

2007 University of Wisconsin Research Plan of Work

Brief Summary about Plan of Work

Operating Philosophy/Program Overview

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 reviewed annually 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 150 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.

The Research Program in this Plan of Work is 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 are 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 20% 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 Executive Associate Director, WAES, and the Associate Dean for Research. These processes ensure that projects are pertinent to the REE and CSREES national goals and emphasis areas and focus on current state research needs.

The process follows a general "logic model" process in which input is sought from stakeholders, establishing a set of operating priorities. Stakeholder groups include both traditional and non-traditional groups. Input is also sought via public meetings such as field day events held at our Agricultural Research Stations or through other Extension venues including meetings and a set of Extension issue-based teams composed of University of Wisconsin – Madison/Extension faculty and county based educators.

Five national goals have been established in the Research, Education, and Economics (REE) Mission Area and USDA Cooperative State Research, Education and Extension Service (CSREES) Agency strategic plans. (<http://www.csrees.usda.gov/business/reporting/portfolios.html>)

These goals are listed as priorities for projects to be funded in the Wisconsin Research program. The number of current Wisconsin projects is included for each goal in parentheses. 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 instances, a research project relates to multiple goals and themes. These research projects are then reported in multiple goals. 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. The number of included projects for each goal is a good indicator of Wisconsin's priorities relative to national goals.

1. Enhance Economic Opportunities for Agricultural Producers. Empower families and communities to address the economic and social challenges through research-based information and education. (23 projects)
2. Support Increased Economic Opportunities and Improved Quality of Life in Rural America. Enhance environmental quality through better understanding of, and building on, agriculture and forestry's complex links with soil, water, air and biotic resources. (81 projects)
3. Enhance Protection and Safety of the Nation's Agriculture and Food Supply. Ensure a safe and adequate food and fiber supply through improved science-based detection, surveillance, prevention, and education. (43 projects)
4. Improve the Nation's Nutrition and Health. Enable people to make health-promoting dietary choices through nutrition education, research, and development of more nutritious foods. (17 projects)
5. Protect and Enhance the Nation's Natural Resource Base and Environment. Empower the agricultural system with knowledge to improve competitiveness in domestic production, processing, and marketing through research and education. (33 projects)

Within these national goals, states are asked to draw on stakeholder input to help direct use of formula funding. In Wisconsin, College administration and 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 performing the research, is beneficial to assist in highlighting areas of research need. Department chairs are also asked

to provide a small number of research topics from each unit of CALS for use in Hatch and McIntire-Stennis call for proposals.

Input from stakeholders is reviewed and discussed periodically as information is obtained at regularly scheduled meetings of the CALS administrative team. The following is a compilation of common themes established as the result of these discussions, reviews and updates by College administration. The list below is provided to draw attention to needs currently of interest within the state, and is published annually as part of the Colleges call for proposals for our Hatch Research program.

1. Mechanisms of pest and pathogen resistance and safe and effective control, with minimum effects on environmental quality and human health.
2. Effects of change in global climate, population pressures, or public policy on agricultural production, environmental resources, ecosystem management, and future land uses.
3. Identification of socioeconomic or other forces that shape the viability of Wisconsin industries and employment including agriculture, bio-based industry, forestry, wildlife management, recreation, and other land uses.
4. Research on food safety, nutritional health, environmental protection, and biotechnology and on providing information on dietary choices, lifestyle and community decisions.
5. Sustainable agricultural and forestry production and processing systems that provide improved food safety and security, environmental protection, economically viable communities, protection of public goods, and human well-being. This need requires an understanding of basic life processes in order to manage biotic systems for human use.

These Wisconsin priorities along with the National Goals are provided to faculty to use in developing proposals for funding under the Hatch program. They are also provided to the review panel that provides recommendations for funding.

We feel that there is a strong relationship between the national goals and Wisconsin priorities. For example, the first National goal (Enhance Economic Opportunities for Agricultural Producers. Empower families and communities to address the economic and social challenges through research-based information and education.) is clearly related to a number of the Wisconsin priorities including:

1. Mechanisms of pest and pathogen resistance and safe and effective control, with minimum effects on environmental quality and human health.
2. Effects of change in global climate, population pressures, or public policy on agricultural production, environmental resources, ecosystem management, and future land uses.
3. Identification of socioeconomic or other forces that shape the viability of Wisconsin industries and employment including agriculture, bio-based industry, forestry, wildlife management, recreation, and other land uses.
5. Sustainable agricultural and forestry production and processing systems that provide improved food safety and security, environmental protection, economically viable communities, protection of public goods, and human well-being. This need requires an understanding of basic life processes in order to manage biotic systems for human use.

Looking at the fourth National Goal, (Improve the Nation's Nutrition and Health. Enable people to make health-promoting dietary choices through nutrition education, research, and development of more nutritious foods.), the following Wisconsin goals relate:

1. Mechanisms of pest and pathogen resistance and safe and effective control, with minimum effects on environmental quality and human health.
4. Research on food safety, nutritional health, environmental protection, and biotechnology and on providing information on dietary choices, lifestyle and community decisions.
5. Sustainable agricultural and forestry production and processing systems that provide improved food safety and security, environmental protection, economically viable communities, protection of public goods, and human well-being. This need requires an understanding of basic life processes in order to manage biotic systems for human use.

Similar relevance can be cited for each national goal: Goal 2, Support Increased Economic Opportunities and Improved Quality of Life in Rural America, is aligned with Wisconsin priorities 2, 3 and 5. Federal Goal 3, Enhance Protection and Safety of the Nation's Agriculture and Food Supply, relates to Wisconsin priorities 1 and 4. Federal Goal 5, Protect and Enhance the Nation's Natural Resource Base and Environment, is supported by Wisconsin priorities is supported by all of the Wisconsin priorities.

These priorities along with other criteria such as Extension/Integrated activity, Multistate, under-represented populations/groups and past Hatch productivity are also used in the merit evaluation of proposals subsequently submitted.

The call for proposals for a fiscal year (for example FY08) beginning Oct. 1, 2007, would be initiated in June, 2006, around 16 months prior to project initiation. Proposals would be due approximately September 15, 2006. A copy of the call for proposals, guidelines and merit criteria are available at <http://www.cals.wisc.edu/research/WAES/Hatch/index.html>.

Proposals are evaluated by an internal panel of faculty, called the Research Advisory Committee (RAC). The RAC is composed of 12 faculty, the Executive Director of the Agricultural Experiment Station and the Associate Dean(s) for Research. Faculty are chosen to represent the broad cross section of the college and serve rotating three year terms. Proposals are assigned to primary and secondary reviewers from the RAC members and two other appropriate scientific reviewers not on the

RAC. These reviewers may be either internal, external or a mix. The criteria for choosing the reviewers would be their ability/knowledge base to judge the merit of the proposals. The RAC will then convene in late November or early December to rank the proposals based on the established criteria.

This process is detailed under "Nature of the Proposal reviews for HATCH and McIntire-Stennis Proposals" included at the end of the Call for Proposals document referenced above.

Outcomes being monitored initially to assess program effectiveness and impact including publications, patents and graduate students trained. Future indicators may be expanded to include other criteria. This information will not only be used to assess current program effectiveness and accomplishments, but will also be used as a consideration in determining future HATCH funding priorities.

CALS feels that Wisconsin accomplishments relate very well to high priority issues cited earlier. Publications in refereed journals, books, and extension bulletins have been reported on projects using the AD-421 annual reports in the CRIS system. UW-Madison CALS was rated first among peer institution in the Scientific Impact Factor of its publications. We feel this is representative of our entire research portfolio including Hatch. Hatch funding of research often leads to significant funding from other sources. CALS rates also very high in extramural funding both among land-grant and public institutions. A number of representative projects are reported as impacts in our Annual Report. Several representative examples of projects and their impacts are cited from CALS' 2005 annual report as follows:

Milk Quality

Key themes: Animal health, Agricultural profitability

Focus areas: Sustainability of agriculture and forestry

Issue: Milk-quality premiums allow dairy farmers to increase the marginal profit of their farms because they offer one of the few ways for farmers to increase the selling price of their milk. Many Wisconsin dairy farmers are getting premiums for quality milk.

What's been done: A UW-Madison/Extension milk quality specialist developed Milk Money, a team-based approach to improving milk quality and boosting profitability. Farmers themselves determine the goals for their operations, then choose a team of dairy experts that meets monthly to discuss the farmer's milk quality goals and how to meet them.

The team focuses on improving milk quality by reducing mastitis. Farmers can't sell milk from cows with clinical mastitis, but sub clinical mastitis also robs profits. High rates of sub clinical mastitis decrease farm income and increase the risk of antibiotic residues appearing in milk. Teams identify best management practices that will help to maximize those premiums, such as analyzing the milking system several times per year, performing bulk tank cultures, culturing and recording all cases of clinical mastitis, having and using a written milking routine, and regularly discussing milk quality with veterinarian and field representative.

Impacts: One hundred seventy-two herds have completed the Milk Money program, 376 have submitted registration forms to the program.

An analysis of the first 113 herds to complete the program increased their monthly per cow income by \$6.60 per cow, resulting in an average income increase of \$19,860 per farm per year. Milk quality improvements resulted in increased income of \$3.24 per cow per month; saving on cost of treating clinical mastitis averaged \$2.24 per cow per month; and higher milk production due to less sub clinical mastitis was \$1.12 per cow per month.

More recent data (a summary of data from 172 herds that completed the Milk Money program) confirm the previously published results. The bulk tank SCC dropped an average of 87,210 cells/ml during the 4-month period of the program and the Standard plate count dropped 5,170 cfu. A conservative estimate of the per farm increase in income attributable to participation in Milk Money is approximately \$1,030 per month (based on current milk prices) with about 60% (\$627) due to farms receiving increased premiums. If maintained for 1 year for every 100 Wisconsin dairy farm families participating the annual return would be \$1,236,000.

This project has both short and long-term impacts. Participating farms realized immediate profits from increased milk profits and decreased costs of treatment (at a time when milk prices were very low and increases particularly helpful). Extending the monthly increases to an annual basis shows an income increase of over one million dollars for these farms alone. Teams working on the farms include county extension agents as team leaders in many cases; experience with single farms are multiplied through the extension network to include whole counties. An extension website on the Milk Money program is available for producers at <http://www.uwex.edu/milkquality/Programs/index.htm>. The website receives almost 3000 visits per month. Long-term impacts include the education of everyone on the team – veterinarians, extension, producers, farm equipment services and farm labor with implications for all the other producers that these professionals serve.

Funding: Wisconsin Hatch project #WIS04734, "Mastitis Resistance to Enhance Dairy Food Safety (part of multistate project NE-1009), and Wisconsin Milk Marketing Board.

Using Cold Plasma to Treat Food-Processing Surfaces, Prevent Contamination

Key issues: Food Safety, Food Borne Pathogen Protection, Food Quality
Focus areas: Improved Pest Control and Food Quality

and Protection Act Implementation

Issue: Food contamination can stem from various sources, including the constituent raw materials, surfaces (including containers and processing equipment), people and air. Microbial attachment to surfaces and the development of biofilm, which house bacteria, are known to occur in many environments. In food processing environments, biofilms can serve as potential sources of contamination, leading to food spoilage or transmission of food-borne diseases. It has been shown that even with acceptable cleaning systems in place bacteria can remain on equipment surfaces and survive for prolonged periods. It is known that contaminated equipment is one of several major contributing factors in microbial food-borne disease outbreaks in the United States.

What's been done: Researchers at the University of Wisconsin-Madison tested how well three different plasma-enhanced methods were able to deposit polyethylene glycol (PEG) on surfaces. PEG reduces protein and cell adsorption and might be able to prevent biofilm from forming. It was found that the plasma-modified surfaces resulting from all three approaches exhibited significant antifouling behavior.

Impacts: This research will allow the development of non-equilibrium plasma technologies for generating surfaces with antifouling properties that will significantly limit protein- and bacterial-adherence and biofilm formation. Applications of these plasma-modified materials will be in food-packaging environments and in the development of various temporary or permanent medical implants, such as catheters, artificial organs or artificial organ parts. Space-flight application might also take advantage of the results of this plasma-aided research.

Funding: Hatch project #WIS04771, "Generation of Antifouling Layers From High Molecular Weight Liquid Phase Compounds Under Cold Plasma Condition"

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Understanding Youth Participation in Community Planning and Environmental Stewardship

Key themes: Communication Skills, Community Development, Impact of Change on Rural Communities, Leadership Training and Development, Youth Development

Focus areas: Small Farm and Their Contributions to Local Economies, Sustainability of Agriculture and Forestry

The issue: Youth program coordinators understand the importance of evaluating outcomes of youth participation in their programs. Likewise, funding agencies are keen to assess the effectiveness of the programs they support. However, many of these programs measure success in easily quantifiable terms (number of participants, hours of participation, pre- and post-participation testing) that does not capture the full experience of participation. Adult coordinators know success when they see it, but find it difficult to communicate these success stories to outside evaluators. Finally, adult coordinators sense that place plays an important role in program outcomes, but are unsure how and to what extent.

What's been done: Landscape Architects at the University of Wisconsin-Madison have a long tradition of working to ensure effective citizen participation in decisions that affect the places in which they live, work and play. They are now focusing on youth participation in place-based programs and working to improve the participant experience by developing better evaluation methods that capture more fully both the experience of young people and the role of place. Initial research found that most of the "success" described by adult coordinators did not get measured or reported in any systematic or formal way and was therefore lost to program evaluators. They are currently working with focus group participants to develop techniques for systematically recording observations of program success.

Impact: Better understanding of the youth experience of place-based programs will help program coordinators and their supporters achieve the outcomes they desire. Involving young people in projects that directly affect the places where they live not only improves quality of life in their communities, but also encourages civic engagement among the participants. Improved methods of recording program success will lead to programs that better serve young people. The initial focus group has evolved into a continuing roundtable of sorts with plans to share its insights through a web-based working group. In this way, implementation and evaluation strategies will be available to other youth program coordinators in the United States and abroad.

Funding: Hatch project #WIS04915, "Understanding Youth Participation in Community Planning and Environmental Stewardship"

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Biosynthesis of Tocopherols (Vitamin E) in Carrot

Key themes: Human Health, Nutraceuticals

Focus areas: Modifying food intake behavior

The issue: Improving the nutritional content of common foods promises to be one of the easiest ways to insure nutritional health. Tocopherols (Vitamin E) are potent anti-oxidants that may confer a variety of health benefits. Vegetable oils and oilseeds are the most common sources of Vitamin E today. Very little research has focused on identifying Vitamin E or increasing Vitamin E content in the fleshy parts of vegetables.

What's been done: Researchers at the UW-Madison studied a mutant white carrot that had very low levels of carotenoids (Vitamin A). The Vitamin A and Vitamin E production pathways in plants are closely related; both arise from the same compound. The researchers theorized that the white carrot, which didn't produce Vitamin A, might produce Vitamin E instead. The white carrot didn't produce high levels of Vitamin E, but while studying it, the researchers developed a process to detect Vitamin E in carrot roots. The process also detects Vitamin E content in sweet potatoes and tomatoes. The researchers have an ongoing screening program, examining carrot germplasm from around the world for increased Vitamin E content.

Impact: A patent was issued for the original gene influencing color and Vitamin E content in carrot roots. Three carrot populations were selected for higher levels of Vitamin E over a period of four years, and the level of this vitamin was increased substantially. White and yellow-rooted carrots were found to contain higher levels of Vitamin E than orange types, suggesting alternative colors may be useful nutritionally. A clear positive relationship between pro-Vitamin A and Vitamin E compounds in carrot was discovered: the darker the orange color in the root, the greater the levels of Vitamin E. Development has begun on carrot hybrids with elevated levels of both vitamins. Multi-colored baby carrot products in the grocery store are beginning to appeal to consumers, who see the color array as visually appealing and the nutritional benefits as useful.

This project has both short and long-term impacts. In the short-term, a patent has been issued on a reduced pigment gene of carrot and a high pigment beet. A new cultivar of beet is ready for release. A new protocol for detecting Vitamin E in foods has been developed and is in use. A brochure on the taste-tests of carrot varieties has been prepared using young adult preferences. Long-term impacts include education on the nutraceutical value of foods and development of improved vegetable cultivars for human health.

Funding: Hatch project #WIS04532, "Biosynthesis of Tocopherols (Vitamin E) and Relationship to Provitamin A in Carrot", Phytocolorants LLC, and Midwest Food Processors Association.

Vegetative Buffer Strips for Reducing Contaminated Runoff from Urban Areas

Key themes: Nutrient Management, Water Quality

Focus areas: Water Quality

The issue: Urban runoff, which contributes to nonpoint source pollution, is increasingly targeted through regulation. Impervious paved areas – such as rooftops, roads, parking lots, sidewalks and driveways – contribute significantly to runoff because they prevent storm water from seeping into the ground. When runoff enters waterways it can carry contaminants – in particular phosphorus and nitrogen, which are components of fertilizers – that affect surface water quality and may affect the environment. Bioavailable phosphorus (BAP) also causes algal blooms, which detract from recreational use of waterways. Sediment, primarily from exposed soil, is often the primary source of an ecosystem's BAP. Excessive sediment reduces oxygen availability for aquatic life and water clarity, while excessive nitrogen in drinking water is regulated by the U.S. Environmental Protection Agency. Mowed turf is commonly used around paved areas in urban areas but requires fertilization with nitrogen and sometimes phosphorus for desirable results. One mechanism that has been proposed to reduce runoff, sediment and nutrient loading is to replace turf in urban areas with native or prairie plants that don't require fertilizer.

What's been done: Scientists from horticulture, soils and biological systems engineering conducted studies comparing turf and prairie as buffer strips to reduce urban runoff pollution. Three ratios of buffer strips to pavement were compared to develop a value engineers can use when designing urban areas. Plots have been shown at five field days since 2002. Data have been presented at two state and three national conferences. One manuscript has been submitted and four are in preparation.

Impact: The project's impact will be spread over many years as urban engineers and regulatory agencies use the data to develop better urban systems to prevent surface water contamination. The Soil Water Conservation Service has invited the scientists to present at its 2006 international conference. Washington, D.C. urban planners are using the data in their work. Federal and state agencies are developing urban runoff plans and regulations to reduce surface water pollution. In Wisconsin, the Department of Natural Resources adopted non-point source pollution rules, known as NR151, in 2000. Data are being shared with the DNR as they develop turf fertilizer guidelines associated with NR151. The goal is to reduce sediment loading (and the commensurate nutrient loading from phosphorus and nitrogen) by 20 percent by 2008 and 40 percent by 2013.

Funding: Hatch project #WIS05232, "Vegetative Buffer Strips for Reducing Contaminated Runoff from Urban Areas"

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The Economic Effects of Rural Land Use Restrictions to Preserve Environmental Amenities

Key themes: Natural Resource Management Land Use

Focus areas: Water Quality

The issue: As rural areas face increasing pressure from development, local authorities sometimes adopt strict land-use policies to protect natural amenities. However, the economic consequences of these policies are poorly understood and difficult to measure.

What's been done: Economists at the University of Wisconsin-Madison used a technique called hedonic analysis to examine the price effects of a comprehensive lakeshore ordinance in Vilas County, Wis., which restricted lakeshore development depending in part on a lake's ecological sensitivity. They found that overall the restrictions have had a positive effect on property values. The researchers also conducted an internet survey of lakefront property landowners to understand what aspects of lakes, in particular which recreational lake activities, people enjoy most, and what they expect for the future of northern Wisconsin lakes. They plan to use the survey data to determine whether people sort themselves across lakes, and if zoning mechanisms drive sorting. Additional future research will examine the impact of water clarity on property values.

Impact: The analysis of Vilas County gives lake managers and property owners information about the effect of shoreline restrictions on property values and, indirectly, information about the value people place on the environmental amenities preserved by such restrictions.

Funding: McIntire-Stennis project #WIS04789, "The Economic Effects of Rural Land Use Restrictions to Preserve Environmental Amenities

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Historically the University of Wisconsin-Extension and the University of Wisconsin-Madison, College of Agricultural and Life Sciences have submitted separate plans and reports. While this remains the case with this plan, the intent on the part of both institutions is to improve the linkage of the plans in areas such as stakeholder and research input, evaluation of integrated activity, and outcome evaluation. This may lead to submission of a single plan for the State of Wisconsin in the future.

Estimated number of professional FTEs/SYs total in the State.

| Year | Extension | | Research | |
|------|-----------|------|----------|------|
| | 1862 | 1890 | 1862 | 1890 |
| 2007 | 0.0 | 0.0 | 158.5 | 0.0 |
| 2008 | 0.0 | 0.0 | 156.0 | 0.0 |
| 2009 | 0.0 | 0.0 | 156.0 | 0.0 |
| 2010 | 0.0 | 0.0 | 154.0 | 0.0 |
| 2011 | 0.0 | 0.0 | 154.0 | 0.0 |

Merit Review Process

The merit review process that will be employed during the 5-Year Plan of Work cycle

- Internal University Panel
- Expert Peer Review

Brief explanation

Proposals for Hatch funding on the UW-Madison campus are reviewed by a 12 person faculty committee. This committee, the Research Advisory committee, is appointed by the Wisconsin Agriculture Experiment Station Executive Director. Interim Executive Director Richard J. Straub currently serves in this role. Each proposal receives two reviews from the panel members (designated primary and secondary reviewers) and two reviews from outside the committee using established experts in the field

from the Madison campus, other UW campuses, WI state agencies, non-governmental organizations and from scientists from other states. Panel reviews are discussed by a primary and secondary reviewer from the campus committee and the entire group ranks the proposals using three criteria that include merit, quality of science and ability of the researchers to complete the project.

Merit includes relevance to program guidelines and to National Goals and Emphases Areas, pertinence to state problems and priorities, relationship to multistate projects and inclusion of integrated activity.

Recommendations of the Research Advisory Committee are used by the Executive Director of the Wisconsin Agriculture Experiment Station and the Associate Dean for Research to make funding and programmatic decisions.

Multi-state efforts are peer-reviewed by the regional committees in the North Central region using a several stage process.

Committees of departmental chairs and heads from pertinent departments review the proposals and make recommendations to the subcommittee of the North Central Region Administrators (NCRA) Committee.

Some Wisconsin faculty are also cooperators in multi-state committees in the Northeast Region, Southern Region, Western Region and a few National (NRSP) projects. Each region has a review process with slight modifications. Details on North Central projects, guidelines, review process and links to other regions are available online at <http://www.wisc.edu/ncra/>.

Evaluation of Multis & Joint Activities

1. How will the planned programs address the critical issues of strategic importance, including those identified by the stakeholders?

The planned program relies on annual input from stakeholder groups to identify critical issues of strategic importance. These priorities are conveyed to faculty who competitively apply for project support from Hatch funds (along with national goals which have been established in the Research, Educators, and Economics (REE) Mission Area and the USDA Cooperation States Research Educators and Extension Service (CSREES) strategic plans). These priorities are also used by the Research Advisory Committee that evaluates the project proposals as described in the Merit Review section. These goals are then used by the Wisconsin AES Executive Director in consultation with the Associate Dean for Research in making final program funding decisions.

A small pool of Hatch funds (5-10% of total) are not allocated through the competitive process, but are used to meet any urgent critical needs which arise outside of the normal funding cycle. Usually about one half of this pool is ultimately used to provide capital support to ongoing projects. This amount will vary based upon the number of emerging issues needing attention.

2. How will the planned programs address the needs of under-served and under-represented populations of the State(s)?

The University of Wisconsin–Madison campus is actively engaged in promoting a diversity initiative, Plan 2008(see <http://www.provost.wisc.edu/plan2008>) charged to increase diversity of our students, staff and faculty and to create an awareness and understanding of diversity issues among our population. A National Science Foundation funded program has promoted inclusion of more women in under-represented sciences. The College of Agriculture and Life Sciences has developed a memorandum of understanding with the Menominee Nation that is bringing college and pre-college students to both campuses for reciprocal visits and education.

We are using such broad based programs to promote awareness of needs of the under-served community. Many societal needs such as those related to health, nutrition and economic development often affect the under-served and under-represented disproportionately. Our current portfolio currently addresses problems related to small farms, organic products, youth, nutrition, minorities, and rural communities. We are committed to continue to provide research results that will improve the lives of all of our population.

3. How will the planned programs describe the expected outcomes and impacts?

The planned program will describe the outcomes and impacts in a number of ways. Initially, we will use three indicators to measure outcomes: Patents (as the single required outcome indicator), number of publications, and graduate students trained (degrees granted) based on the project portfolio. Since we have not previously tracked patents specifically tied to Hatch support, this measure is somewhat more tentative than the other two that we have monitored. We also believe that patent disclosures might be a better short term indicator, since the patent process may not come to completion until well after the active research project has terminated. This is something we intend to monitor as a possible future indicator of effort. We are hopeful that the “One Solution” reporting system under development will allow us flexibility to add outcomes specific to our Plan of Work. Inclusion of such flexible fields would greatly help us track indicators on an annual basis as part of our required reporting process.

We will continue to develop impact statements on projects that we feel have contributed not only to the advancement of the Knowledge Areas, but which have had a greater impact in terms of Extension programming or societal benefits.

4. How will the planned programs result in improved program effectiveness and/or efficiency?

The planned program results in improved program effectiveness and/or efficiency in that it is annually being reviewed, and being re-directed to issues that are newly emerged or considered most relevant to national and state needs. As part of the merit review and application process that is used, past output performance by the faculty/scientists is considered. Evidence of productivity is an important consideration in reviewing and rating projects for approval. The annual proposal process also allows for updating stakeholder input on a regular basis. These changes are published in the call for proposals and are presented to the proposal review panel for use in making recommendations on project proposals.

Stakeholder Input

1. Actions taken to seek stakeholder input that encourages their participation (Check all that apply)

- Targeted invitation to traditional stakeholder groups
- Targeted invitation to non-traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to non-traditional stakeholder individuals
- Targeted invitation to selected individuals from general public
- Other ()

Brief explanation.

Stakeholder Input

Stakeholders' input for the development and conduct of research relating to state needs is accomplished in a tiered system. Many departments, centers, and institutes maintain advisory committees that meet periodically with researchers in the units. Departments convey these inputs to the Dean's office. The College of Agricultural and Life Sciences has a central Advisory Board that meets twice a year with the Dean and Associate Deans. Members of the committee are selected from a wide range of producers, industry, consumer, environmental groups and state agencies. This Board not only advises on research and outreach needs, but also advises on contacts for constituency groups and individuals.

In addition to advisory groups, the Dean of CALS periodically meets with focus groups representing organizations within Wisconsin in a series of meetings called CALS Roundtables. Focus groups include traditional and non-traditional stakeholders. Input from these stakeholders is used to help highlight areas of research need. A listing of these focus groups follows at the end of this section. The primary goal of the CALS Roundtable is to improve communication between the College and the people it serves and to provide feedback to the College. The Roundtable provides periodic opportunities for leaders of user groups to interact informally with CALS administration and faculty to discuss: a) user group needs and opportunities; b) current CALS programs and program proposals and their effectiveness; and c) ways to increase cooperation among user groups, the university, and state and federal agencies. Discussions focus primarily on issues related to CALS research, education and extension/outreach programs.

Focus Group List

- General Agriculture
- Food Processing and Marketing
- Animal Agriculture
- Plant Groups
- Environmental and Natural Resources
- Green and Forestry
- Biotechnology
- Sustainable and Organic Food Produces
- Consumer and Non-Traditional Groups

The Dean's and Director's office also tries to participate in as many public or stakeholder sponsored meeting/field days for public input. Normally, we would participate in 50-100 of these per year, including field days at our Agricultural Research Stations.

2(A). A brief statement of the process that will be used by the recipient institution to identify individuals and groups stakeholders and to collect input from them

1. Method to identify individuals and groups

- Use Advisory Committees
- Use Internal Focus Groups

Brief explanation.

Methods to Identify Individuals and Groups

As indicated earlier in Question 1 of this section, UW–Madison relies heavily on advisory boards to help identify stakeholders. The College of Agricultural and Life Sciences through its Dean, Associate Deans, and Assistant Dean for Communications maintains a close relationship with stakeholders and through these face-to-face interactions obtains information on needs and on other potential stakeholders. Departments, department chairs and faculty can also recommend contacts.

2(B). A brief statement of the process that will be used by the recipient institution to identify individuals and groups stakeholders and to collect input from them

1. Methods for collecting Stakeholder Input

- Meeting with traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Meeting with the general public (open meeting advertised to all)
- Meeting specifically with non-traditional groups
- Meeting specifically with non-traditional individuals
- Meeting with invited selected individuals from the general public
- Other ()

Brief explanation

Stakeholder Input

Stakeholder input is most commonly obtained through meetings with stakeholder groups and/or individuals. Examples of a series of CALS Roundtable discussions were highlighted earlier. In addition, there may be other focus group meetings including broad audiences, selected stakeholder groups or one-on-one meetings with a key farmer, group leader, or other constituent that are held periodically throughout the year.

Because of the commitment of the College’s Dean’s staff to attend as many public or community oriented forums including field days at our Agricultural Research Stations, significant input is often obtained in informal one-on-one or small group conversations. On an annual basis, 50-100 of such public meetings are often attended. A list of such events from 2005 follows:

| Date | Event |
|-------------------|--|
| January 4, 2005 | AgSource Board of Directors (WAC) |
| January 14, 2005 | Meeting with Dairy Science Advising Committee/Faculty |
| January 19, 2005 | Wisconsin Fertilizer, Agrilime & Pest Management Conference |
| January 20, 2005 | Northern Wisconsin Ext. Initiative Council - Spooner |
| January 21, 2005 | Fertilizer Research Council |
| Januray 27, 2005 | Wisconsin Agri Business Council |
| January 27, 2005 | Wisconsin Corn Growers Assoc. (WCLA) |
| January 27, 2005 | Wisconsin Pork Producers Council (WPPC) |
| February 3, 2005 | Buffer Strip Hearing |
| February 3, 2005 | Meeting with Pete Nowak and Wisconsin Ag Assembly |
| February 10, 2005 | Wisconsin Potato and Vegetable Growers Assoc. Mtg. – Hancock |
| February 15, 2005 | Wisconsin Livestock Identification Consortium (WLSC) |
| February 18, 2005 | Grow Wisconsin Livestock Initiative |
| February 18, 2005 | |

Wisconsin Cattlemen's Association (WCA)
February 23, 2005
Meeting with Wisconsin Farm Bureau Board
March 1, 2005
Wisconsin Muck Grower's Annual Meeting
March 1, 2005
Wisconsin Livestock Identification Consortium
March 1, 2005
Meeting with Dairy Business Innovation Center
March 11, 2005
Wisconsin Agriculture Stewardship Initiative (WASI)
March 16, 2005
Ag Day at the Capitol
March 30, 2005
Wisconsin Ag. Stewardship Initiative
April 4, 2005
Wisconsin Farm Technology Days
April 8, 2005
Western District Wisconsin Associated County Ext. Committees (WACEE)
April 9, 2005
Meat Product Judging Show
April 18, 2005
Round Table (Forest & Green Industry Meat & Dairy Sci., Natural Resources)
April 24, 2005
Assoc. Women in Ag. Breakfast
May 5, 2005
Beef Field Day – Lancaster & Wisconsin Livestock Identification Consortium
May 7, 2005
Dean's Club Brunch
May 12, 2005
Conference call with US Dairy Forage Research Center
May 17, 2005
Incident Management System (IMS) ; variety of agencies
May 19, 2005
Alto Dairy
May 24, 2005
Meeting with WI Cranberry Association
May 25, 2005
Ashland Area Extension, Government Admin., Citizens
May 27, 2005
WACEC State Wide Conference
May 27, 2005
Meeting with Wisconsin Fed. of Cooperatives
May 28, 2006
WACEC State Wide Conference
June 3, 2005
Marshfield Mayor's Breakfast
June 3, 2005
Attend Marshfield Dairy Breakfast
June 7, 2005
Wisconsin Farm Technology Days Media
June 8, 2005
Meeting with Wisconsin Farm Bureau
June 13, 2005
Meeting with Wisconsin Cattlemen's Association
June 15, 2005
FFA State Convention

June 23, 2005
Future of Farming & Rural Life Meeting
June 24, 2005
Tour of Arlington Research Station with Senator Kohl's Staff
July 6, 2005
Weeds Field Day – Arlington
July 10, 2005
Turfgrass Day
July 11-14, 2005
WFTD Show
July 19, 2005
Wisconsin Ag. Stewardship Initiative
July 20, 2005
Potato Storage Meeting at Hancock
July 25, 2005
Turfgrass Field Day
July 26, 2005
WTA Field Day – OJ Noer
August 3, 2005
WMAR Field Day
August 3, 2005
Wisconsin Farm Bureau Federation (WFBF) DATCP
August 4, 2005
Agronomy Field Day – Hancock
August 6, 2005
Dairy Forage Research Center Open House – Land Transfer Program: Badger Ammunition Plant
August 9, 2005
Potato Field Day – Hancock
August 12, 2005
Pasture Field Day – Lancaster
August 17, 2005
Wisconsin Turfgrass Assoc. Meeting
August 20, 2005
Horticulture Field Day – West Madison
August 20, 2005
Turfgrass Field Day – OJ Noer
August 31, 2005
Arlington Field Day
September 1, 2005
Walnut Street Green House Dedication and DATCP, Ag. Organizations
September 8, 2005
Beef Field Day – Lancaster
September 9, 2005
CALSA WALSAA Event
September 15, 2005
IMS
September 17, 2005
Franbrook Field Day – Local Ag. and Government
September 28-29, 2005
Ag Source, Cooperative Resources International
October 5, 2005
World Dairy Expo Dinner W. Stars
October 7, 2005
Ashland/Bayfield County Government and Ag. Agencies
October 10, 2005
Wisconsin Farm Bureau Coalition Meeting
October 13, 2005

Bioenergy Group – Madison
October 14, 2005
Wisconsin Ag. Stewardship Initiative
October 20-21, 2005
CALs Board of Visitors
October 22, 2005
CALs Dean's Club Brunch
October 25, 2005
Wisconsin Ag. Stewardship Initiative
October 25, 2005
Meeting with Pete Giacommin Ag Source Cooperative
November 2-3, 2005
Professional Dairy Producers of Wisconsin. Summit
November 3, 2005
WI National Farmer's Organization Event
November 4, 2005
Ashland/Bayfield County Government and Ag. Agencies
November 7, 2005
DATCP, Ag. Organizations
November 16, 2005
DATCP, Ag. Organizations
November 17, 2005
Wisconsin Potato and Vegetable Growers Assoc. Mtg. – Madison
November 23, 2005
Professional Dairy Producers of Wisconsin Meeting
November 29, 2005
Wisconsin Cranberry Board – Warrens, WI
November 30, 2005
Dairy Business Assoc. Meeting
December 1, 2005
Organic Growers and Processors
December 5, 2005
Wisconsin Farm Bureau Federation Annual Meeting
December 6, 2005
Northern Wisconsin Extension Initiative Council – Spooner
December 7, 2005
Arlington Dairy Day
December 12, 2005
Meeting with WI Cranberry Growers Association
December 13, 2005
Wisconsin Potato and Vegetable Growers Assoc. Research Council – Stevens Point

Wisconsin Cooperative Extension has developed 47 system and issue teams comprised of University research and Extension professionals, other agency personnel and producers to develop educational programs directed at farm, rural 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) and community issues (economic development, health, land use). Issue teams deal with integrated issues across the agriculture 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 and provide input to the College.

3. A statement of how the input will be considered

- In the Budget Process
- To Identify Emerging Issues
- Redirect Research Programs
- In the Staff Hiring Process
- To Set Priorities

Brief explanation.

Stakeholders Input

Stakeholders input is used by the UW–Madison College of Agricultural and Life Sciences in a number of ways. It is used in helping establish strategic and shorter term action plans, in establishing budget priorities and in establishing direction of our teaching, outreach and research programs. This would include reallocation of resources to emerging or critical areas, identification of those emerging area, and setting priorities among programs and research areas.

As described earlier in the program overview, the CALS administrative team discusses stakeholder input as part of a series of regularly scheduled meetings of the administrative group. Priorities are reviewed, discussed, and updated based on stakeholder input. These priorities are published and distributed annually as part of the Call for Proposals for our Hatch research program.

Planned Program Table of Content

| S. NO. | PROGRAM NAME |
|--------|-----------------|
| 1 | Overall Program |

1. Name of the Planned Program

Overall Program

2. Program knowledge areas

- 212 4% Pathogens and Nematodes Affecting Plants
- 702 5% Requirements and Function of Nutrients and Other Food Components
- 304 5% Animal Genome
- 206 5% Basic Plant Biology
- 202 6% Plant Genetic Resources
- 307 4% Animal Management Systems
- 311 4% Animal Diseases
- 305 4% Animal Physiological Processes
- 904 58% Other (See Narrative)
- 302 5% Nutrient Utilization in Animals

3. Program existence : Mature (More than five years)

4. Program duration : Long-Term (More than five years)

5. Brief summary about Planned Program

Wisconsin Competitive Research Program

The Wisconsin Competitive Research Program is an evolutionary program that attempts to fund the best science relative to national, regional and state needs and priorities. The program process reallocates approximately 25% of the HATCH portfolio each year based upon a competitive process among our faculty. The program uses the national goals and emphasis areas established in the REE and CSREES agency strategic plans and areas of identified research needs for Wisconsin as priority areas for the process. This process allows us to continually update our portfolio because projects are generally approved for 3-4 years (some multistate projects get 5 year approval). At the end of each project, faculty must re-apply documenting not only need, relevance to program priorities (including integrated activity and multistate programs), and scientific merit, but also productivity of the project to date.

Narrative: We are unable to provide the information here due to the truncation of text. We will provide as a separate document, if requested, information on details of the Knowledge Areas lumped under "other".

6. Situation and priorities

Current goals and priorities include the following national goals:

Enhance Economic Opportunities for Agricultural Producers. Empower families and communities to address the economic and social challenges through research-based information and education.

Support Increased Economic Opportunities and Improved Quality of Life in Rural America. Enhance environmental quality through better understanding of, and building on, agriculture and forestry's complex links with soil, water, air and biotic resources.

Enhance Protection and Safety of the Nation's Agriculture and Food Supply. Ensure a safe and adequate food and fiber supply through improved science-based detection, surveillance, prevention, and education.

Improve the Nation's Nutrition and Health. Enable people to make health-promoting dietary choices through nutrition education, research, and development of more nutritious foods.

Protect and Enhance the Nation's Natural Resource Base and Environment. Empower the agricultural system with knowledge to improve competitiveness in domestic production, processing, and marketing through research and education.

Areas of identified research need for Wisconsin are also to be given priority. These are updated annually based upon feedback from stakeholders. These priorities include:

Within these national goals, states are asked to draw on stakeholder input to help direct use of formula funding. In 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 performing the research, is beneficial to assist in highlighting areas of research need. Department chairs are asked to provide a small number of research topics from each unit of CALS for use in Hatch and McIntire-Stennis call for proposals. The following is a compilation of common themes reviewed and updated annually. The list below is provided to draw attention to needs currently of interest within the state.

Mechanisms of pest and pathogen resistance and safe and effective control, with minimum effects on environmental quality and

human health.

Effects of change in global climate, population pressures, or public policy on agricultural production, environmental resources, ecosystem management, and future land uses.

Identification of socioeconomic or other forces that shape the viability of Wisconsin industries and employment including agriculture, bio-based industry, forestry, wildlife management, recreation, and other land uses.

Research on food safety, nutritional health, environmental protection, and biotechnology and on providing information on dietary choices, lifestyle and community decisions.

Sustainable agricultural and forestry production and processing systems that provide improved food safety and security, environmental protection, economically viable communities, protection of public goods, and human well-being. This need requires an understanding of basic life processes in order to manage biotic systems for human use.

7. Assumptions made for the Program

The following assumptions are made for this program:

The greatest advances in addressing national, regional, and state needs can be made by competitively soliciting the best science and research.

Graduate training efforts funded through the UW-Madison competitive HATCH competition will provide a sound basis for the future of the HATCH related sciences and issues.

Funding of the program will continue in a stable manner.

8. Ultimate goal(s) of this Program

1. To address national and state issues with the science of highest quality and greatest potential to have an effect in addressing the issues relevant to the HATCH mission.
2. Train graduate students to build the human resources needed to address current and future problems relevant to the HATCH mission.

9. Scope of Program

- In-State Research
- Integrated Research and Extension
- Multistate Integrated Research and Extension
- Multistate Research

Inputs for the Program

10. Expending formula funds or state-matching funds : Yes

11. Expending other than formula funds or state-matching funds : No

12. Estimated Number of professional FTE/SYs to be budgeted for this Program

| Year | Extension | | Research | |
|------|-----------|------|----------|------|
| | 1862 | 1890 | 1862 | 1890 |
| 2007 | 0.0 | 0.0 | 158.5 | 0.0 |
| 2008 | 0.0 | 0.0 | 156.0 | 0.0 |
| 2009 | 0.0 | 0.0 | 156.0 | 0.0 |
| 2010 | 0.0 | 0.0 | 154.0 | 0.0 |
| 2011 | 0.0 | 0.0 | 154.0 | 0.0 |

Outputs for the Program

13. Activity (What will be done?)

As a research driven activity, this state project is made up of approximately 160 individual research projects addressing national,

regional and state needs, and includes both multi-state and integrated activity. As a research report, we are not reporting activities for the University of Wisconsin-Extension.

14. Type(s) of methods to be used to reach direct and indirect contacts

| Extension | |
|---------------------|---------------------|
| Direct Methods | Indirect Methods |
| ● {NO DATA ENTERED} | ● {NO DATA ENTERED} |

15. Description of targeted audience

{NO DATA ENTERED}

16. Standard output measures

Target for the number of persons(contacts) to be reached through direct and indirect contact methods

| | Direct Contacts Adults | Indirect Contacts Adults | Direct Contacts Youth | Indirect Contacts Youth |
|------|------------------------|--------------------------|-----------------------|-------------------------|
| Year | Target | Target | Target | Target |
| 2007 | 0 | 0 | 0 | 0 |
| 2008 | 0 | 0 | 0 | 0 |
| 2009 | 0 | 0 | 0 | 0 |
| 2010 | 0 | 0 | 0 | 0 |
| 2011 | 0 | 0 | 0 | 0 |

17. (Standard Research Target) Number of Patents

Expected Patents

2007 : 2 2008 : 3 2009 : 3 2010 : 3 2011 : 3

18. Output measures

Output Target

Output measures for this project include patents, graduate students trained, and publications. While we have data on patents with federal support, we have not previously tracked patents specifically linked to HATCH support. This estimated output does not have the same level of confidence as the others measures and will be refined as we gain experience with this measure for HATCH supported work.

Graduate Students Trained (Degrees Granted):

2007: 35 2008: 35 2009: 30 2010: 30 2011: 30

Outcomes for the Program

19. Outcome measures

Outcome Text: Awareness created

Outcome Target

Outcome measures for this work are both qualitative and quantitative. We will rely on feedback from stakeholder groups,

advisory boards, and individual constituents, as well as from UW Extension teams on the relevance, importance and impact of our research program. The output measures listed earlier will also serve as outcome measures in that patents graduate degrees, and publications all include an element of critical review and assessment of uniqueness, originality, contribution to the science and knowledge base, or other performance criteria. Finally, we will use the Thomson ISI Essential Science Indicator for agricultural science as a measure of impact of our research program. Our target for this outcome measure is to be ranked in the top 5 institutions in the United States. We will continue to develop impact statements for individual projects which have shown exemplary and significant impact.

Publications:

Outcome Type: Long

2007: 160 2008: 160 2009: 160 2010: 160 2011: 160

20. External factors which may affect outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities

Description

A variety of factors could affect the outcomes of this project including those listed above. However, the breadth of this program makes it unlikely that the outputs and outcomes would be completely disrupted unless there was some major natural, economic, or public policy disruption. A major change in Federal policy or appropriation affecting the HATCH program could affect our ability to meet our outcomes. The UW-Madison is implementing a policy change regarding tuition remission. HATCH and other formula funds have been exempted for now. Since these funds do not allow tuition remission, could force us to re-evaluate some alternative to meeting our HATCH mission with fewer graduate students being trained. However, we recently have re-affirmed this as a priority for this program.

21. Evaluation studies planned

- Retrospective (post program)
- During (during program)

Description

Evaluation studies planned include qualitative and quantitative methodology. We have already described a number of methods used to solicit stakeholder input. At the time input is being sought from these groups, boards, and individuals, we are also soliciting feedback on the pertinence and effectiveness of our current programs. This information is primarily qualitative, but provides important feedback on the program. Similar input will be sought from UW Extension's issue oriented teams. In the competitive reapplication process that is for projects, project productivity and impact are also evaluated. This occurs every 2-4 years, and is an important factor in whether a scientist's project will be re-approved. When new projects are proposed, past project performance is also a significant consideration. Overall project success will be evaluated by monitoring the number of graduate students trained, peer reviewed publications, and an impact factor based on our research based on the ISI Essential Science Indicators. While this is an indicator of our overall CALS research program, we believe that it is also representative of our HATCH research component.

22. Data Collection Methods

- Sampling
- Structured
- Unstructured
- Portfolio Reviews

Description

Data collection will include structured and unstructured interview information from stakeholder groups, advisory boards, and key individual constituents. We will ask Extension to solicit information annually from their issue oriented teams. Data will be compiled annually on patents, graduate students trained, and number of publications. The Thomson ISI Essential Science Indicators will be monitored annually to assess impact of our research program.