2008 University of Wisconsin Research Plan of Work

I. Plan Overview

1. 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.

This process has worked very well during periods of stable funding. However, with significant increases in Formula Funding occurring mid-year for FY 2007, we anticipate carrying over funds into FY 2008. These funds will be allocated during FY 2007 using the competitive process to the extent possible, but we do foresee that significant allocation will be made administratively based on the stakeholder input processes described and on national and state priorities. Progress and accomplishment will be reported in our FY 2007 and FY 2008 annual Reports of Work. We expect our allocation for FY 2008 to be administered as described in this document.

Formula funds are distributed to approved projects with yearly budgets. Normally, approximately 160 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. (82 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. (19 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. (46 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. (14 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. (44 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, was initiated in June, 2006, approximately 16 months prior to project initiation. Proposals were due 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' 2006 annual report as follows:

"Response to Light-Induced Singlet Oxygen Formation by Phototrophs"
Key themes and Focus areas: Understanding how photosynthetic cells respond to and mitigate the effects of singlet oxygen, a destructive by-product of photosynthesis, will lead to strategies to increase the conversion of sunlight into bioenergy compounds, improve crop yields and control plant pathogens.
The issue: In all plants, singlet oxygen is a major limiting factor for plant growth. Singlet oxygen, a natural by-product of photosynthesis, destroys important cellular proteins and other structures. Instead of using all of their energy for growth, plants must expend a portion of their energy and resources repairing the cellular damage caused by singlet oxygen. Strategies to limit or control the negative effects of singlet oxygen in agricultural crops would increase the efficiency by which photosynthetic organisms harvest solar energy, improve crop yields and increase income for farmers. Because singlet oxygen is also used by plants to kill bacteria, this research could also lead to strategies to control plant diseases.
What's been done: Previously, University of Wisconsin-Madison researchers discovered proteins in photosynthetic cells that sense and respond to singlet oxygen. In this study, the researchers have begun to study that response in more detail, determining how the sensory protein that recognizes singlet oxygen works, and how the proteins under control of this sensory pathway prevent or repair damage caused by singlet oxygen. Already, the researchers have completed a three-dimensional crystal structure of the sensory protein and pinpointed how it likely responds to singlet oxygen. They have also begun to identify other proteins that are required for survival in the presence of singlet oxygen.
Impact: In plants, singlet oxygen wreaks havoc on cellular structures that the cell must then fix. This process limits plant growth by redirecting plant energy and resources from growth. This project has shed light on the cellular response to singlet oxygen, and the results have been shared through eleven talks, one paper and a podcast developed by the American Society for Microbiology; a second paper is in the review process. In the future, this research will help plant breeders to breed or engineer crops that suffer less from the toxic effects of singlet oxygen, and therefore increase the photosynthetic efficiency and yields of crops. Similarly, this information can also be used to develop strategies to make plant pathogens more susceptible to the negative effects of singlet oxygen, as a new approach to combat plant diseases.

Funding: Hatch project #WIS04951
More Information: Timothy Donohue, tdonohue@wisc.edu, 608-262-4663

"Rural Development, Work, and Poverty in North Central Region (NC-1100)"
Key themes and Focus areas: Understanding the role that manufacturing jobs play in the economic health of Wisconsin's rural areas will help community leaders and policy makers develop strategies to reduce rural poverty and support economic development in those areas.
The issue: Between the years 2000 and 2004, Wisconsin lost approximately one-third of its manufacturing jobs. Traditionally, manufacturing jobs have provided good wages, good benefits and a lifelong job. It is unclear whether or not this is still the case, but many rural economic development plans continue to emphasize the recruitment of manufacturing jobs. A thorough study of how manufacturing jobs benefit rural economic health throughout the Midwest would help Wisconsin communities decide whether or not to try to recruit manufacturing industries to their area, or to focus on other job-creation strategies.
What's been done: Researchers involved in this multi-state project have found that certain Midwestern states are gaining manufacturing jobs, including North Dakota, South Dakota and Kansas. Meanwhile, other states are losing manufacturing jobs, such as Wisconsin, Michigan, Illinois and Missouri. They also found that today's manufacturing jobs tend to offer lower wages, fewer benefits and more part-time positions than in the past. So, manufacturing jobs are not as beneficial, compared to working in other sectors, as they once were, especially in the upper Midwest. Based on this information, they conclude that rural areas with a high concentration of low-wage, low-skill jobs still stand to benefit from the recruitment of new manufacturing jobs. However, rural areas that tend to have jobs with higher wage and skill levels should focus their resources on other economic development strategies, such as helping small businesses get started, helping existing businesses expand, and helping to revitalize a municipality's downtown district.
Impact: As a UW-Extension agent and director of the Center for Community and Economic Development, the lead investigator of this project applies these findings to real-world situations as he works with Wisconsin communities on economic development issues. He also shared this information with other Wisconsin extension agents who specialize in economic development, and functioned as an expert consultant on rural development issues for the Dane County Collaborative Council, whose job it was to create a regional economic development plan for Dane County. Additionally, the results of this study have been published in two peer-reviewed journals that focus on rural sociology, and will be featured at an economic development training program for practitioners in late 2007.
Funding: Hatch project #WIS04888
More Information: Gary Green, ggreen@ssc.wisc.edu, 608-262-2710

"Durable Resistance to Common Rust in Sweet Corn, Genetics and Breeding of Vegetative Phase Change and Adult Plant Resistance"
Key themes and Focus areas: Breeding sweet corn to have long-lasting resistance to common rust will save farmers money and protect the environment.
Issue: Common rust is the most serious sweet corn disease in Wisconsin today, where more than 100,000 acres of the crop are grown. Depending on the season and the chemical fungicide used, farmers spend between $25 and $75 per acre each year to minimize the impact of the disease. Before 1999, farmers were growing sweet corn varieties that were resistant to common rust due to a single gene that protected the crop. However, in 1999, the fungus mutated so that the single-gene protection no longer worked. A corn crop with multiple-gene resistance to common rust would give Wisconsin's sweet corn crop long-lasting protection from the effects of this disease, saving farmers money and reducing the impact of fungicides on the environment.
What's been done: University of Wisconsin-Madison researchers gathered corn varieties from around the world that display multiple-gene resistance to common rust. Because these exotic strains are not adapted to temperate climates, the researchers crossed them with Wisconsin sweet corn varieties, and selected for increased disease resistance and important quality factors, such as flavor and texture. Already, they have isolated several new hybrids resistant to common rust, and agricultural companies are testing their marketability to consumers. In another research vein, the scientists are breeding for sweet corn with fewer juvenile leaves, which are more susceptible to common rust than adult leaves. They have already developed sweet corn plants with 20 percent fewer juvenile leaves.
Impacts: The new sweet corn varieties developed through this research project are expected to exhibit long-lasting protection against common rust and save farmers between $25 and $75 per acre each year on fungicides. Reduced fungicide use will also benefit the environment. In addition to providing the new seeds to agricultural companies for testing, the findings from this study have been shared with the broader agricultural and research community at three conferences and through three journal articles.
Funding: Wisconsin Hatch project #WIS01020

More Information: William Tracy, wftracy@wisc.edu, 608-262-2587

"Identifying Potentially Anticarcinogenic Components in Common Vegetables"
Key themes and Focus areas: Identifying healthful compounds in common vegetable crops will encourage consumers to eat more vegetables, thereby improving public health and supporting agriculture.
The issue: Although there have been multiple national-level efforts to encourage the general public to eat more vegetables (and fruits), including the "five-a-day" campaign, many Americans do not consume enough of these healthful foods. However, when a specific health-promoting compound is linked to a particular vegetable or fruit, as when broccoli was shown to contain sulforaphane (an anti-cancer compound) in the 1990s, consumption can increase dramatically. So, to encourage the public to include more vegetables in their diets, it is important to identify and promote healthful compounds in vegetables, as well as the specific health benefits that they confer to humans.
What's been done: University of Wisconsin-Madison researchers have analyzed common crop plants for healthful compounds, in particular, those with potential to reduce cancer risk. So far, the researchers have identified ten different compounds with anti-cancer activities in green onions. They have also isolated compounds (or groups of compounds that work together) that have potential anti-cancer activities in red beet root and maize. The findings have been shared in three journal articles, at five symposia and with a group of food industry representatives at an annual meeting at UW-Madison.
Impact: The discovery of health-promoting compounds in crops will encourage consumers to eat more vegetables. This, in turn, will improve the health of Americans and help curb rising health care costs. Once these compounds are known, crop breeders can develop plants—via traditional breeding or genetic engineering—with increased levels of these compounds. Also, food processors can adjust their methods to preserve these components during processing.
Funding: Hatch project #WIS04787
More Information: Kirk Parkin, klparkin@wisc.edu, 608-263-2011

"Reducing Phosphorus Concentration in Lactating Dairy Diets Based on By-products of the Corn Distilling Industry"
Key themes and Focus areas: To ensure a robust market for distiller's grains and solubles (a major by-product of corn ethanol production) as a dairy cattle feed, it is important to find ways to remove phosphorus from the feed or to mix it with low-phosphorus feeds in a way that optimizes animal health and protects the environment.
The issue: For every bushel of corn processed in an ethanol plant, approximately one-third ends up as a by-product that is sold as animal feed. While this by-product, called distiller's grains and solubles (DGS), contains a lot of protein, it also contains a high level of phosphorus, which when fed to animals, eventually ends up in surface water where it negatively impacts water quality. This study seeks to maximize the use of DGS while minimizing its negative environmental impact using two different approaches: (1) by reducing phosphorus levels in DGS, and (2) by balancing DGS "as is" with other feed supplements to maximize production, optimize diet costs and reduce phosphorus excretion from dairy cattle.
What's been done: Researchers at the University of Wisconsin-Madison are experimenting with different ways to minimize the amount of phosphorus in DGS that ends up in cow manure, and thus surface water. In one study, they found a method to remove 85 percent of the phosphorus from distiller's solubles, where a vast majority of the phosphorus is located. In a second study, researchers performed a feeding trial and found that dairy cows could eat up to 18 percent DGS in their diet (mixed with a variety of other common protein and nutrient sources) without reductions in milk yield and quality. However, phosphorus levels were still too high in all cases, highlighting the need to develop technologies to remove phosphorus from DGS (the aim of the first part of this project) or from the other animal feed sources, or to reduce the amount of DGS in diets below 18 percent.
Impact: Findings from this project will help ensure that the corn ethanol industry has customers for its DGS by-product, while simultaneously solving an environmental issue for farmers — phosphorus runoff into surface water. Already, the researchers have developed a method to remove 85 percent of phosphorus from distiller's solubles, and ruled out the possibility of using 18 percent or more DGS "as is" in dairy cattle feed. So far, the preliminary results of this study have been shared with important stakeholders through three conferences, a field day, one journal article and two meetings—one attended by dairy farmers and one attended by Wisconsin extension agents working in this field.
Funding: Hatch project #WIS05239
More information: Louis Armentano, learment@wisc.edu, 608-263-3490 and KG Karthikeyan, karthikeyan@wisc.edu, 608-262-9367

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
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
2012	0.0	0.0	154.0	0.0

II. Merit Review Process

1. The Merit Review Process that will be Employed during the 5-Year POW Cycle

- Internal University Panel
- Expert Peer Review

2. 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/.

III. 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.

IV. Stakeholder Input

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

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

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 Internal Focus Groups
- Use Advisory Committees

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 who are stakeholders and to collect input from them

1. Methods for collecting Stakeholder Input

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

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 2006 follows:

Date/Event
January 4, 2006
Ag Source Board
January 10, 2006
590 Committee
January 13, 2006
WASI Coordinating Council
January 17, 2006
Water Quality Program - Milwaukee, WI
January 18, 2006
Breakfast with Big 5
January 19, 2006
Dairy Business Innovation Center Board Meeting
January 25, 2006
WASI Strategic Planning Committee
February 1, 2006
FB Ag. Day on the Hill
February 7, 2006
Bayfield, Ashland County Representatives
February 10, 2006
Kickapoo Valley Reserve, Organic Valley
February 13, 2006
590 Committee
February 14, 2006
WASI Strategic Planning Committee
February 22, 2006
Tom Lochner – WI Cranberry Growers
February 28, 2006
Superior Days Meeting
March 7, 2006
Northern District Conference Call
March 14, 2006
Ag. Leaders Breakfast
March 21, 2006
WGIF Board Meeting
March 24, 2006
WPVGA Conference Call
March 27, 2006
Dap Kapanke's Staff
April 4, 2006
WASI
April 6, 2006
Tom Lochner – WI Cranberry Growers
April 7, 2006
Western District WACEC Meeting
April 11, 2006
Al Ott – Assembly Ag. Committee
April 12, 2006
Wisconsin FTD Board Meeting
April 17, 2006

Tom Lyon
April 19, 2006
Governor's Mansion
April 20-21, 2006
CALS Board Of Visitors
April 24, 2006
CIG Advisory Committee
April 28, 2006
Farm Bureau Breakfast
April 28, 2006
PDPW Board and Staff
May 4, 2006
Representative Hines
May 5, 2006
Dairyland State Academy Reps
May 16, 2006
Tom Lochner – WI Cranberry Growers
May 19, 2006
WASI Strategic Planning Committee
May 23, 2006
WFFRL – Menominee, WI
May 23, 2006
Wisconsin Farm Technology Media Event
June 8, 2006
WFFRL – Waukesha, WI
June 8, 2006
WLIC
June 21, 2006
Wisconsin AgriBusiness Council Board Meeting
June 23, 2006
Eric Hurley – Dairyland State Academy
July 10, 2006
Wisconsin Farm Technology Days Banquet
July 11, 2006
WGIF Board Meeting
July 11, 2006
SPUDDRO Meeting – Rhinelander, WI
July 18, 2006
Ag Source Board
July 21, 2006
Future of Farming, Ashland, WI
July 26, 2006
Hancock Potato Field Day
July 27, 2006
Meed Residence Hall Dedication
August 1, 2006
OJ Noer Turfgrass Day
August 8, 2006
State Fair 4 H Meat Auctin
August 10, 2006
WI Nursery Association- Salem, WI
August 11, 2006
Northwest Extension Initiative – Spooner, WI
August 12, 2006

Savor The Summer Festival
August 14, 2006
Sustainable Ag Lunch Oconomowoc
August 15, 2006
WI Farm Bureau
August 16, 2006
WPVGA/Karsting Meeting
August 17, 2006
Mike Schmidt
August 22, 2006
Wisconsin Farm Technology Days Board Meeting
August 23, 2006
Marshfield Ground Breaking
August 23, 2006
FFRL – Fox Valley, WI
August 30, 2006
Pork Producers- Arlington, WI
August 30, 2006
Arlington Welcome Event
September 5, 2006
Farm Bureau
September 5, 2006
WASI Strategic Planning Committee
September 6, 2006
Al Ott – Assembly Ag. Committee
September 18, 2006
ICPM Advisory Committee
September 13, 2006
Professional Dairy Producers of WI
September 18, 2006
Green Industry Reception
September 18, 2006
WGIF Welcome Event
September 29, 2006
Cranberry Growers Meeting
October 4, 2006
Dairy Industry Stockholders
October 7, 2006
Michael Fields Institute
October 9, 2006
Farm Bureau Ag Coalitions Meeting
October 9, 2006
Eco Health 1st Conference
October 10, 2006
Vita Plus Reception
October 13, 2006
Future of Farming and Rural Life – Platteville, WI
October 20, 2006
WALSAA
October 23, 2006
Margaret Krome/Michael Fields Institute
October 24, 2006
FFRL – Wausau, WI
October 30, 2006

Nature Conservancy
October 31, 2006
The Nature Conservancy
November 1, 2006
Dairy Business Innovation Center Board Meeting
November 3, 2006
Agriability Advisory Board Meeting
November 6, 2006
Goat Initiative Meeting
November 7, 2006
WGIF Board of Directors Meeting
November 7, 2006
WPVGA Research Comm.
November 8, 2006
Wisconsin Farm Bureau
November 15, 2006
WPVGA Res. Committee
November 16, 2006
Grow WI Livestock Farm at DATCP
November 16, 2006
WASI Strategic Planning Committee
November 16, 2006
Paul Zimmerman
November 21, 2006
Milk Quality Task Force
November 29, 2006
Al Ott, Assembly of Ag. Committee
November 29, 2006
Certified Seed Growers
December 2, 2006
NFO State Convention- Marshfield, WI
December 4, 2006
Wisconsin Farm Bureau Federation Banquet
December 5, 2006
Northern Extension Meeting – Ashland, WI
December 7, 2006
Wisconsin Livestock Identification Consortium
December 13, 2006
Arlington Dairy Day
December 15, 2006
Wisconsin Turfgrass Association
December 21, 2006
Wisconsin School For Beginning Dairy Farmers

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

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

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.

V. Planned Program Table of Content

S. NO.	PROGRAM NAME
1	Wisconsin Competitive Research Program

V(A). Planned Program (Summary)

1. Name of the Planned Program

Wisconsin Competitive Research Program

2. 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 trucation of text. We will provide as a separate document, if requested, information on details of the Knowledge Areas lumped under "other".

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

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

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

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

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

- 102 4% Soil, Plant, Water, Nutrient Relationships
- 112 3% Watershed Protection and Management
- 123 5% Management and Sustainability of Forest Resources
- 133 3% Pollution Prevention and Mitigation
- 201 9% Plant Genome, Genetics, and Genetic Mechanisms
- 202 4% Plant Genetic Resources
- 206 11% Basic Plant Biology
- 212 5% Pathogens and Nematodes Affecting Plants
- 215 3% Biological Control of Pests Affecting Plants
- 216 3% Integrated Pest Management Systems
- 302 4% Nutrient Utilization in Animals
- 304 3% Animal Genome
- 305 10% Animal Physiological Processes
- 311 6% Animal Diseases
- 501 3% New and Improved Food Processing Technologies
- 502 4% New and Improved Food Products
- 606 3% International Trade and Development
- 702 9% Requirements and Function of Nutrients and Other Food Components
- 712 3% Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occuring Toxins
- 723 5% Hazards to Human Health and Safety

V(C). Planned Program (Situation and Scope)

1. 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.

2. Scope of the Program

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

V(D). Planned Program (Assumptions and Goals)

1. Assumptions made for the Program

The following assumptions are made for this program:
1. The greatest advances in addressing national, regional, and state needs can be made by competitively soliciting the best science and research.
2. 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.
3. Funding of the program will continue in a stable manner.

2. 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.

V(E). Planned Program (Inputs)

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

Year	Extension		Research	
	1862	1890	1862	1890
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
2012	0.0	0.0	154.0	0.0

V(F). Planned Program (Activity)

1. Activity for the Program

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. However, we do integrated activity as part of our Hatch and other Formula Funded programs. A variety of methods are used to accomplish these efforts. These are listed below.

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

Extension	
Direct Methods	Indirect Methods
• One-on-One Intervention • Other 1 (Field Days) • Demonstrations • Group Discussion • Workshop	• Other 1 (Press Releases) • Web sites

3. Description of targeted audience

As a research report, we are not reporting activities for the University of Wisconsin-Extension. Integrated activity for our Hatch and other Formula Funded programs target a broad group of stakeholder audiences in agricultural, natural resources, and the public. Examples can be seen in our stakeholder information provided elsewhere in this report.

V(G). Planned Program (Outputs)

1. 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
2008	0	0	0	0
2009	0	0	0	0
2010	0	0	0	0
2011	0	0	0	0
2012	0	0	0	0

2. (Standard Research Target) Number of Patents

Expected Patents

2008 :3 **2009 :**3 **2010 :** 3 **2011 :**3 **2012 :**3

3. Expected Peer Review Publications

Year	Research Target	Extension Target
2008	150	0
2009	150	0
2010	150	0
2011	150	0
2012	150	0

V(H). State Defined Outputs

1. 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):

2008 :35 **2009 :**30 **2010 :** 30 **2011 :**28 **2012 :**28

V(I). State Defined Outcome

1. 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:

2. Outcome Type : Change in Condition Outcome Measure

2008 :150 **2009 :** 150 **2010 :** 150 **2011 :**150 **2012 :** 150

3. Associated Knowledge Area(s)

- 102 - Soil, Plant, Water, Nutrient Relationships
- 112 - Watershed Protection and Management
- 123 - Management and Sustainability of Forest Resources
- 133 - Pollution Prevention and Mitigation
- 201 - Plant Genome, Genetics, and Genetic Mechanisms
- 202 - Plant Genetic Resources

- 206 - Basic Plant Biology
- 212 - Pathogens and Nematodes Affecting Plants
- 215 - Biological Control of Pests Affecting Plants
- 216 - Integrated Pest Management Systems
- 302 - Nutrient Utilization in Animals
- 304 - Animal Genome
- 305 - Animal Physiological Processes
- 311 - Animal Diseases
- 501 - New and Improved Food Processing Technologies
- 502 - New and Improved Food Products
- 606 - International Trade and Development
- 702 - Requirements and Function of Nutrients and Other Food Components
- 712 - Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occuring Toxins
- 723 - Hazards to Human Health and Safety

V(J). Planned Program (External Factors)

1. External Factors which may affect Outcomes

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

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 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 fund 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.

V(K). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

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

2. Data Collection Methods

- Structured
- Portfolio Reviews
- Sampling
- Unstructured

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.