can partially address the following principles of ecosystem management, 1) recognition of different temporal scales, 2) hierarchical context and systems perspectives, 3) an understanding of the dynamism and complexity of ecological systems, 4) adaptive management and institutions that respond to new knowledge.
The impact: The project provides a comprehensive review of the state of forestland tax programs across the nation along with recommendations for fostering new or modified programs that more explicitly address ecosystem management. The project has been reported widely in the popular press and in natural resource management publications.

Funding – USDA McIntire-Stennis project #4164. "The role of forestland tax programs in promoting ecosystem management."

Study lays groundwork for microbial of degradation of TNT

Key themes: Biological control, Hazardous materials, Bioremediation

The issue: Contamination of the environment by nitroorganic compounds such as those associated with trinitrotoluene (TNT) is a major concern. It is estimated that 1,000's of sites around the nation are contaminated by nitroorganic compounds and that remediation where feasible, will cost billions of dollars. Conventional approaches to remediation involve removal of contaminated soil, which is either buried or subject to costly chemical treatment or incineration, each of which poses further environmental risk. The prospect of developing cost-effective *in situ* bioremediation is emerging as a promising alternative to conventional remediation strategies. One problematic site in Wisconsin is the Badger Prairie Ammunitions Plant in Baraboo where current discussions with local groups are looking at alternative uses to the facility.

What's been done: During the last several years an UW-Madison bacteriologist has been investigating novel approaches for microbial degradation of nitroglycerin. The research has progressed on two fronts: characterization of the enzymatic activities of the XenB enzyme and a genetic analysis of its functionality. XenB attacks TNT by two primary routes: reduction of the nitrate groups attached to the toluene ring and direct reduction of the toluene ring itself. The ability of XenB to reduce the toluene ring is unusual and is now the subject of a genetic study. The concept is to isolate mutants of XenB with altered ability to reduce nitro groups of TNT and determine if this biological method could be used to detoxify contaminated sites. A library of such mutants has been developed and their characterization has begun.
The impact: Bioremediation is being investigated as a potentially cost effective remediation method for degrading nitrorganic compounds at contaminated sites. The studies are laying the groundwork for developing remediation systems for some of the most recalcitrant compounds in the environment. These methods should be safer and less damaging to the sites than those currently used.

Funding – USDA Hatch project #4023. "Microbial degradation of nitroglycerin".

Improving the productivity and environmental performance of eroded soils.

Key themes: Soil erosion, Riparian management, sustainable agriculture

The issue: The hilly landscapes of southwestern Wisconsin were not directly affected by glaciation. The soils of the region have undergone considerable erosion since they were first cultivated in the middle of the 18th Century. The relationship between erosion and crop productivity in these landscapes is complex. This complexity reflects the combination of the highly variable thickness of silty material in which the upper part of the soil is formed and the subsequent redistribution of soil by erosion. Understanding the relationship of soil variation to crop productivity and developing strategies to improve productivity remains a challenge in these hilly landscapes.
What's been done: An innovative approach for soil mapping have been developed that provides a rapid means of determining silt depth. Silt depth is the major variable controlling crop productivity and is measured with a cone penetrometer. The penetrometer measures soil resistance and in these soils provides a clear signal that distinguishes silt from the underlying soil material. In addition, dairy cattle manure has been applied to soils exhibiting three different levels of erosion to improve soil physical properties. The manure additions have improved soil physical properties such as water holding capacity, and crop production. However, the rate of water movement through the soil has also increased, which is associated with increased leaching of the pesticide, atrazine.
The impact: This research has developed a tool for rapid soil mapping in a complex landscape that is transferable elsewhere where comparable conditions occur. In addition, the research highlights the importance of evaluating agronomic, soil and environmental impacts associated with manure additions to the landscape.

Funding – (WI portion of multistate project NC-174): USDA Hatch project #2846. "Management of eroded soils for enhancement of productivity and environmental quality".

The project NC-174 is an ongoing collaboration investigating the impact of erosion on crop productivity. In recent years, the researchers have placed special emphasis on measuring environmental impacts associated with management variables on fragile soils. The Wisconsin

project has lead to additional funding from a state agency to further investigate the relationship between manure additions and increased leaching of atrazine.

Goal 5. Enhanced economic opportunity and quality of life for Americans.

Executive summary

Under this goal, there were 23 projects including 6 that were multistate, interdisciplinary projects and 4 that were integrated research/extension projects. Included among these projects are those addressing the public perceptions and consumer behavior, rural economies and applications of statistical methods for interpreting data.

Wisconsin is committed to continually changing our portfolio of research. Two new projects have been added in the last year: one dealing with tribal communications and their relationship to natural resource conservation and the second looking at the importance of knowledge of citizens participating in public policy decisions. Meetings with our stakeholders have emphasized the differences in attitudes between those who feel well informed and those who still have questions. Newly added projects indicate that faculty are responding to these stakeholder needs.

Updated project list for FY00

New projects are marked with an asterisk (*) and printed in **bold**. Note that recent reclassification of projects has moved some projects into goals different from those previously listed in the Plan of Work. Some projects address several goals but are listed in only one.

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch	Hatch Multistate	McIntire/ Stennis	Animal Health	Integrated research/ extension	Tota Formul Fund
5: Enhanced Economic Opportunity and Quality of Life for Americans								
	Objective 5.1: To increase the capacity of communities and families to enhance their own economic well-being							
WIS03858	Jasper, C. R.; Goebel, K.	FAMILY BUSINESSES: INTERACTION IN WORK AND FAMILY SPHERES (NE-167)	X	X				
WIS03974	Douthitt, R.	PRIVATE STRATEGIES, PUBLIC POLICIES, AND FOOD SYSTEM PERFORMANCE (NE-165)	X	X				
WIS04040	Freudenburg, W.R.	POVERTY, PROSPERITY AND NATURAL RESOURCES IN WISCONSIN	X					
WIS04041	Green, G. P.	EVALUATING THE OUTCOMES AND IMPACTS OF GROWTH MANAGEMENT EFFORTS IN NONMETROPOLITAN WISCONSIN	X				X	
WIS04043	Tigges, L. M.	THE REORGANIZATION OF LABOR PRACTICES IN THE FOOD PROCESSING SECTOR	X					
WIS04044	Slesinger, D. P.	THE IMPACT OF HEALTH INSURANCE ON HEALTH STATUS & MEDICAL UTILIZATION AMONG WISCONSIN FARMERS	X					
WIS04098	Deller, S. C.	RURAL ECONOMIC DEVELOPMENT: ALTERNATIVES IN THE NEW COMPETITIVE ENVIRONMENT (NE-162)	X	X				
WIS04321	Provencher, R. W.	THE ECONOMIC VALUE OF			X			

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch	Hatch Multistate	McIntire/ Stennis	Animal Health	Integrated research/ extension	Tota Formul Fund
		PRESERVING NATURAL AMENITIES IN REMOTE AREAS: LAKE SHORE						
		Total:	**$91,571**	**$34,175**	**$28,248**	**$0**	**$22,365**	**$153,99**
	Objective 5.2: To increase the capacity of communities, families, and individuals to improve their own quality of life							
WIS03865	Voss, P. R.	BEYOND TIGER: THE LINKS BETWEEN THE HUMAN LAYER AND NATURAL RESOURCE LAYERS IN A GIS ENVIRONMENT	**X**				**X**	
WIS03972	Barham, B. L.; Jackson-Smith, D.	IMPACTS OF STRUCTURAL CHANGE IN THE DAIRY INDUSTRY (NE-177)	**X**	**X**				
WIS03973	Sarmadi, M.	DEVELOPMENT OF TEXTILE MATERIALS FOR ENVIRONMENTAL COMPATIBILITY AND HUMAN HEALTH AND SAFETY (S-272)	**X**	**X**				
WIS04017	Pingree, S.	CHILDREN AND THE NEW MEDIA ENVIRONMENT	**X**				**X**	
WIS04042	Heberlein, T. A.	THE SOCIAL PSYCHOLOGY OF SOCIAL CHANGE: CONTESTED MEANING OF PLACE IN NORTHERN WISCONSIN	**X**					
WIS04093	Lee, M.	INDUSTRIAL CHANGE AND LABOR FORCE UTILIZATION IN WISCONSIN LABOR MARKETS	**X**					

Wisconsin Project No.	Principal Investigator	Title of Project	Hatch	Hatch Multistate	McIntire/ Stennis	Animal Health	Integrated research/ extension	Tota Formul Fund
WIS04170	Ray, R. O.	INTENTIONS AND OUTCOMES: EDUCATION AND LEARNING IN STATE AND NATIONAL FORESTS IN WISCONSIN			X			
WIS04243	Trumbo, J.	VISUALIZATION AND VISUAL LITERACY IN SCIENCE COMMUNICATION	X					
WIS04295	Gunther, A. C.	THE HOSTILE MEDIA EFFECT AND ITS CONSEQUENCES FOR SCIENTIFIC ISSUES	X					
WIS04296	Hitchon, J. C.	COSTLY CHARITY OR SMART STRATEGY? IMPACT ON CONSUMERS AND MANAGERS OF ADVERTISING WITH A SOCIAL DIMENSION	X					
IS04282*	**Loew, P. A.**	**TRIBAL NEWSPAPERS & SOVEREIGNTY: A FRAMEWORK FOR UNDERSTANDING ATTITUDES ABOUT NATURAL RESOURCES IN WISCONSIN**	X				X	
IS04474*	**Kleinman, D. L.**	**CITIZENSHIP AND THE KNOWLEDGE ECONOMY**	X					
		Total:	**$165,896**	**$50,916**	**$20,060**	**$0**	**$54,277**	**$236,87**
	Objective 5.3: Not Assigned							
WIS03820	Buttel, F.	IMPACT ANALYSES AND DECISION STRATEGIES FOR AGRICULTURAL RESEARCH (NC-208)	X	X				
WIS04050	Nordheim, E. V.	USE OF INTERVENTION ANALYSIS	X					

Wisconsin roject No.	Principal Investigator	Title of Project	Hatch	Hatch Multistate	McIntire/ Stennis	Animal Health	Integrated research/ extension	Tota Formul Fund
		FOR TIME SERIES DATA AS APPLIED TO LARGE-SCALE ECOLOGICAL STUDIES						
VIS04194	Clayton, M.	APPLICATION OF STATISTICS TO AGRICULTURE: ANALYSIS OF SPATIALLY AUTOCORRELATED CATEGORICAL DATA	**X**					
		Total:	**$44,067**	**$22,643**	**$0**	**$0**	**$0**	**$66,71**
		Total Goal 5:	**$301,534**	**$107,734**	**$48,308**	**$0**	**$76,642**	**$457,57**
		Grand Total:	**$3,877,292**	**$1,000,351**	**$486,977**	**$147,497**	**$1,261,528**	**$5,512,11**

Publications in refereed journals, books and extension bulletins have been reported on projects using the AD-421 annual reports in the CRIS system. A number of projects are reported as impacts on agriculture or natural resources. Some of the projects had funding from Hatch, McIntire-Stennis and Animal Health; others were funded from competitive federal programs and industry gifts and grants. Outputs described in the original Plan of Work are illustrated by example from the past year in the following projects.

All in the family: business at home

Key themes: Promoting business programs, Family resource management

The issue: Family businesses need to have success in two areas: business and family. A group of 12 multistate researchers and extension faculty is looking at family businesses to assess the health and viability of both aspects. In particular, the Wisconsin project has been involved in economically vulnerable communities and issues due to gender differences in family businesses. Sparsely populated communities, a major portion of rural Wisconsin face extra challenges with economic viability, loss of labor from youthful migration, farm crisis and the need to create employment opportunities outside the family.
What's been done: A longitudinal study of family businesses has been made that looked at family functioning and business viability. A substantial economic contribution to communities was seen with almost 14% of the families owning at least one business. Based on results of their study, extension education materials have been prepared and used to educate the public on the benefits and risks of family-owned businesses.
The impact: This project was awarded the 2001 Northeastern Multistate Research Award for Excellence which recognized its contributions and publications as well as its role in informing elected officials of the importance of family businesses to the economy.

Funding: USDA Hatch Project #3858, part of multistate project NE-167, "Family Businesses: interaction in work and family spheres"

Farmer choices on genetically-modified crops

Key themes: Impact of change on rural communities, Managing change in agriculture, Biotechnology

The issue: Producers have choices in which crops to plant, including use of new genetically-modified varieties. Choices made by producers influence farm profitability and sustainability as well as local communities. Consumers and their attitides influence marketability of crops and other farm products.
What's been done: Surveys of producers over three years have looked at adoption rates for new technologies, farmers' evaluations of performance, and profits. Analysis of public concern and ambivalence to genetic modification of foods has also been examined.
The impact: A surprising result of longitudinal surveys shows that up to one fourth of producers who originally adopted new biotechnologies have reversed their decisions and returned to traditional varieties. Reasons for these changes include perceptions that promised performance enhancements (net profits per acre) were not realized. Results on differential experiences of

producers have been reported on approximately 15 radio shows and interviews indicating public interest in the results of the study. Research emphasis on profitability parameters of new crops will have influence on producer decisions.

Funding: USDA Hatch project #3820, “Impact analyses and decision strategies for agricultural research”

Evaluation of success of multistate, multii-institutional and multidisciplinary activities

The College of Agricultural and Life Sciences and indeed the entire UW-Madison campus place a high value upon faculty-driven, multi-state, multi-institutional and multidisciplinary activities. This traditional value that has served science and the state well for many years. For the most part, UW Madison administrators take pride in breaking down barriers to multi-state, multi-institutional and multidisciplinary work so that faculty can form effective teams to address pressing problems and issues.

Interdisciplinary tradition and enthusiasm on the UW-Madison campus received recent reaffirmation in the creation of a faculty hiring strategy called “cluster hiring.” This hiring strategy encourages and rewards creation of new faculty positions that are interdisciplinary, inter-college and inter-departmental in nature. A recent example of a cluster is one where four faculty members were hired to address food safety problems, particularly those related to mycotoxin contamination. New faculty members have been hired in areas of mycotoxin biosynthesis, mycotoxin genomics, food microbiology and toxicology (surface coatings), and human medicine – all with a focus of reducing human health dangers posed by mycotoxin and other contaminants of foods. Similarly, cluster hires are underway in land use planning, structural biology, chemical biology, genomics and a host of other areas across campus.

Discussions under each of the goals previously presented in this report identify multi-state, multi-institutional research projects, as well as those that have integrated research and extension objectives. Those data will not be cataloged again here. UW-Madison faculty members are heavily involved in North Central Regional research projects, and have competed effectively as part of multi-state teams in the new Initiative for Future Agriculture and Food Systems grant program. Dairy Extension programming in the Upper Midwest functions to a considerable degree on a multi-state basis. For many years, Wisconsin has made its Lancaster Agricultural Research Station available to joint research projects with Iowa State University, the University of Illinois, the University of Minnesota. Collaborative efforts result in research projects directed at cropping, and soil and water conservation issues on the unglaciated soils found at the station. This cooperative research effort has served well those agricultural interests which share common challenges of farming on hilly, unglaciated terrain found in the nearby four-state region. The UW-Madison College of Agricultural and Life Sciences participates in a UW System Consortium for Agricultural and Natural Resources Research, Extension and Instruction. The purpose of the consortium is to conduct collaborative research among investigators at UW-Madison, UW-Platteville, UW-River Falls and UW-Stevens Point, in addition to bringing better coordination to instructional and extension programs operated by the four Wisconsin universities. The Midwest Poultry Science Undergraduate Center of Excellence is yet another example of multi-state programming in the instructional area that has great value in offering students from a number of different institutions educational opportunities that otherwise would not be available to them. This program is organized through the UW-Madison.

Multi-state and multi-institutional programming in all three land grant functional areas (research, extension and instruction) is a strategy that individuals states and institutions adopt with increasing enthusiasm as budget constraints press down.

Multi-state, multi-institutional and multidisciplinary programs have been effective in addressing needs of stakeholders. An example of this effectiveness can be found in a new Wisconsin effort called the Agricultural Stewardship Initiative, which is directed at the state's huge livestock industry. This program came into being because Wisconsin livestock and dairy producers face growing challenges and regulations in managing and utilizing animal wastes in ways that do not degrade the natural resource base or the environment. Farmers asked that state agencies, the university, the industries and producer organizations to listen to their concerns and develop effective programs to address those concerns.

The Agricultural Stewardship Initiative was developed as an answer to agricultural producer concerns. It is made up of component research, a systems farm, and a network of Discovery Farms to evaluate and demonstrate appropriate waste management and nutrient cycling technologies and practices. Key to the entire effort is farmer-driven research, demonstrations and education programs. Throughout the initiative's development and its early operation, there has been intensive producer input.

Following are additional examples of Hatch research projects that relate to the concerns producers have raised about management of animal waste, particularly phosphorus management (including one multistate project):

	WIS03954	Bland, W. L.	EFFECTIVENESS OF CLIMATE AND LANDSCAPE BASED MANAGEMENT TO REDUCE THE RISK OF PHOSPHORUS RUNOFF
	WIS03996	Converse, J. C.; Powell, J. M.; Holmes, B. J.	ANIMAL MANURE AND WASTE UTILIZATION, TREATMENT, AND NUISANCE AVOIDANCE FOR A SUSTAINABLE AGRICULTURE (S-275)
New project this year	WIS05224	Shepard, R. L.; Madison, F.	AN EVALUATION OF NUTRIENT MANAGEMENT PLANNING IN WISCONSIN

User input and program response to that input is also referenced in each to the goals sections. It will not be repeated here, other than to stress that great amounts of energy are devoted to meeting with various user groups and incorporating their suggestions and needs into research and extension programming.
Finally, the Wisconsin Agricultural Experiment Station makes sincere efforts to serve needs of consumers, minority populations, small landowners, alternative agriculture and non-traditional clientele. Below are listed a number of research projects that relate to these special client groups. Note that three of the following projects are multi-state, multidisciplinary projects.

Projects serving underrepresented and minority populations:

Population	Project	Principal investigator	Title
Small producers	WIS04034	Wendorff, W. L.	DEVELOPMENT OF THE PROCESS TECHNOLOGY FOR IMPROVED SHEEP MILK PRODUCTS
Young adults	WIS03967	Nitzke, S. A.	USING STAGES OF CHANGE MODEL TO PROMOTE CONSUMPTION OF GRAINS,

			VEGETABLES AND FRUITS BY YOUNG ADULTS (NC-219)
Tribal land owners	WIS05216	Ventura, S. J.; Summers, G.; Davis, T.	IMPLEMENTATION OF A MULTIPURPOSE LAND INFORMATION SYSTEM IN A COMPLEX INSTITUTIONAL AND CULTURAL SETTING
Sustainable agriculture/organic producers	WIS04051	Kloppenburg, J. R.; Stevenson, G. W.	COMMODITIES, CONSUMERS, AND COMMUNITIES: LOCAL FOOD SYSTEMS IN A GLOBALIZING ENVIRONMENT (NE-185)
Children	WIS04017	Pingree, S.	CHILDREN AND THE NEW MEDIA ENVIRONMENT
Low income	WIS04040	Freudenburg, W.R.	POVERTY, PROSPERITY AND NATURAL RESOURCES IN WISCONSIN
Native Americans (new project this year)	WIS04282	Loew, P. A.	TRIBAL NEWSPAPERS & SOVEREIGNTY: A FRAMEWORK FOR UNDERSTANDING ATTITUDES ABOUT NATURAL RESOURCES IN WISCONSIN
Families/ small business owners	WIS03858	Jasper, C. R.; Goebel, K.	FAMILY BUSINESSES: INTERACTION IN WORK AND FAMILY SPHERES (NE-167)
Women foresters	WIS04323	Thomas, C.; Houghton, J.	ASSESSING THE EDUCATIONAL NEEDS OF WOMEN WHO OWN NON-INDUSTRIAL PRIVATE FOREST LAND IN WISCONSIN

Although formal evaluations have not been done to determine the effectiveness of these efforts, there is ample field experience and observations to support the contention that they do have significant impact on the problems and populations addressed. See earlier presented research impact statements.

Stakeholder Input Process

Stakeholder input for the development and conduct of research relating to state needs has been accomplished in a tiered system. The College of Agricultural and Life Sciences has a central Advisory Board (CALS Board of Visitors) that meets twice a year with the Dean and Associate Deans. Members of this committee (see Appendix B for current list of members) are selected from a wide range of producer, industry, consumer, environmental groups and state agencies. In addition to advisory groups, the Dean of CALS has been meeting with small groups of leaders representing Wisconsin organizations (see Appendix C) for roundtable discussions. These meetings include traditional and non-traditional stakeholders (invitees included in original Plan of Work).

The Dean and Associate Deans attend many meetings of organizations concerned with our research priorities (Appendix D). Faculty regularly attend national scientific conferences and are members of national and international scientific committees. Many attend national forums for research priority setting such as the FAIR 2002 (Food Animal Integrated Research Symposium) and CROPS 99 (Coalition for Research on Plant Systems). These national conferences include stakeholders and representatives from federal agencies. Many departments, centers and institutes maintain advisory committees that meet periodically with researchers in the units. Additionally, faculty regularly attend events with agricultural, natural resource and community service activities (examples in Appendix E).

Wisconsin Cooperative Extension has developed 15 system and issue teams (comprised of University research and Extension professionals, other agency personnel and producers) to develop educational programs directed at both farm and industry clientele. System teams conduct applied research and educational programming that address issues and problems specific to commodities (dairy, beef, swine, sheep, grain crops, forages, vegetable crops, fruit crops and urban agriculture/horticulture). Issue teams deal with integrated issues across the agricultural systems (marketing and risk management, farm business management, nutrient management, land use and agriculture, food safety and quality, and new and emerging farm and agricultural markets). Principal investigators with Hatch, McIntire-Stennis and Animal Health grants are members of both system and issue teams.

Implementation of research priorities in the formula funding process is accomplished through a compilation of the departments' research priorities based on their interactions with stakeholders. Department chairs were asked to provide a small number of research topics from each unit of CALS for use in annual Hatch and McIntire-Stennis calls for proposals. The Dean and Associate Deans assembled a list of common themes from this set that is included in this year's call for proposals.

For the Animal Health process, every two years, the Association of American Veterinary Medical Colleges (AAVMC), with numerous cosponsors organize a two-day listening conference entitled "Critical Issues in Animal Health Research Conference." Representatives from major and minor commodity groups present their positions on the most critical area for research investment. The Associate Dean of the School of Veterinary Medicine (SVM) attends and helps organize this national conference. The SVM has a Board of Visitors that meets twice a year with SVM administration and faculty to provide input on critical research issues. Faculty

reviewers of proposals annually attend a meeting of a variety of stakeholder groups such as the American Veterinary Medical Association, the National Pork Producers, the Bovine Practitioners Association, and the National Turkey Growers Association.

At UW-Stevens Point, concurrent with the distribution of request for proposals, members of the UWSP Forestry Advisory Committee were contacted and asked to submit priority areas of forestry-related research needs in Wisconsin. The committee consists of 21 members who are recognized as leaders in the forestry and conservation community in the State of Wisconsin.

University of Wisconsin –Extension also has a stakeholder process used for setting priorities. Details are available in pdf format at

http://www.uwex.edu/ces/pdande/ProgramPlanning/statewide.html

Since many of our faculty have joint appointment in UW-Extension, this stakeholder input is also used in setting research priorities in programs by those joint faculty and other colleagues in their departments.

CALS specific activities for planning and input:

November 1999 April 2000	CALS Board of Visitors (advisory committee, see Appendix B for current members	CALS Executive Staff and Deans, Dept. chairs of departments
May 2000	Administrative retreat	CALS Deans and chairs of departments
Dec. 1999	CALS budget retreat	CALS Deans

Areas of Identified Research Need for Wisconsin

Meetings with stakeholders, such as those listed above, are utilized to identify research needs specific to Wisconsin. Faculty meet regularly with a number of college and departmental advisory groups, commodity organizations, state agencies, consumer groups, and private citizens. Input from these stakeholders and from those who are performing the research is used to help highlight areas of research need. Every other year, department chairs are asked to provide a small number of research topics from each unit of CALS for use in Hatch and McIntire-Stennis calls for proposals. The Dean and Associate Deans of the College of Agricultural and Life Sciences work on these needs to identify a set of goals for use in the Hatch and McIntire Stennis call for proposals. Reviewers are provided theses priorities as is the Research Advisory Committee that ranks the proposals for funding. The following is a compilation of common themes identified and published in the UW-Madison Call for Proposals in summer 1999.

1. Mechanisms of pest and pathogen resistance and control that minimize effects on environmental quality and human health.
2. Effects of change in global climate, population pressures or public policy on agricultural production, natural resources, and future land use.
3. Identification of socioeconomic forces that shape the viability of rural industries and employment including agriculture, forestry and other land uses.
4. Research on human perceptions and access to information on food choices, food safety, environmental protection, and biotechnology.
5. Sustainable agricultural and forestry production and processing systems that provide improved food safety, environmental protection, and human well-being.

Program review process

Hatch, McIntire-Stennis, and Animal Health funds are used for specific projects solicited in an annual call for proposals. Animal Health proposals are reviewed at the School of Veterinary Medicine; Hatch and McIntire-Stennis proposals are reviewed in CALS.
CALS process:
The following is published in the call for proposals as guidance to the scientists requesting Hatch or McIntire-Stennis funding. This process occurred in November of 1999 for 51 new proposals . One additional call for proposals was made in Spring 2000 for scientists requesting multistate

research funding. A similar review process was done for multistate funding with the smaller subset of proposals already approved through the regional Experiment Station director's processes in March 2000.

The Faculty Review Panel (FRP):

The Associate Dean for Research will choose members of the FRP in consultation with the Research Advisory Committee (RAC). Each proposal will be reviewed by two members of the FRP and at least two other (ad hoc) reviewers. The CALS Research Division, in consultation with RAC members, will make the identification of the ad hoc reviewers. Where possible, ad hoc reviewers will be CALS faculty, though other reviewers both on and off campus may be appointed as necessary. The critical criteria for selection of FRP members and ad hoc reviewers will be scientific excellence, appropriate disciplinary expertise, and overall balance. No member of the FRP will have a proposal under review.

Review Criteria for Reviewers:

Reviewers are asked to critique and evaluate proposals in a constructive way, identifying both the strengths and weaknesses of the proposal(s) reviewed. Reviews should be concise and include comments addressing each of the following criteria:

- *An evaluation of the scientific significance of the objectives and appropriateness of the research approach as indicated in the original Congressional Acts and CSREES Goals.*
- *A judgement of the potential usefulness to society of the research, in the short and/or long term. Problem-solving is a key feature of the formula funding guidelines.*
- *An evaluation of the ability of the research team to accomplish the stated objectives and the match between the objectives and available resources. For teams with multiple investigators, please include a plan of coordination of the work across laboratories or departments.*

Review Process:

- *Copies of the proposal will be sent to two members of the Faculty Review Panel (FRP) and at least two ad hoc reviewers. Each reviewer will prepare a written critique of the proposal and rank the proposal from 1 (highest) to 5 (lowest). The reviews will be submitted to the CALS Research Division and recorded anonymously upon receipt. The two FRP reviewers will receive copies of all reviews (anonymity maintained) on which they are primary or secondary reviewers prior to the FRP meeting so they may be prepared to lead the discussion on the proposals assigned to them.*
- *A meeting will be held of FRP to discuss proposals. Prior to the meeting, copies of all reviews will be provided to FRP members.*
- *At the meeting, the primary reviewer will give a short description of the proposal, the principal investigator's background, and his/her own critique. The secondary reviewer will provide his/her own critique and raise any other points that have been overlooked. Where the FRP has insufficient expertise in the proposal area, an ad hoc reviewer may be brought in as primary or secondary discussant. Comments from ad hoc reviewers will be provided by the primary reviewer and confusing issued clarified.*
- *An approximate placement will be made with respect to proposals as discussion takes place. Obviously this placement will involve some degree of reconsideration of previously placed proposals. Because of this process, an inappropriately negative external review will not condemn a proposal. At the end of the process, FRP members will go over the list and look for any inappropriate placement. The prioritized list will be forwarded to the Associate Dean for Research.*
- *The primary reviewer of each proposal will prepare a summary of the written review*

comments and FRP discussion. The summary and reviews from individual reviewers will be returned to applicants.

The Research Advisory committee of CALS (12 faculty including representation of the School of Human Ecology) approves the guidelines for Hatch proposals, review, and funding. The committee has changed the wording slightly from year to year, but no substantial change in the review process has occurred from the Plan of Work description submitted in July 1999.

SVM Process
Animal Health proposals are reviewed by a faculty committee appointed by James Tracy, Associate Dean for Research, UW-Madison School of Veterinary Medicine. Proposals for research grants from Animal Health Formula Funds are reviewed by the Research Committee of the School of Veterinary Medicine (SVM) in a dual peer review process. After receiving and reading all proposals, the Research Committee first meets to select two peer reviewers, experts in the area of each proposal. These experts are asked to comment both on the scientific merit as well as the relevancy to animal health and specifically to health of livestock in Wisconsin. The Associate Dean for Research of the School of Veterinary Medicine together with the Research Committee from the SVM reviews the overall portfolio of research projects sponsored by the Animal Health Formula Funds make sure that the portfolio of projects is representative of the livestock health issues in Wisconsin.

UW –Stevens Point Process
The McIntire-Stennis Proposal Review Panel consists of five members, three from the College of Natural Resources and two from the forestry community in Wisconsin. Each review panel member was asked to rank the proposals using the following criteria: scientific and technical merit, ability of the principal investigators to perform the research potential for publishable results, and recommended research topics by the UWSP Forestry Advisory Committee. Decisions are made by the Victor Phillips, Dean of the College of Natural Resources, UW-Stevens Point.

Integrated Research and Extension Activities

Our integrated research and extension activities are organized into projects that have been listed under the appropriate goals. Brief descriptions of activities are included as examples of the integration in those sections.

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)

	Wisconsin Agricultural Experiment Station, College of Agricultural & Life Sciences
	Wisconsin

		Multistate Extension Activities
	x	**Integrated Activities (Hatch Act Funds)**
		Integrated Activities (Smith-Lever Act Funds)

penditures

nned Program/Activity		**FY 2000**
ed Research and Extension		
roject lists under goals and criptions		1,261,528
		1,261,528

_____ _____

Director **Date**

EES-REPT (2/00)

Appendices

Appendix A – Science Reports (2 issues) and CALS Quarterly (4 issues)

(not included in electronic version, hard copy by separate mailing)

Appendix B – CALS Advisory Committee membership

CALS Board of Visitors. September 2000

Dr. Ken Barton (‘00)
Director, Ag Biotechnology Pipeline
Monsanto

Mr. Stephen S. Becker (‘02)
Becker Food Company, Inc.

Dr. James R. Behnke (‘03)
Advisor to the CEO Pillsbury Corporation

Ms. Linda Bochert (‘01)
Michael Best & Friedrich
Environmental Law Firm

Mr. Victor Brockmiller (‘01)
Agricultural Chemical Supplier

Mr. Ed Brooks (‘00)
Dairy Farmer

Mr. Steve Diercks (‘01)
Coloma Potato Farms, Inc.

Ms. Kay A. Finch (‘02)
Perry Creek Cranberry Co.

Mr. Guy Gottschalk (‘00)
Gottschalk Cranberry, Inc.

Mr. Paul Gunderson, PhD (‘00)
Marshfield Medical Clinic (Researcher)

Mr. John Hansen (’02)
Nesnah Group

Mr. Gail E. Janssen (‘01)
Retired Agricultural Banker

Dr. Ralph Kauten, President (‘02)
PanVera (Biotech) Company

Mr. Monroe S. Miller (‘01)
Manager of Blackhawk Golf Course

Mr. Paul E. Scharfman (‘01)
c/o Specialty Cheese Company, Inc.

Mr. Donald Storhoff, President (‘00)
Foremost Farms USA, Cooperative

Mr. Robert Tramburg (‘01)
Vita Plus Corporation

Mr. Michael Wehler (‘00)
Pork Producer

Ms. Linda Wenck, President (‘02)
Morgan & Myers/The Barkin Group

Appendix C – Dean's roundtable meetings

September 17,1998 -- General Farm Organizations Roundtable
November 3, 1998 -- Animal Agriculture Roundtable
November 6, 1998 -- Plant Industries Roundtable
February 1, 1999 -- Environmental Organizations Roundtable
April 28, 1999 -- Forestry/Green Industry Roundtable
February 1, 2000 -- Sustainable Agriculture Groups Roundtable

Upcoming 2001 Roundtable discussions:

February 1 -- General Farm Organizations
February 19 -- Food Processing and Marketing
February 23 -- Forestry/Green Industry
March 9 -- Plant Production
March 16 -- Meat and Dairy Production
March 23 -- Environmental Organizations

Appendix D – Stakeholder events, Deans' office

December 18, 1998 -- Food Processing and Marketing Roundtable
January 1, 1999 -- Cranberry Growers Assn. meeting
January 8, 1999 -- Wisconsin Federation of Farm Credit Services meeting
January 14, 1999 -- Wisconsin Fertilizer Council meeting
January 20, 1999 -- Wisconsin Fertilizer, Ag-lime and Pesticide Management meeting
January 22, 1999 -- College alumni meeting
February 6, 1999 -- Wisconsin Farmers Union meeting
February 17, 1999 -- Meeting with Senator Herb Kohl staffers
March 1-2, 1999 -- Council on Agricultural Research, Education and Teaching conference
March 3, 1999 -- Wisconsin Federation of Cooperatives CEO conference
March 5, 1999 -- Leadership of Wisconsin Farm Bureau Federation meeting
March 17, 1999 -- State Legislator Barbara Gronemus meeting
March 25, 1999 -- Meetings with State Legislators Sheryl Albers, Alice Clausing, Robin Kreibich, and Spencer Black
April 5, 1999 -- State Legislator David Ward meeting
April 6, 1999 -- State Legislator DuWayne Johnsrud meeting
April 14, 1999 -- Meeting with state and federal potato industry leaders
May 6, 1999 -- Wisconsin Livestock and Meat Board meeting
May 25, 1999 -- State Legislator Rick Skindrud meeting
May 26, 1999 -- Foremost Farms Board of Directors meeting
June 2, 1999 -- Wisconsin Farm Bureau leadership meeting
July 6, 1999 -- State Legislators Robert Welch, Joan Wade and Hundertmark meeting at the Hancock Agricultural Research Station Potato Field Day
July 20, 1999 -- Informal conversations with about 30 State Legislators participating in the AgriBusiness Council Legislative Tour
August 3, 1999 -- Dairy 2020 Council meeting
August 27, 1999 -- Leadership of Wisconsin Farm Bureau meeting
September 28, 1999 -- Wisconsin Soybean Association Board meeting
October 20, 1999 -- Ag and Natural Resources Cooperative Extension county faculty members annual conference
November 4, 1999 -- Professional Dairy Producers meeting
November 15, 1999 -- Farm Bureau Dairy Committee meeting
December 2, 1999 -- Soybean Marketing Board leaders meeting
December 3, 1999 -- Potato Seed Producers meeting
January 11, 2000 -- Wisconsin Milk Marketing Board staff meeting
January 19, 2000 -- Ginseng Growers meeting
January 28, 2000 -- Wisconsin Agri-Services Association meeting
February 1, 2000 -- Sustainable Agriculture Groups Roundtable
February 15, 2000 -- Corn and Soybean Growers annual meeting
February 25, 2000 -- Potato and vegetable growers leaders meeting
March 6-7, 2000 -- National meeting of Council on Agricultural Research, Extension and Teaching

March 8, 2000 -- Professional Dairy Producers of Wisconsin meeting
March 14, 2000 -- State Legislator Barbara Gronemus meeting
March 15, 2000 -- Senator Herb Kohl staff visit
March 17, 2000 -- State Legislator meeting with Russ Decker
March 24, 2000 -- Cooperative Resources International meeting
March 27, 2000 -- Wisconsin Federation of Cooperatives leadership meeting
April 8, 2000 -- Wisconsin Association of Meat Processors meeting
April 17, 2000 -- Congresswoman Tammy Baldwin meeting
April 20, 2000 -- Meeting of leaders of Wisconsin's general farm organizations (Agribusiness Council, NFO, Farmer's Union, Farm Bureau and Federation of Cooperatives)
April 21, 2000 -- Potato and vegetable industry leaders meeting
May 8, 2000 -- State Legislator Scott Suder meeting
May 31, 2000 -- Food Research Institute member and advisory board meeting
June 13, 2000 -- Rural Energy Management Council committee leader meeting
October 4, 2000 -- State Legislator Eugene Hahn meeting
October 19, 2000 -- Wisconsin Federation of Cooperatives leadership meeting
October 20, 2000 -- College alumni board meeting
October 25, 2000 -- State Legislator Russ Decker meeting
October 25, 2000 -- Wisconsin Potato and Vegetable Growers meeting
November 6, 2000 -- Soybean Growers Assn. leaders meeting
November 7, 2000 -- Rural Energy Management Council meeting
November 27, 2000 -- Wisconsin Farm Bureau Federation leadership meeting
December 4, 2000 -- Wisconsin Farm Bureau Federation annual meeting

Appendix E - Examples of stakeholder activities with faculty:

Date	Stakeholder group	Department or unit
March 2000	Issues Forum on Land-Use Planning	CALS Executive Staff and Deans, Dept. of Rural Sociology and Dept. of Urban and Regional Planning
June 2000	Mayor's breakfast at Marshfield Agricultural Research Station	CALS Associate Dean for Research, CALS Director of School of Natural Resources, Staff of Agricultural Research Stations
December 1999	Angus Advisory Group	Animal Science
December 1999	Polled Hereford Advisory Group	Animal Science
January 2000	Wisconsin Fertilizer and Ag-Lime Conference	CALS Executive staff and Deans, Departments of Soil Science, Agronomy, Biological Systems Engineering, Agronomy
August 2000	Stakeholder meeting as part of review of Peninsular Ag Research Station, fruit growers and processors, extension agents and local users	Faculty review team including the Associate Dean for Research
February 2000	Wisconsin Horse Council	Animal Science
April 2000	USDA Fish and Wildlife staff visit	CALS Associate Dean for Research, CALS Director of School of Natural Resources, Depts. of Wildlife Ecology, Forest Ecology and Management
August 2000	Wisconsin Turfgrass Association Field Day at O.J. Noer Agricultural Research Station	Associate Dean for Research, chairs and faculty from Horticulture, Entomology, Soil Science, Plant Pathology and Agronomy
April 2000	Wisconsin Livestock Breeders	Animal Science
September 2000	Raper Symposium, industry and alumni guests and research presentations from faculty and students	Bacteriology

July 2000	WI Potato and Vegetable Growers Research committee	CALS Associate Dean for Research, chair Horticulture and faculty from Horticulture, Plant Pathology,
Sept. 2000	Wisconsin Pork Producers	Animal Science
August 2000	Urban Horticulture Field Day at West Madison Agricultural Research Station	Dean, Associate Dean for Research, chairs and faculty of Horticulture, Agronomy, Plant Pathology
Quarterly	Dept. Advisory committee	Landscape Architecture
September 2000	Soybean Board Research Priorities meeting (growers, feed dealers, suppliers)	Research faculty from Soils, Agricultural and Applied Economics, Agronomy, Plant Pathology and Life Sciences Communication
July 2000	International Society of Animal Genetics	Associate Dean for Research, Faculty of Dairy and Animal Science
May 1999	WI Nature Conservancy	Landscape Architecture
August 2000	USDA National Laboratory for Agricultural Utilization, Peoria, IL	Dean, Associate Dean for Research, Director of School for Natural Resources
August 2000	Milwaukee Trails office	Landscape Architecture
May 2000	Dietetics Education Advisory Council	Nutritional Sciences
September 2000	Current Issues in Elderly Nutrition conference	Nutritional Sciences (coordinated with Extension)
June 2000	Food Research Institute Board of Advisors	Food Microbiology and Toxicology
May 2000	Food Research Institute Annual Retreat	Food Microbiology and Toxicology
February 2000	Babcock Associates (industry advisory group)	Food Science
September 2000	Wisconsin Soybean Marketing Board	Biological Systems Engineering
September 1999	Advisory committee	Biological Systems Engineering
August 1999	Annual retreat and symposium	Biochemistry
April 2000	WI Dept. of Natural Resources Science Services retreat	Wildlife Ecology
September 2000	Alumni Advisory Council	Urban and Regional Planning
June & September 2000	Governor's Council on Forestry	Forest Ecology and Management
April 2000	Wisconsin Woodland Owner's Association (small holders)	Forest Ecology and Management

August 2000	Advisory Committee retreat	Dairy Science
July 2000	Central Wisconsin Potato Field Day, Hancock Agricultural Station	Associate Dean for Research, Chair Horticulture, faculty from Horticulture, Plant Pathology, Entomology, Soil Science
Multiple meetings	Professional Dairy Producers, Farm Credit Services, Cargill Animal Nutrition, Wisconsin Milk Marketing Board, Integrated Dairy Facilities Advisory Committee	Dairy Science
February, March, & April 2000	Wisconsin Newspaper Association	Life Sciences Communication
Monthly	National Agri-Marketing Association (professional chapter)	Life Sciences Communication
Multiple meetings	Great Lakes Intertribal Council, Troy Gardens Coalition, Family Health La Clinica, Centro Hispanica, State of Wisconsin Migrant Services	College of Agricultural and Life Sciences Food System Partnership
Multiple meetings	1000 Friends of Wisconsin, Wisconsin Chapter of American Planning Associates, Wisconsin Realtors, River Alliance of Wisconsin	Urban and Regional Planning
January, April, July 2000	Wisconsin Nutrition Education Network steering committee (special emphasis on low income families)	Nutritional Sciences