Agriculture and Food Research Initiative
Competitive Grants Program

FY 2009 Program Announcement (PA)

U.S. Department of Agriculture
Cooperative State Research, Education, and Extension Service

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AFRI REQUIRES ELECTRONIC SUBMISSION FOR ALL APPLICATIONS

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Please Note: As of 12/22/08, this PA was modified to correct discrepancies for enhanced consistency and accuracy, including changes to deadline dates. Please see the summary of significant changes including modified deadline dates on page 2 of this PA. Changed or corrected dates are underlined in **Bold Red Text**.

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Initial Announcement:
This is a Program Announcement (PA) for the Agriculture and Food Research Initiative (AFRI). AFRI combines elements of the former National Research Initiative (NRI) and Initiative for Future Agriculture and Food Systems (IFAFS) programs and is the new core competitive grant program for research, education, and extension. **It is anticipated that the complete Request for Applications, which will contain the application submission instructions and be accompanied by required application forms, will be made available in early 2009 on the CSREES Web site and the Grants.gov Web site.**

This AFRI PA contains opportunities for support of research, education, and extension priorities.

This PA is being released prior to the passage of the Fiscal Year (FY) 2009 Agricultural Appropriations Act. The release of this PA is to inform the applicant community of upcoming research, education, and extension opportunities through the AFRI program to fund issues critical to agriculture. The enactment of the FY 2009 Appropriations Act may impact the overall level of funding for the AFRI program. Hence, the Cooperative State Research, Education, and Extension Service (CSREES) reserves the right to amend, delete, or otherwise alter any programs. Depending on the FY 2009 Appropriations Act, CSREES may be issuing a supplemental RFA to address topics already identified in this PA. Updated information about the AFRI program will be made available on the CSREES Web site: **http://www.csrees.usda.gov/funding/afri/afri.html**.

CATALOG OF FEDERAL DOMESTIC ASSISTANCE: This program is listed in the Catalog of Federal Domestic Assistance under 10.310.

Dates:
All applications must be submitted via Grants.gov by Close of Business (COB), which is 5:00 p.m. Eastern Time (not local time), on the deadline date indicated in the program description (see Part II, E), as well as in Table 4 at the end of this announcement. Applications received after the deadline will not be considered for funding. Comments regarding this PA are requested within six months from the issuance of this notice. Comments received after this date will be considered to the extent practical. The FY 2009 AFRI RFA is intended to reflect the same due dates as the FY 2009 AFRI PA. In the event there are conflicting due dates, the RFA due dates will supersede the PA due dates.

Executive Summary:
The Department of Agriculture established the Agriculture and Food Research Initiative (AFRI) under which the Secretary of Agriculture may make competitive grants for fundamental and applied research, extension, and

education to address food and agricultural sciences (as defined under section 1404 of the National Agricultural Research, Extension, and Teaching Policy Act of 1977 (7 U.S.C. 3103)), as amended, in six priority areas. The six priority areas include 1) Plant health and production and plant products; 2) Animal health and production and animal products; 3) Food safety, nutrition, and health; 4) Renewable energy, natural resources, and environment; 5) Agriculture systems and technology; and 6) Agriculture economics and rural communities.

In FY 2009, CSREES anticipates that approximately $190 million will be available for support of this program. Of this amount, no less than 30 percent will be made available to fund integrated research, education, and extension. This PA identifies research, education, or extension and integrated program objectives, eligibility criteria, and matching requirements for each type of project.

Projects supported by AFRI will propose single function research, education, or extension projects or multi-functional integrated projects. Award types are: Research Grants, Education Grants, Extension Grants, Integrated Grants, Conference Grants, Postdoctoral Fellowships, New Investigator Grants, and Strengthening Grants (see PART II(C) for more information).

PLEASE NOTE – AFRI PA / SIGNIFICANT MODIFICATION SUMMARY 12/22/2008:

Page 5 – changed Letter of Intent (LOI) Date for Applied Plant Genomics CAP to 1/16/09; changed LOI date for Integrated Solutions for Animal Agriculture to 3/16/09;

Page 76 – changed Application Deadline for Improving Food Quality and Value to March 31, 2009

Pg 130 – changed Improving Food Quality and Value Application Deadline to 3/31/2009; corrected Application Deadline for Protection of Managed Bees CAP in chart to reflect 5/1/2009.

Pgs. 29, 35, 37, and 97, Remove references to Plant Biology: Gene Function and Regulation as program will not be supported in FY 2009.

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PLEASE READ
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Important Information about the Agriculture and Food Research Initiative

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PLEASE READ
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Introduction to the Agriculture and Food Research Initiative:
Section 7406 of the Food, Conservation, and Energy Act of 2008 (FCEA) (Pub. L. 110-246) (i.e., the 2008 Farm Bill) amends subsection (b) of the Competitive, Special, and Facilities Research Grant Act (7 U.S.C. 450i(b)) to authorize the Agriculture and Food Research Initiative (AFRI). AFRI is a new competitive grant program to provide funding for fundamental and applied research, extension, and education to address food and agricultural sciences. While AFRI covers an equally broad scope of topics and will support many of the grant types offered by the former National Research Initiative (NRI), the new authority allows greater flexibility in the types of projects funded to include: single function projects in research, education and extension, and integrated research, education and/or extension awards (described in greater detail below). AFRI is the new core competitive grant program for research, education, and extension.

CSREES anticipates that approximately $190 million will be available for support of this program in FY 2009. The monies will be allocated in accordance with the authorizing language:

- No less than 30 percent will be made available to fund integrated programs (please see Part I(B) and Part IV (D) for more information).
- Of the amount allocated for research activities, 60 percent of research funding is directed toward fundamental (or basic) research, and 40 percent toward applied research (please see Part I(B) and Part IV (D) for more information).
- Not less than 30 percent of AFRI funds allocated to fundamental research will be directed toward research by multidisciplinary teams(please see Part I(B) and Part IV (D) for more information).
- It is anticipated that no less than 10 percent of the funds will be made available for Food and Agricultural Science Enhancement (FASE) Awards which are offered across all programs (please see Part II(C) and Part IV (D) for more information).

Program Announcement versus Request for Application:
Release of the AFRI Request for Applications (RFA) has been delayed while anticipating an updated electronic grants package that contains Adobe forms for submission through Grants.gov. It is the Agency's goal to keep its community informed and prepared. For this reason, the AFRI Program Announcement (PA) is being made available prior to the release of the RFA. The PA contains the program descriptions, anticipated deadline dates, , and eligibility information. In addition to the information in this PA, the AFRI RFA will contain instructions for the completion and submission of the updated application forms via Grants.gov.

Integration in the AFRI Program:
Integration of research, education and extension may be achieved at the program level or at the project level. Integration at the program level indicates that the program offers opportunities for single function projects in research, education, or extension, which, together, achieve stated program goals. Integration at the project level indicates that the program offers opportunities for multi-function projects that incorporate at least two of the three elements of the agricultural knowledge system (e.g., research, education, and extension). Please review the table below to see a comprehensive list of integrated programs. Be aware also that integrated programs have different eligibility requirements than non-integrated programs (see description below).

Program	**Program Code**
Agricultural Prosperity for Small and Medium-sized Farms	96360
Air Quality	94140
Animal Biosecurity CAP	92420
Applied Plant Genomics Coordinated Agricultural Project (CAP)	91710
Biology of Weedy and Invasive Species in Agroecosystems	94240
Food Safety and Epidemiology: Epidemiological Approaches for Food Safety	93232
Integrated Solutions for Animal Agriculture	92620
Human Nutrition and Obesity	93330
Managed Ecosystems	94340
Plant Breeding and Education	91810
Plant Biosecurity	91510
Protection of Managed Bees CAP	91910
Rapid Response Food and Agricultural Science for Emergency Issues	97100
Rural Development	96260

Eligibility for AFRI Programs:
Eligibility is linked to the program of interest. All project types solicited under integrated programs must comply with Integrated Program eligibility, see Part III, A. Likewise, all project types solicited under non-integrated programs must comply with Non-Integrated Program Eligibility, see Part III, A.

Types of Projects Accepted by AFRI:
The AFRI programs offer a variety of project types to achieve program goals. To learn more about the different project types, please refer to Part II, C.

Letter of Intent:
In some specific programs within AFRI, consideration for funding depends on submission of a required Letter of Intent (LOI) in accordance with a 5:00 P.M., Eastern Time deadline on a specified date. The LOI must be formatted following the requirements listed in Part II, F. LOI's will be reviewed by program staff to determine if full proposals would be suitable within the scope of the program and meet program requirements. Where LOI are required, only invited applications will be considered for funding.

In FY 2009, institutions interested in submitting applications for integrated programs and requesting consideration as Hispanic-serving Agricultural Colleges or Universities (HSACUs) must meet certain eligibility requirements. Please see Part III (D) for more information.

Program	Program Code	Letter of Intent Deadline
Air Quality	94140	3/5/2009
Animal Genome, Genetics, and Breeding	92120	3/5/2009 Priorities 1-4 Only
Animal Health and Well-Being: Animal Health	92521	1/16/2009
Animal Health and Well-Being: Animal Well-Being	92522	1/16/2009
Animal Health and Well-Being: Tools and Resources	22523	6/1/2009
Applied Plant Genomics Coordinated Agricultural Project (CAP)	91710	**1/16/2009**
Arthropod and Nematode Biology and Management: Suborganismal Biology	91112	4/1/2009
Arthropod and Nematode Biology and Management: Tools, Resources, and Genomics	91113	4/1/2009
Bioactive Food Components for Optimal Health	93130	1/22/2009
Biobased Products and Bioenergy Production Research	95150	2/11/2009
Biology of Weedy and Invasive Species in Agroecosystems	94240	4/20/2009
Food Safety and Epidemiology: Biological Approaches for Food Safety	93231	3/4/2009
Food Safety and Epidemiology: Epidemiological Approaches for Food Safety	93232	3/4/2009
Food Safety and Epidemiology: Practical Approaches for Food Protection	93233	3/4/2009
Improving Food Quality and Value	93430	1/21/2009
Integrated Solutions for Animal Agriculture	92620	**3/16/2009**
Managed Ecosystems	94340	3/3/2009
Microbial Biology: Microbial Associations with Plants	91210	2/16/2009
Microbial Genomics: Functional Genomics of Microorganisms	91312	2/5/2009
Plant Biology: Environmental Stress	91412	1/30/2009
Plant Biology: Biochemistry	91413	2/20/2009
Plant Biology: Growth and Development	91414	3/2/2009
Plant Breeding and Education	91810	3/16/2009
Plant Biosecurity	91510	4/13/2009
Plant Genome, Genetics, and Breeding	91610	1/16/2009
Protection of Managed Bees CAP	91910	3/2/2009
Rapid Response Food and Agricultural Science for Emergency Issues	97100	Immediately
Soil Processes	94440	1/16/2009

Food and Agriculture Science Enhancement Grants:
Food and Agricultural Science Enhancement (FASE) Grants assist in the development of capabilities in the agricultural, food, and environmental services by providing grants to institutions and individuals meeting certain other eligibility requirements. FASE grants strengthen capabilities in all areas of agricultural science. These grants are designed to enhance institutional capacity, and to attract new scientists into careers in high-priority areas of National need in agriculture, food, and environmental sciences. The FASE grants provide support for Postdoctoral Fellowships, New Investigators, and to strengthen small, mid-sized, and minority-serving institutions, as well as those in EPSCoR states (see below). Deadline dates are provided under Part II, E. Applications should be submitted to an appropriate program described in this solicitation by the deadline date specified.

Eligibility for strengthening awards has changed. AFRI accepts strengthening award applications from small and mid-sized schools, Experimental Program for Stimulating Competitive Research (EPSCoR) states, and minority-serving institutions. Please review the criteria below to determine specific eligibility requirements (see also Part II (C)(3)(c) for more information).

Small and mid-sized institutions are academic institutions with a current total enrollment of 17,500 or less, including graduate and undergraduate as well as full- and part-time students. An institution in this instance is an organization that possesses a significant degree of autonomy (i.e. *independently accredited*, please see Part IV, D. for more information).

Experimental Program for Stimulating Competitive Research (USDA-EPSCoR) states (as defined in Part IV, D.) are eligible for strengthening funds. Since this is the first year for the AFRI program, this information is based on the data obtained from grants made through the National Research Initiative program with funds appropriated from fiscal year (FY) 2006 to FY 2008. Beginning FY 2009 and continuing through FY 2011, the following States meet the eligibility requirements for this category:

Alabama	Louisiana	Rhode Island
Alaska	Maine	South Carolina
Connecticut	Mississippi	South Dakota
Delaware	Nevada	Vermont
Idaho	New Hampshire	West Virginia
Hawaii	North Dakota	Wyoming
Kentucky		

Other entities eligible for USDA-EPSCoR funds in FY 2009 and continuing through FY 2011, include the following United States commonwealths, territories, possessions and their successors, and the District of Columbia:

American Samoa
District of Columbia
Guam
Micronesia
Northern Mariana Islands
Puerto Rico
Virgin Islands of the U.S.

Minority serving institutions are academic institutions whose enrollment of a single minority group or a combination of minority groups (as defined in Part IV, D.) exceeds 50 percent of the total enrollment, including graduate and undergraduate as well as full- and part-time students.

Limited institutional success describes institutions that are not among the most successful universities and colleges for receiving Federal funds for science and engineering research. See Table 1 at the end of this document for an alphabetical list of the most successful institutions.

Response to Stakeholder Input:
On September 10, 2008, CSREES conducted a public meeting at the Waterfront Centre in Washington, DC to solicit comments regarding the implementing regulations to be developed for this program. CSREES considered stakeholder input received from this public meeting as well as other written comments in developing this PA for this program.

There will be an ongoing process in AFRI of evaluating and implementing suggestions made by stakeholders. Based on stakeholder input (http://www.csrees.usda.gov/business/reporting/stakeholder/an_stakeholder_afri.html) single function extension grants are being offered in the Plant Biosecurity and Human Nutrition and Obesity Programs. Similarly, education grants are being offered in Microbial Genomics, Biobased Products and Bioenergy, Soil Processes and Bioactive Food Components for Optimal Health. Conventional plant and animal breeding are receiving greater support in the Plant Breeding and Education Program, Plant Genome, Genetics and Breeding Program, Applied Plant Genomics Coordinated Agricultural Program and in Translational Animal Genomics. AFRI is authorized to make awards for up to 10 years. Although no programs will offer awards of this length in FY 2009, we have begun moving in this direction by initiating the Sustainable Agroecosystems Science and Long-Term Agroecosystem Programs that will support coordination efforts to develop approaches for effective 10 year projects.

TABLE OF CONTENTS

PART I – FUNDING OPPORTUNITY DESCRIPTION

A. Legislative Authority and Background

Section 7406 of the Food, Conservation, and Energy Act of 2008 (FCEA) (Pub. L. 110-246) amends subsection (b) of the Competitive, Special, and Facilities Research Grant Act (7 U.S.C. 450i(b)) to authorize the Secretary of Agriculture to establish the Agriculture and Food Research Initiative (AFRI), a new competitive grant program to provide funding for fundamental and applied research, extension, and education to address food and agricultural sciences. Grants shall be awarded to address priorities in United States agriculture in the following areas:

A) Plant health and production and plant products;
B) Animal health and production and animal products;
C) Food safety, nutrition, and health;
D) Renewable energy, natural resources, and environment;
E) Agriculture systems and technology; and
F) Agriculture economics and rural communities.

Eligible applicants for these grants include:
State Agricultural Experiment Stations; (2) Colleges and Universities; (3) University research foundations; (4) other research institutions and organizations; (5) Federal agencies; (6) national laboratories; (7) private organizations or corporations; (8) individuals who are U.S. citizens or nationals; and any group consisting of 2 or more entities identified in (1)-(8). Eligible applicants **do not** include foreign and international organizations unless otherwise provided for in the RFA.

Section 7406 of the FCEA also authorizes support for Integrated projects under section 406 of the Agricultural Research, Extension, and Education Reform Act of 1998 (7 U.S.C. 7626). Eligible applicants for the integrated research projects include: (1) Colleges and universities (as defined in section 1404 of the National Agricultural Research, Extension, and Teaching Policy Act of 1977 (7 U.S.C. 3103)); (2) 1994 Institutions (as defined in section 532 of the Equity in Educational Land-Grant Status Act of 1994 (Public Law 103–382; 7 U.S.C. 301 note)); and (3) Hispanic-serving agricultural colleges and universities (as defined in section 1404 of the National Agricultural Research, Extension, and Teaching Policy Act of 1977 (7 U.S.C. 3103), as amended).

To the maximum extent practicable, CSREES, in coordination with the Under Secretary for Research, Education, and Economics (REE), will make grants for high priority research, education, and extension, taking into consideration, when available, the determinations made by National Agricultural Research, Extension, Education, and Economics Advisory Board (NAREEEAB) pursuant to subsection (b)(10) of the Competitive, Special, and Facilities Research Grant Act (7 U.S.C. 450i(b)(10)), as amended. The authority to carry out this program has been delegated to CSREES through the Undersecretary for Research, Education, and Economics.

B. Purpose and Priorities

The CSREES Competitive Programs Unit administers AFRI. The purpose of AFRI is to support research, education, and extension grants and integrated research, extension, and education grants that address key problems of National, regional, and multi-state importance in sustaining all components of agriculture, including farm efficiency and profitability, ranching, renewable energy, forestry (both urban and agroforestry), aquaculture, rural communities and entrepreneurship, human nutrition, food safety, biotechnology, and conventional breeding. Providing this support requires that AFRI advances fundamental sciences in support of agriculture and coordinates opportunities to build on these discoveries. This will necessitate efforts in education and extension that deliver science-based knowledge to people, allowing them to make informed practical decisions. This AFRI PA is announcing anticipated funding opportunities for fundamental research, applied research, education, extension, and integrated research, extension, and education projects.

Please note that there are substantial opportunities for conventional plant and animal breeding projects, both research and integrated, within AFRI. For plant breeding, see the Plant Biology: Environmental Stress program, the Plant Genome, Genetics, and Breeding program, and the Plant Breeding and Education program. For animal breeding, see the Animal Genome, Genetics, and Breeding program.

CSREES may also solicit applications for AFRI funds through other announcements, including supplemental FY 2009 AFRI RFAs or in conjunction with multi-agency programs. Such announcements will be made public in the same manner as this announcement.

The programs described herein were developed within the context of the authorized purposes of USDA research, extension, and education and within the framework of the CSREES Strategic Plan. In addition, AFRI obtains input from Congress, the National Agricultural Research, Extension, Education, and Economics Advisory Board, as well as many university, scientific, and agricultural committees and organizations. CSREES developed a stakeholder's Web page (http://www.csrees.usda.gov/business/reporting/stakeholder.html) to document stakeholder input that is considered when developing and updating program descriptions and priorities each year.

C. Agency Contacts

Applicants and other interested parties are encouraged to contact AFRI staff:
Telephone: (202) 401-5022;
Fax: (202) 401-6488;
E-mail: AFRI@csrees.usda.gov.
Specific questions pertaining to technical matters may be directed to the appropriate National Program Leader listed in Table 4 at the end of the document.

D. Information on the CSREES Web site

AFRI program information will be made available on the CSREES Web site:
http://www.csrees.usda.gov/funding/afri/afri.html.

PART II – GRANT INFORMATION

A. Available Funding

There is no commitment by USDA to fund any particular application or to make a specific number of awards. Contingent on congressional action, in FY 2009, CSREES anticipates that approximately $190 million will be available for support of this program. Of this amount, no less than 30 percent will be made available to fund integrated projects. Of the AFRI funds allocated to research activities, section 7406 of the FCEA directs 60 percent toward grants for fundamental (or basic) research, and 40 percent toward applied research. Of the AFRI funds allocated to fundamental research, not less than 30 percent of AFRI grants will be directed toward research by multidisciplinary teams. It is anticipated that no less than 10 percent of the funds will be made available for Food and Agricultural Science Enhancement (FASE) Awards, excluding New Investigator Grants, and no more than two percent will be made available for equipment grants. AFRI funds may be used to support applications submitted to supplementary AFRI RFAs and/or solicitations for multi-agency programs in which AFRI is participating.

B. Types of Applications

The 7406 of the FCEA amended subsection (b) of the Competitive, Special, and Facilities Research Grant Act (7 U.S.C. 450i(b)), authorizing the creation of the AFRI program. Because this is a new program, all applications must be submitted as new.

1. New application

A new application is a project application that has not been previously submitted to AFRI. New applications will be reviewed competitively using the evaluation criteria specified in Part IV, A.

C. Project Types

Projects supported by AFRI will propose single function research, education, or extension projects or multi-functional integrated projects. Award types are: Research Grants, Education Grants, Extension Grants, Integrated Grants, Conference Grants, Postdoctoral Fellowships, New Investigator Grants, and Strengthening Grants.

1. Single-function Projects

(a) Research Grants

Research will be supported that is **fundamental** or **applied** and that is conducted by **individual** investigators, co-investigators within the same discipline, or **multidisciplinary** teams. Individual applicants (i.e., those who do not apply through an organization) are required to be U.S. citizens or permanent residents of this country. Certain programs within AFRI require a letter of intent prior to submitting a full application. See specific program descriptions to determine whether a letter of intent is required. Letter of intent instructions are available in Part II, F.

> ***Fundamental research means r****esearch testing scientific hypotheses and providing basic knowledge that enables advances in applied research and from which major conceptual breakthroughs are expected to occur.*
> ***Applied research means r****esearch that includes expansion of the findings of fundamental research in order to uncover practical ways in which new knowledge can be advanced to benefit individuals and society.*
> ***Multidisciplinary*** *projects are those in which investigators from two or more disciplines collaborate closely. These collaborations, where appropriate, may integrate the biological, physical, chemical, or social sciences.*

(b) Research Coordinated Agricultural Project (CAP) Grant
The Coordinated Agricultural Project (CAP) is a type of research grant that supports large-scale, multi-million dollar projects to promote collaboration, open communication, and the exchange of information; reduce duplication of effort; and coordinate activities among individuals, institutions, States, and regions. CAP grants are only solicited in designated programs. In a CAP project, participants serve as a team that conducts targeted research in response to emerging or priority area(s) of National need. Applications articulate how a CAP will complement and/or link with existing programs or projects at the National level. A research CAP project contains the needed science-based expertise, as well as expertise from principal stakeholders and partners to accomplish project goals and objectives. Applications should outline the potential of the project, the structure, coordination, and plan of implementation, and propose several research areas that will be evaluated during the study period.

CAP grants are typically made as continuation grants. A continuation grant is a grant instrument by which the Department agrees to support a specified level of effort for a predetermined period of time with a statement of intention to provide additional support at a future date, provided that performance has been satisfactory, appropriations are available for this purpose, and continued support would be in the best interest of the Federal government and the public.

(c) Education Grants
An education grant is an award made by an Authorized Departmental Officer to fund an eligible grantee to develop human capital relevant to overall program goals for U.S. agriculture. The applications for Education Grant projects may address any of the following activities: conducting classroom, and laboratory instruction, and practicum experience, faculty research internship for curricula development, student training, cutting-edge agricultural science and technology curriculum development, innovative teaching methodologies, and development of modules for on-the-job training and/or providing knowledge and skills for professionals creating policy or transferring to the agriculture workforce. The activities for Education Grant projects must show direct alignment with increasing technical competency in AFRI priority area(s) to ensure that the U.S. remains globally competitive in the knowledge age.

Educations projects address one or more of the following key strategic actions:
(i) train students for Associate, Baccalaureate, Master's or doctoral degrees;
(ii) prepare K-12 teachers and higher education faculty to understand and present food and agricultural sciences;
(iii) supports informal education to increase food and agricultural literacy of adults as well as students through museums, science centers, aquaria, on-the-job training;
(iv) promote science-based agricultural literacy by increasing understanding and use of food and agricultural science data, information, and programs;
(v) build science-based capability in people to engage audiences and enable informed decision making.

These projects should lead to measurable, documented changes in learning, actions, or conditions in an identified audience or stakeholder group. Extension related activities designed to build institutional capacity are also allowable. These projects should incorporate a wide range of research results."

(d) Extension Grants
An extension grant is an award made by an Authorized Departmental Officer to fund an eligible grantee to meet the costs of conducting programs and activities that deliver science-based knowledge and informal educational programs to people, enabling them to make practical decisions.

(e) Conference Grants
Conference grants support scientific meetings that bring together scientists to identify research, education, or extension needs, update information, or advance an area of science are recognized as integral parts of scientific efforts. Support for a limited number of meetings covering subject matter encompassed by this solicitation will be considered for partial or, if modest, total support. Individual conference grants are not expected to exceed $10,000 and are not renewable. Indirect costs are not allowed. Conference Grant applications should be submitted by the deadline date for the appropriate program described under Part II, E.

Certain programs within AFRI require a letter of intent prior to submitting a full application. **A letter of intent, however, is not required for Conference Grant applications.** Applicants interested in submitting conference applications are strongly advised to consult the National Program Leader listed as the contact for the applicable program before preparing their application.

2. Integrated Multi-Functional Projects

(a) Integrated Project Grants

An integrated project, defined in Part IV, D., includes at least two of the three components of the agricultural knowledge system (i.e., research, education, and extension) within a project. The functions addressed in the project should be interwoven throughout the life of the project and act to complement and reinforce one another. In other words, the functions should be interdependent and necessary for the success of the project.

(1) The proposed research component of an integrated project should address knowledge gaps that are critical to the development of practices and programs to address the stated problem.

(2) The proposed extension component of an integrated project should lead to measurable, documented changes in learning, actions, or conditions in an identified audience or stakeholder group. Extension related activities designed to build institutional capacity are also allowable. The extension component should incorporate a wide range of research results, not just those of the current project. Please note that research-related activities such as publication of papers, or speaking at scientific meetings are not considered extension for the purposes of this program.

(3) The proposed education (teaching and teaching-related) component of an integrated project should strengthen institutional capacities and result in curricula and related products that will be sustained beyond the life of the project. The following activities are appropriate for the education component of an integrated project: curriculum development; instructional materials development; education delivery systems; student experiential learning (internships, externships, clinics); student recruitment and retention efforts; career planning materials and counseling; pedagogy; student learning styles and student-centered instruction; faculty development programs; student study abroad and international research opportunities relevant to overall program goals for U.S. agriculture; and faculty and student exchanges.

The bullets below describe additional requirements for integrated project proposals.

- Integrated projects should aim to resolve today's problems through the application of science-based knowledge;
- Integrated projects should address needs identified by stakeholders. Stakeholder involvement in project development, implementation, and evaluation is strongly encouraged, where appropriate;
- Integrated projects should clearly identify anticipated outcomes and must have a plan for evaluating and documenting the success of the project. The applicant is strongly advised to consult with an evaluation specialist to develop appropriate measures of success;
- Applications proposing integrated projects must include the elements of a logic model detailing the activities, outputs, and outcomes of the proposed project. This information may be provided as a narrative or formatted into a logic model chart. More information and resources related to the logic model planning process are provided at www.csrees.usda.gov/funding/integrated/integrated_logic_model.html.
- Integrated proposals should contain objectives for each function included in the project. Please note that extension and education activities are expected to differ (see enumerated descriptions above and definitions in Part IV, D.) and should be described in separate project objectives;
- Integrated projects must budget sufficient resources to carry out the set of extension, research, and/or education activities that will lead to the desired outcomes. No more than two-thirds of a project's budget may be focused on a single component. In other words, no more than two-thirds of the project's budget may be allocated to research (or education, or extension);

- Integrated projects must include individuals on the project team with significant expertise in each component of the project (research, education, and/or extension);
  See http://www.csrees.usda.gov/funding/integrated/integrated.html for additional information on integrated programs, including tips for writing integrated project proposals and an example of an integrated proposal.

Those interested in submitting integrated applications are encouraged to contact the appropriate National Program Leader to discuss the anticipated project parameters and outcomes to ensure the application content appropriately meets the requirements of an integrated project.

(b) Integrated Coordinated Agricultural Projects (CAP) Grant

A limited number of programs solicit applications for the Integrated Coordinated Agricultural Project (CAP) grant. Integrated CAP grants support large-scale multi-million dollar projects to promote collaboration, open communication, and the exchange of information; reduce duplication of effort; and coordinate activities among individuals, institutions, States, and regions. As a type of integrated project, Integrated CAP projects address problems through research, education, and extension (i.e. all three components of the agricultural knowledge system). Project participants serve as a team that conduct targeted research, extension, and education in response to emerging or priority area(s) of National need. Applications articulate how an Integrated CAP grant will complement and/or link with existing programs or projects at the National level. An Integrated CAP contains the needed science based expertise in teaching, extension, and research, as well as expertise from principal stakeholders and partners to accomplish project goals and objectives. Applications should outline the potential of the project, the structure, coordination, and plan of implementation, and propose several research, extension, and education areas that will be addressed during the study period. All integrated project requirements described earlier in this section apply to integrated CAP projects.

An integrated CAP grant is typically made as a continuation grant. A continuation grant is a grant instrument by which the USDA-CSREES agrees to support a specified level of effort for a predetermined period of time, typically one year, with a statement of intention to provide additional support at a future date, provided that performance has been satisfactory, appropriations are available for this purpose, and continued support would be in the best interest of the Federal government and the public.

3. Food and Agricultural Science Enhancement (FASE) Grants

Food and Agricultural Science Enhancement (FASE) Grants strengthen science capabilities in research and integrated programs. These grants are designed to help institutions develop competitive research and integrated projects, research programs, and to attract new scientists into careers in high-priority areas of National need in agriculture, food, and environmental sciences. The FASE grants provide support for Postdoctoral Fellowships, New Investigators, and Strengthening Grants. Specific eligibility requirements for these grants are described below. Applications submitted by non-United States organizations will not be considered for support. However, United States citizens or national applying as individuals for Postdoctoral Fellowships may do all or part of the proposed work at a non-United States organization.

Deadline dates are provided under Part II, E. Applications should be submitted to an appropriate program described in this solicitation by the deadline date.

(a) Postdoctoral Fellowships

Individuals who have recently received or will soon receive their doctoral degree are encouraged to submit an application for a Postdoctoral Fellowship for research or integrated activities. **These applications may be submitted either directly by the individual or through the mentor's institution. The postdoctoral applicant must be the sole PD listed on the application**. Certain programs within AFRI require a letter of intent prior to submitting a full application. See specific program descriptions to determine whether a letter of intent is required.

The following requirements apply for all Postdoctoral Fellowships:

(1) the doctoral degree must be received after January 1, 2006 and cannot be received later than nine months after the application due date for the AFRI program of interest;

(2) the individual must be a citizen or national of the United States;

(3) the application must contain (A) documentation that arrangements have been made with an established investigator to serve as mentor; (B) documentation that arrangements have been made for the necessary facilities, space, and materials for conduct of the work; and (C) documentation from the host institution's authorized organizational representative (AOR) indicating that the host institution concurs with these arrangements; and

(4) the research proposed must be solicited in and submitted directly to a specific program described under Part II, E.

Although a proposed project may fit in the context of the mentor's existing scientific area, the postdoctoral grant should initiate an independent scientific program, rather than serve as an extension of ongoing projects in the mentor's laboratory. Postdoctoral grants are limited to a total award of $125,000 for a two-year duration and are not renewable. Funds should be requested primarily for salary support, although other expenditures (e.g., supplies, travel, and publication) are allowable costs if properly justified. Institutional allowance, not to exceed $2,400 per year, may be requested within the $125,000 maximum award limit. Indirect costs are not allowed.

An institution may provide compensation for project-related services and such compensation is not considered stipend supplementation. However, it is expected that compensated services will occur on a limited, part-time basis apart from the normal postdoctoral activities, which require a minimum of 40 hours per week. Under no circumstances may the conditions of stipend supplementation or the services provided for compensation interfere with, detract from, or prolong the fellow's two-year approved AFRI postdoctoral fellowship.

Applications should be submitted to the appropriate program described in this solicitation by the designated deadline for that particular program. A separate peer review panel will not be assembled to review these applications. Applicants are urged to contact the appropriate National Program Leader concerning questions related to eligibility, budget, and similar matters.

(b) New Investigator Grants

A new investigator is defined as an individual who is beginning his/her career, does not have an extensive scientific publication record, and has less than five years postgraduate, career-track experience. The new investigator may not have received competitively awarded Federal research funds with the exception of pre- or postdoctoral research grants or USDA AFRI Seed Grants. The application must contain documentation that lists all prior Federal research support. New Investigator grant applications are subject to letter of intent guidelines, where they exist for a program. See specific program descriptions to determine whether a letter of intent is required.

The work proposed shall be appropriate to a program described under Part II, E and the application must be submitted directly to that program by the designated deadline date. A separate peer review panel will not be assembled to review these applications.

(c) Strengthening Grants

Applications from small and mid-sized schools, Experimental Program for Stimulating Competitive Research (EPSCoR) states, and minority-serving institutions are eligible for reserved funds for research, education, extension, and integrated grants. These funds are expected to enhance institutional capacity, with the goal of leading to future funding in the project area, as well as strengthen the competitiveness of the investigator's research, education, and/or extension activities. Strengthening grants consist of standard grant types (both single-function and multi-functional projects) as well as seed grants, equipment grants, and sabbatical grants. **AFRI particularly encourages applications for Sabbatical grants.** All applications submitted for Strengthening Grants must fulfill the requirements for a Strengthening grant, as well as be appropriate to one of the programs described in this document.

Flow Chart for Strengthening Grant Eligibility

A flow chart is provided at the end of the document, see Figure 1, to assist with determining eligibility for Strengthening Grants.

- Sabbatical Grants, Seed Grants, Equipment Grants, and Strengthening Standard Grants will be available to PDs at **small and mid-sized academic institutions** (not among the top 100 universities and colleges for receiving Federal funds for science and engineering research), **minority serving institutions**, or at an **institution located in an Experimental Program for Stimulating Competitive Research (EPSCoR)** state. See Table 1 for a list of the most successful institutions. If your institution is listed in Table 1 and is not in an EPSCoR state, you are not eligible for a Sabbatical Grant, Seed Grant, Equipment Grant, or Strengthening Standard Grant.

Strengthening Grant Definitions

(1) EPSCoR States
Every three years, AFRI determines the states that are eligible for USDA EPSCoR funding. This list is generated by calculating which states have had a funding level no higher than the 38th percentile of all states, based on total funding for the previous three-year period (excluding strengthening set-aside funds). Since this is the first year for the AFRI program, this information is based on the data obtained from grants made through the National Research Initiative program from 2005 to 2008. Beginning FY 2009 and continuing through FY 2011, the following States meet the requirements for this category:

Alabama	New Hampshire
Alaska	North Dakota
Connecticut	Rhode Island
Delaware	South Carolina
Idaho	South Dakota
Hawaii	Vermont
Kentucky	West Virginia
Louisiana	Wyoming
Maine	
Mississippi	
Nevada	

Other entities eligible for USDA-EPSCoR funds in FY 2009 include the following United States commonwealths, territories, possessions and their successors, and the District of Columbia:

American Samoa
District of Columbia
Guam
Micronesia
Northern Mariana Islands
Puerto Rico
Virgin Islands of the U.S.

(2) Small and mid-sized institutions are academic institutions with a current total enrollment of 17,500 or less, including graduate and undergraduate as well as full- and part-time students. Applicants applying under this category should indicate the current total enrollment of the institution in a cover letter. An institution in this instance is an organization that possesses a significant degree of autonomy. Significant degree of autonomy is defined by being independently accredited as determined by reference to the current version of the *Higher Education Directory*, published by Higher Education Publications, Inc., 6400 Arlington Boulevard, Suite 648, Falls Church, Virginia 22042. (703-532-2300).

(3) Minority serving institutions are academic institutions whose enrollment of a single minority group or a combination of minority groups (as defined in Part IV, D) exceeds 50 percent of the total enrollment, including graduate and undergraduate as well as full- and part-time students.

- Applicants applying under this category should indicate the current percentage of applicable minority students enrolled at the institution in a cover letter. An institution in this instance is an organization that possesses a significant degree of autonomy. Significant degree of autonomy is defined by being

independently accredited as determined by reference to the current version of the *Higher Education Directory*, published by Higher Education Publications, Inc., 6400 Arlington Boulevard, Suite 648, Falls Church, Virginia 22042. (703-532-2300). A list of post-secondary minority-serving institutions can be found at http://www.ed.gov/about/offices/list/ocr/edlite-minorityinst.html.

(4) Limited institutional success is defined as institutions that are not among the most successful universities and colleges for receiving Federal funds for science and engineering research. See Table 1 at the end of this document for an alphabetical list of the most successful institutions.

All institutions grouped under one main campus as listed in Table 1 are excluded from eligibility for equipment grants and, unless located in an EPSCoR state, all other strengthening funds. However, if any campus within a multi-campus listing can provide information demonstrating that it is administratively independent or has an independent accreditation, then the PD may petition for an exemption to this rule and request eligibility for strengthening funds. The PD must include a letter with the full application indicating how the institution is independent of the main campus, either through accreditation or administration. In addition, if the institution is in a non-EPSCoR state, the letter should stipulate that the institution is eligible as a small and mid-sized or minority-serving institution due to enrollment and, in the case of small and mid-sized institutions, total federal funds received for science and engineering research. The letter must be signed by the AOR and included with the completed application.

An individual applicant may submit only one of the following types of strengthening applications (sabbatical grants, equipment grants, and seed grants) as PD this fiscal year. Investigators are encouraged to contact the National Program Leader of the appropriate program, described in Part II, E, regarding suitability of project topics to verify that their submission is appropriate to the program. For equipment grants, investigators are also encouraged to contact the appropriate National Program Leader regarding appropriateness of requested equipment for research topics within program requirements.

(1) Sabbatical Grants

The purpose of this grant is to provide an opportunity for faculty to enhance their research, education and/or extension/outreach capabilities by funding sabbatical leaves. These grants will be limited to individual faculty who have appointments at small and mid-sized or minority-serving degree-granting institutions that previously had limited institutional success for receipt of Federal funds and to faculty who have appointments at degree-granting institutions eligible for USDA-EPSCoR funding. Collaborative arrangements are encouraged. Colleagues who serve as collaborators should not be listed on the Senior/Key Person Profile. Grants will be limited to one year of salary and funds for travel and supplies, where justified. These grants are not renewable. Certain programs within AFRI require a letter of intent prior to submitting a full application**. A letter of intent, however, is not required for Sabbatical Grant applications.**

CSREES also encourages and will support the concept of "mini-sabbaticals" for faculty desiring short-term training to learn new techniques that will improve their competitiveness. These short-term training opportunities generally follow all of the sabbatical requirements described below, but for a shorter duration. These grants may be used to participate in short courses offered at various research institutions.

- The sabbatical description must include the research, education, and/or extension/outreach interests and goals of the PD, the project to be pursued while on sabbatical leave, an indication of how the sabbatical leave will enhance the capabilities of the PD, and a statement of future professional goals and how the sabbatical will enable the PD to pursue these goals.

- The application should include a letter detailing the particulars of the arrangement with the home institution (e.g., dates and duration of sabbatical and salary arrangements).

- The application should also include a letter from the established investigator who will be the host. The host's letter should provide intent and assurance that all facilities and space necessary to conduct the proposed work will be available.

(2) Equipment Grants

Equipment grants are designed to strengthen the research, education and/or extension/outreach capacity of institutions. These grants will be limited to individual faculty who have appointments at small and mid-sized degree-granting institutions that previously had limited institutional success for receiving Federal funds (see Table 1 for a list of the top 100 Most Successful Universities and College Receiving Federal Funds), faculty at minority-serving institutions, and to faculty who have appointments at degree-granting institutions eligible for USDA-EPSCoR funding.

These grants are not intended to replace requests for equipment in individual project proposals. Rather, they are intended to help fund items of equipment that will upgrade infrastructure. Requests for computer equipment are allowed only if the equipment is to be used in an activity integral to the proposed project. Requests for computer equipment will not be permitted if the equipment will primarily serve as a word processor or perform administrative functions.

Each request shall be limited to one major piece of equipment within the cost range of $10,000-$250,000. The amount requested shall not exceed 50 percent of the cost or $50,000, whichever is less. Unless waived, it is the responsibility of the PD to secure the required matching funds with non-Federal funds. No installation, maintenance, warranty, or insurance expenses may be paid from these grants, nor may these costs be part of the matching funds. Indirect costs are not permitted on Equipment Grant Awards. Certain programs within AFRI require a letter of intent prior to submitting a full application. **A letter of intent, however, is not required for Equipment Grant applications.** The following requirements apply to all Equipment Grant applications.

- A letter(s) from the organization(s) committed to providing the non-Federal matching funds must be included in the application.

- The application should include a description of the project(s) for which the equipment will be used and detail how the equipment will fit into or enhance the research, education, or extension program and allow the applicant to become more competitive for future funding.

- The application should also include a description of similar or complementary equipment currently available to the PD and an explanation as to why the requested equipment is necessary.

- PDs are encouraged to provide evidence of institutional commitment for operation and maintenance of requested equipment. Arrangements for sharing equipment among faculty are encouraged. However, it must be evident that the PD is a principal user of the requested equipment.

- The requirement for matching funds may be waived if the following three criteria are met.
  1. The grant is made to a college, university, or research foundation maintained by a college or university that ranks in the lowest one-third of academic institutions receiving Federal research funds (see Table 2 for a list of institutions that are eligible for waiver of matching funds for equipment grants);
  2. The equipment to be acquired costs not more than $25,000; and
  3. The equipment will have either multiple uses within a single research, education, and/or extension project or is useable in more than one project.

(3) Seed Grants

The purpose of this grant is to provide funds to enable investigators to collect preliminary data in preparation for applying for a Standard Research, Standard Education, Standard Extension, or Integrated Grant. The grants are not intended to fund stand-alone projects, but rather projects that will lead to further work applicable to one of the program areas in AFRI.

These grants are limited to faculty with appointments at small and mid-sized or minority-serving degree-granting institutions that have had limited institutional success for receiving Federal Funds and to faculty with appointments at degree-granting institutions eligible for USDA-EPSCoR funding. These grants will be limited to a total of $150,000 (including indirect costs) for two-years and are not renewable. Certain

programs within AFRI require a letter of intent prior to submitting a full application. **A letter of intent, however, is not required for Seed Grant applications.** The following requirement applies to all Seed Grant applications.

- Applications for seed grants are expected to indicate how the project will enhance future competitiveness of the PD in applying for Standard Research, Standard Education, Standard Extension, and Integrated Grants from AFRI.

(4) Strengthening Standard Grants

FASE grants use strengthening set-aside funds for meritorious standard proposals that fall below the funding cutoff limit. These grants will be limited to an application led by a PD who has a faculty appointment at a degree-granting institution eligible for USDA-EPSCoR funding or at a small and mid-sized or minority-serving degree-granting institution that has had limited institutional success for receiving Federal funds. The eligibility requirements only apply to the lead PD and are not required for co-PD(s) associated with the project.

D. AFRI and CSREES Strategic Planning

AFRI supports the objectives and goals identified in the CSREES Strategic Plan (http://www.csrees.usda.gov/about/offices/pdfs/csrees_stratic_plan.pdf). The CSREES plan has the following goals:

1. Strategic Goal 1: Enhance International Competitiveness of American Agriculture
2. Strategic Goal 2: Enhance the Competitiveness and Sustainability of Rural Farm Economics
3. Strategic Goal 3: Support Increased Economic Opportunities and Improved Quality of Life in Rural America
4. Strategic Goal 4: Enhance Protection and Safety of the Nation's Agriculture and Food Supply
5. Strategic Goal 5: Improve the Nation's Nutrition and Health
6. Strategic Goal 6: Protect and Enhance the Nation's Natural Resource Base and Environment

The CSREES plan is compatible with the goals of the USDA Strategic Plan and is a dynamic working document that evolves in response to changes in National needs. Decisions about AFRI priorities are made by considering stakeholder input, congruence with Presidential initiatives, and reports from the National Academy of Sciences and National Agricultural Research, Extension, Education, and Economics Advisory Board (NAREEEAB).

E. Program Opportunities

CSREES offers a number of programs that support research, education, and extension, and integrated research, education, and extension projects. Applicants are encouraged to review this entire PA as well as explore other programs offered by CSREES to find the most appropriate source of funding. The PA can be accessed through the Agency's Web site :.http://www.csrees.usda.gov/funding/afri/afri.html.

The following program opportunities provide a base from which applications for all types of functional projects and FASE grants may be developed. These descriptions provide boundaries on the scope of each individual program within the scope of program priorities. AFRI encourages submission of innovative "high-risk" projects with potential for future high impact on agriculture, as well as innovative applications with potential for near-term use.

Projects addressing biological issues should focus on agriculturally-important organism(s) to accomplish the project objectives. The use of other organisms as experimental model systems **MUST** be justified relative to the goals of the appropriate program.

Note to multidisciplinary research teams: AFRI recognizes the value of research performed as a team effort and recommends the following be taken into consideration when assembling a project team and developing an application for funding. A competitive project will have objectives aligned with AFRI program priorities and the appropriate person to complete the tasks proposed. A clear management strategy should be provided which identifies the contribution of each member of the team.

E.1. Plant Health and Production and Plant Products

The Plant Health and Production and Plant Products area addresses CSREES' strategic goals to enhance the competitiveness and sustainability of rural and farm economies; enhance the international competitiveness of American agriculture; enhance protection and safety of the Nation's agriculture and food supply; improve the Nation's nutrition and health; and protect and enhance the Nation's natural resource base and environment.

Plant production and health plays a critical role in the sustainability and competitiveness of U.S. agriculture and, as a result, in the success and growth of the Nation's economy. An increased understanding of plant biology from the genome to the systems level provides the foundation for development of plant varieties with increased yield, reduced production cost, enhanced quality, and new uses for food and industry. Similarly, the study of plant pests and diseases underpins the development of innovative approaches to increase effects of beneficial microbes, arthropods, and nematodes and limit harmful effects of new or re-emerging pathogens or pests. This increased knowledge of plant systems will allow U.S. agriculture to face critical needs in areas such as bioenergy, climate change, loss of agricultural land, and increasing global competition. The overall goals of the Plant Health and Production and Plant Products program area are to:

1. Increase our knowledge regarding agriculturally-important arthropods and nematodes through study of genomics and biology and development of tools, to enhance use of beneficial species for plant production and to better design novel strategies for management of pests and reduction of pesticide use;
2. Enhance our understanding of the genomes and biology of agriculturally-important microorganisms, developing improved or new tools, technologies, and approaches to increase productivity and reduce agricultural pest and disease outbreaks;
3. Increase our understanding of plant genome structure, function and organization and to incorporate modern molecular breeding technologies and classical breeding practice to improve crop and forestry efficiency and sustainability;
4. Improve our knowledge of plant biology, including gene function and regulation, abiotic stress response, growth and development, disease resistance, and biochemical pathways, to enhance yield, quality, and use of plants and plant products through classical breeding or biotechnology approaches;
5. Provide training opportunities in plant breeding in agriculturally and economically important plant and forestry species; and
6. Develop and support implementation strategies to safeguard U.S. agriculture from critical and emerging high-consequence plant pathogens and arthropods.

In FY 2009, the AFRI invites applications in the following programs in the Plant Health and Production and Plant Products area:

a. Arthropod and Nematode Biology and Management
b. Protection of Managed Bees Coordinated Agricultural Project (CAP)
c. Microbial Biology: Microbial Associations with Plants
d. Microbial Genomics
e. Plant Biology
f. Plant Biosecurity
g. Plant Genome, Genetics and Breeding
h. Applied Plant Genomics Coordinated Agricultural Project (CAP)
i. Plant Breeding and Education

The following cross-cutting AFRI programs also contribute to the goals with the Plant Health and Production and Plant Products area:

Managed Ecosystems
Bioactive Food Components for Optimal Health
Biobased Products and Bioenergy Production Research
Improving Food Quality and Value
Soil Processes

a. Arthropod and Nematode Biology and Management

National Program Leader – Dr. Mary Purcell-Miramontes (202-205-0440 or mpurcell@csrees.usda.gov)
Total Program Funds – approximately $12.5 million
Proposed Program Funds – This program contains three elements. See each program element for additional budgetary information.

1. Arthropod and Nematode Biology and Management: Organismal and Population Biology
2. Arthropod and Nematode Biology and Management: Suborganismal Biology
3. Arthropod and Nematode Biology and Management: Tools, Resources, and Genomics

Letter of Intent Deadline – See each program element for additional details.
Application Deadline – See each program element for additional details.

Overview
The intentional or accidental introduction of arthropod or nematode pests into the U.S. is a major threat to the security of agricultural systems, our food supply, and communities. To combat these threats, conventional agricultural chemicals are the primary means to control most of these pests, despite concerns about adverse effects on public health, non-target organisms, and natural resources. Environmentally safer alternatives have been developed in some systems, such as the use of biological control organisms (e.g. parasites, predators, and microbes), semiochemicals, resistant plant varieties, and genetically modified crops that resist attack by pests. However, fundamental knowledge of arthropod and nematode biology, which could lead to better usage of these alternatives or novel approaches to management, is still lacking in many areas. In addition, growing demands for organically-grown commodities in the U.S. has led to increased needs for biologically-based approaches to managing pests. Also, the health of pollinator populations could be greatly improved if the mechanisms that affect susceptibility to pests, diseases, disorders, and environmental stressors were better understood.

To meet these identified needs of agriculture, the long-term (10-year) goals of this program area are to 1) improve our understanding of the biotic and abiotic factors associated with establishment and distribution of pests and beneficial species; and 2) develop the scientific and technological framework for environmentally sound pest management strategies. Examples of promising outcomes include genetically modified arthropods or nematodes for pest control, improved utilization of biological control organisms, development of novel pheromone blends or biologically-based pesticides, and adoption of pest-resistant strains of managed bees.

All three program elements in the Arthropod and Nematode Biology and Management program area support research in the following systems: Horticultural and field crops, forests, rangelands, urban landscapes, livestock, and food or feed transported and stored for consumption by humans or animals. Pest organisms are limited to insects, mites, ticks, plant-parasitic nematodes, and weeds in the context of a biological control agent. Beneficial species include biological control organisms (e.g. insects, microbes, or nematodes) of the above pests and pollinators. Arthropods, which vector plant or livestock diseases important to agriculture, are also appropriate. Pests which are primarily important as vectors of human diseases will not be considered.

1. Arthropod and Nematode Biology and Management: Organismal and Population Biology
Program Code - 91111
National Program Leader – Dr. Mary Purcell-Miramontes (202-205-0440 or mpurcell@csrees.usda.gov)
Total Program Funds – approximately $5.5 million
Proposed Program Funds –

- Proposed research project budget requests must not exceed $350,000 for single-investigator projects and $450,000 for multi-disciplinary projects for project periods of 2-4 years (including indirect costs).
- Requests exceeding the budgetary guidelines above will not be reviewed.

Letter of Intent Deadline – not required for this program element
Anticipated Application Deadline – March 9, 2009 (5:00 P.M., ET); the firm deadline will be made available in the AFRI RFA.

Background
The Organismal and Population Biology element of the Arthropod and Nematode Biology and Management program will support hypothesis-driven research at the organismal and population level to address the challenges of managing arthropod or nematode pests and enhancing use of beneficial organisms.

FY 2009 Priorities for Research Projects – Applicants must address at least one of the following priorities.

1. Determine chemical-ecological or eco-physiological mechanisms that affect abundance of pests or beneficial species.

2. Characterize ecological or population level dynamics that affect establishment and/or movement of pests or beneficial species.

3. Elucidate multitrophic interactions between pests, beneficial organisms, or microbes and commodities (e.g. plants or livestock).

Other Key Information

- **This is a non-integrated program. Please refer to Part III, A for eligibility criteria.**

- Projects that include an evaluation of management of pests using biological control or IPM strategies are strongly encouraged to include an economic component (e.g., how are crop yields affected, or a cost-benefit analysis)

- The Project Description portion of the application must include a section providing a clear justification for the system studied, in terms of economic and/or societal benefit to agriculture and rural communities. Studies of model systems may be submitted to the program only if knowledge gained is applied to systems of economic or societal importance within the submitted project.

- Applications that do not address at least one of the stated research program priorities will not be reviewed.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

2. Arthropod and Nematode Biology and Management: Suborganismal Biology
Program Code - 91112
National Program Leader – Dr. Mary Purcell-Miramontes (202-205-0440 or mpurcell@csrees.usda.gov)
Total Program Funds – approximately $3.3 million
Proposed Program Funds –

- Proposed research project budget requests must not exceed $400,000 for project periods of 2-4 years (including indirect costs).
- Requests exceeding the budgetary guidelines above will not be reviewed.

Letter of Intent Deadline – April 1, 2009 (5:00 P.M., ET) see the Part II, F for format and submission instructions.
Anticipated Application Deadline – June 24, 2009 (5:00 P.M., ET); the firm deadline will be made available in the AFRI RFA.

Background
The Suborganismal Biology element of the Arthropod and Nematode Biology and Management program supports hypothesis-driven research at the cellular and molecular levels to address the problem of managing arthropod and nematode pests and the Nation's over-dependence on harmful pesticide applications. Advances in the molecular genetics, physiology, biochemistry, and genomics of arthropods and nematodes are poised to provide novel solutions to these problems that threaten the Nation's food supply and natural resources.

FY 2009 Priorities for Research Projects – Applicants must address at least one of the following priorities.

1. Characterization of digestive physiology, endocrine, neurophysiological, or biochemical processes of arthropods and nematodes.

2. Understanding the cellular, biochemical, and molecular level interactions of arthropods or nematodes with associated organisms (e.g. host plants, livestock, microbes, or beneficial organisms).

3. Elucidation of the mechanism of action of novel targets for pest control, including semiochemicals and fundamental pesticide resistance studies.

Other Key Information

- A letter of intent is required for this program. The letter of intent deadline is **April 1, 2009, by 5:00 P.M., Eastern Time**. Format and content for the letter of intent can be found in Part II, F.

- **This is a non-integrated program. Please refer to Part III, A for eligibility criteria.**

- The Project Description portion of the application must include a section providing a clear justification for the system studied, in terms of economic and/or societal benefit to agriculture and rural communities. Studies of model systems may be submitted to the program only if knowledge gained is applied to systems of economic or societal importance within the submitted project.

- Applications that do not address at least one of the stated research program priorities will not be reviewed.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

3. Arthropod and Nematode Biology and Management: Tools, Resources, and Genomics
Program Code - 91113
National Program Leader – Dr. Mary Purcell-Miramontes (202-205-0440 or mpurcell@csrees.usda.gov)
Total Program Funds – approximately $3.7 million
Proposed Program Funds –

- Proposed research project budget requests must not exceed $750,000 for project periods of 2-4 years (including indirect costs).
- **Mini-tool development** budget requests can range between $50,000 and $100,000. Budget requests must not exceed $100,000 for project periods of 1-2 years (including indirect costs).
- Requests exceeding the budgetary guidelines above will not be reviewed.

Letter of Intent Deadline – April 1, 2009 (5:00 P.M., ET); see Part II, F for format and submission instructions.
Anticipated Application Deadline – June 24, 2009 (5:00 P.M., ET); the firm deadline will be made available in the AFRI RFA.

Background

The Tools, Resources, and Genomics program element of the Arthropod and Nematode Biology and Management program will support research to better develop genomic tools, resources, and tool development for agriculturally important arthropods or nematodes to facilitate future genome sequencing and annotations studies or lead to hypothesis-driven research in the future.

FY 2009 Priorities for Research Projects – Applicants must address at least one of the following priorities.

1. Develop innovative approaches for mapping, identification, sequencing, and/or expression of genes to enable future studies on genome organization and lead to hypothesis testing**.** Utilization of newer-generation sequencing technologies for transcriptome analysis to address a key biological function of a specific tissue or life stage relevant to future pest control is encouraged

2. Generate bioinformatic tools to manage and interpret sequence data (e.g. analytical tools for integrative and comparative genomics), technology platforms, and computational resources.

3. Characterize the function(s) of genes or networks of genes. Proposals that include development of methodologies (e.g., RNAi, VIGS) for functional studies of plant-pest interactions are particularly encouraged.

Mini-tool Development Grants: Beginning in FY 2009, this program will also accept smaller-sized proposals for between $50,000 and $100,000 to develop genomic tools for targeted groups of agricultural pests that are significantly lacking genomic information. This year, we are restricting these mini-grant proposals to *only lepidopteran insects that are major pests of agriculture.* We anticipate soliciting proposals in the future to develop genomic tools for another targeted pest group.

Other Key Information

- A letter of intent is required for this program. The letter of intent deadline is **April 1, 2009, by 5:00 P.M., Eastern Time**. Format and content for the letter of intent can be found in Part II, F.

- **This is a non-integrated program. Please refer to Part III, A for eligibility criteria.**

- The Project Description portion of the application must include a section providing a clear justification for the system studied, in terms of economic and/or societal benefit to agriculture and rural communities. Studies of model systems may be submitted to the program only if knowledge gained is applied to systems of economic or societal importance within the submitted project.

- The outcome of all draft sequencing projects is expected to include generation of high quality sequence data, organization of sequence reads into contiguous sequences (contigs), correlation with physical maps when appropriate, annotation of open reading frames, and deposition of information in a publicly accessible database.

- If proposing microarray studies, applicants should include a statement addressing Minimum Information About Microarray Experiment (MIAME) compliance, see www.mged.org. Applications involving the development of microarrays should include plans for distributing the arrays as a community resource. Collaboration with international partners is appropriate; however, applications must be submitted by eligible U.S. institutions.

- Information (e.g., Web site addresses) necessary to access publicly available genomic sequence data should be provided in the Project Narrative portion of the application. Applicants are expected to explain if the sequence data is not publicly available or there are restrictions on its availability.

- Investigators are encouraged to seek support from other sources so that complete sequence data can be obtained in a reasonable time frame. If parallel support from another agency is under consideration or being planned, investigators should indicate in the proposal how the funded activity will be organized and coordinated within the larger project.

- Applications that do not address at least one of the stated research program priorities will not be reviewed.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

b. Protection of Managed Bees Coordinated Agricultural Project (CAP)

Program Code - 91910
National Program Leader – Dr. Mary Purcell-Miramontes (202-205-0440 or mpurcell@csrees.usda.gov)
Total Program Funds – approximately $3 Million
Proposed Budget Request –

- Proposed project budget for a new Integrated CAP for continuing activities must not exceed a total budget including indirect costs of $3,000,000 for a project period of 3 years
- Requests exceeding the budgetary guidelines above will be returned without review.

Letter of Intent Deadline - March 2, 2009 (5:00 ET); see Part II, F for format and submission instructions.
Anticipated Application Deadline – May 1, 2009 (5:00 P.M. ET); the firm deadline will be made available in the AFRI RFA.

Background
Bee pollination is responsible for $15 billion in added crop value, particularly for specialty crops, such as almonds and other nuts, berries, fruits, and vegetables. Bee populations throughout the U.S. are in serious decline due to pests, diseases, and environmental stresses, including pesticide exposure, inadequate nutritional resources, and extreme temperatures. In addition, a potentially new phenomenon, tentatively termed Colony Collapse Disorder, is threatening the honey bee industry and potentially may impact the Nation's food supply. It has become increasingly difficult for beekeepers to meet the pollination demand for several crops and the cost of bees used for pollination services has more than doubled. The recent completion of the honey bee genome and whole genome microarray may allow researchers to develop effective strategies to better protect managed bees and to improve the viability of the apiculture industry. A coordinated approach that links basic and applied research, in conjunction with extension and educational activities to better protect and manage bee pollinators is essential.

The program anticipates making one award as a continuation grant, which is a grant instrument by which the Department agrees to support a specified level of effort for a predetermined project period (e.g. annually). Additional support will be made at a future date. Provided that performance has been satisfactory, appropriations are available for this purpose, and continued support is in the best interest of the Federal government and the public. Solicitation for new Integrated CAP proposals on this topic is not anticipated the following year.

FY 2009 Priority for Integrated CAP Projects – Applicants must address the following priority.
This program invites a new applications but proposed activities must complement ongoing research and extension efforts to address CCD in the US. The submitted proposal must include the following priorities:

1. Determine and mitigate the causes of CCD in honey bees

2. Incorporate pathogen or disease resistant traits and increase genetic diversity of honey bees, which includes improving conservation and management practices for *non-Apis* pollinators

3. Deliver research knowledge developed via extension or educational programs to apiculture clientele

Other Key Information

- A letter of intent is required for this program. The letter of intent deadline is **March 2, 2009, by 5:00 P.M., Eastern Time**. See Part II, F for format and submission instructions.

- **This is an integrated program. Please refer to Part III, A for eligibility criteria.**

- Project proposals must include at least two of the three components of the agricultural knowledge system (i.e., research, education, and extension). Each component should be represented by one or more objectives within the proposal. Projects must budget sufficient resources to carry out the proposed set of research, extension and/or education activities, with **no more than two-thirds** of a project's budget being allocated

to a single knowledge area. Please see Part II.C.2 for a full listing of integrated project requirements, which should be followed closely to ensure success in the peer review process.

- Please see Part IV, A for the criteria that will be used to evaluate integrated proposals. Applicants are also encouraged to see http://www.csrees.usda.gov/funding/integrated/integrated for an example of an integrated proposal and other grant-writing resources.

- Applications must include the elements of a logic model detailing the activities, outputs, and outcomes of the proposed project. This information may be provided as a narrative or formatted into a logic model chart. The logic model planning process is a tool that should be used to develop your project **before** writing your proposal. Two additional pages are allowed for this information. More information and resources related to the logic model planning process are provided at http://www.csrees.usda.gov/funding/integrated/integrated_logic_model.html.

- The AFRI encourages integrated projects that develop content suitable for delivery through eXtension. This content is for "end users" as opposed to staff development and must align with the eXtension Guiding Principles, Implementation Plan and other requirements as presented at http://about.extension.org/university-researcher/. Funds may be used to contribute to an existing Community of Practice or to form a new Community of Practice as appropriate.

- The AFRI encourages integrated projects that lead to measurable, documented changes in learning, actions or conditions in Family and Consumer Sciences disciplines and/or projects suitable for 4-H audiences and stakeholder groups while meeting identified program priorities. 4-H projects should align with 4-H Mission mandates of Science, Engineering, Technology, Healthy Living or Citizenship. See guiding principles at http://www.national4-hheadquarters.gov/ <http://www.national4-hheadquarters.gov/ or contact your university Cooperative Extension headquarters or Family and Consumer Sciences State Leaders.

- Applicants are strongly encouraged to see the previously funded CAP awards for guidance (e.g. http://www.aicap.umd.edu/; http://www.prrs.org/; http://maswheat.ucdavis.edu/; http://www.uark.edu/ua/ricecap/)

- Flexibility in attainment of project goals is an important feature of CAP projects. It is recognized that unexpected advances and promising leads, or unforeseen needs related to project goals and objectives, may emerge during the project. As a result, objectives may be revised and/or new objectives may be developed with associated budget adjustments. In addition, the program does not expect that all investigators associated with the proposed project will be supported throughout its duration. It is suggested that investigators involved in shorter-term, specific tasks be supported through a series of renewable subcontracts.

- CAP projects should include an advisory board of principal stakeholders and partners (to aid in evaluation of scientific merit, agricultural relevance, and progress). The advisory board will also serve to identify the most promising objectives and work plans to pursue in the coming year (for which sub-contracts and plans of work would subsequently be submitted for approval from the Authorized Departmental Officer).

- The lead project director is expected to make a significant time commitment to assure that the project remains his or her top priority. To support the lead project director, as well as other project personnel, applicants are encouraged to include additional administrative support in the budget request.

- A project management plan should be included to ensure efficient functioning of the CAP team. The plan should include an organizational chart, administrative timeline, a description of how the project will be governed, and identification of short-, medium- and long-term metrics to be evaluated, roles and responsibilities of team members, a mechanism whereby progress metrics can be evaluated for future budgetary allocations, and how the project will complement and/or link to existing programs or projects. The plan must include an exit strategy beyond the requested award period, without assuming long-term NRI support

- The CAP program must develop publicly accessible products such as (but not limited to):
    - Standardized protocols for various areas (e.g. diagnostics for pest or pathogen detection, resistance, or breeding studies);
    - Sample repositories and databases;
    - Genomics/proteomics tools, reagents, and protocols (e.g. arrays, clone sets, bioinformatics tools, and services); or
    - Extension and communication programs (e.g. training tools, demonstrations, conferences, continuing education, publications, impact assessment, and Web sites).
- Leveraging and coordinating project resources with other USDA and non-USDA efforts for the same area;
- Project budget must not exceed $1,000,000 per year.
- Filling critical knowledge gaps including the exploration of some high-risk approaches.
- If a project is funded, beginning in the first year of funding, project directors are required to organize annual meetings for the CAP group. Reasonable travel expenses should be included as part of the project budget.

c. Microbial Biology: Microbial Associations with Plants

Program Code - 91210
National Program Leader – Dr. Ann Lichens-Park (202-401-6460 or apark@csrees.usda.gov)
Total Program Funds – approximately $7.4 million
Proposed Budget Restrictions –
- Proposed research project budget requests must not exceed $400,000 for project periods of 2-4 years (including indirect costs).
- Requests exceeding the budgetary guidelines above will not be reviewed.

Letter of Intent Deadline – February 16, 2009 (5:00 P.M., ET); see Part II, F for format and submission instructions.
Anticipated Application Deadline – April 30, 2009 (5:00 P.M., ET); the firm deadline will be made available in the AFRI RFA.

Background
Microorganisms are critical to the productivity and sustainability of agricultural ecosystems. Unlocking the information in microbial genomes is essential to understanding the molecular mechanisms underlying agriculturally relevant processes in microbes and managing microorganisms for the benefit of U.S. agriculture. These processes include pathogenicity, disease suppression by biological control agents, and growth promotion. Mechanisms of microbial communication between microbes in communities or in association with plants must be elucidated to understand the molecular mechanisms underlying agriculturally relevant processes within microbes, between microbes, and between microbes and their hosts. This program supports: 1) fundamental hypothesis-driven research on the interactions between microorganisms and plants with which they are associated and 2) characterization of and communication in plant-associated microbial communities in agriculturally relevant environments. The program encourages application of knowledge gained to systems of economic importance to U.S. agriculture or of importance to agricultural sustainability.

Microorganisms have a tremendous impact on the productivity and profitability of U.S. agriculture. Microorganisms may increase productivity, cause or help prevent disease, and/or affect the safety and quality of the Nation's food supply. New microbes and microbial communities are routinely being discovered and characterized as genomic and metagenomic tools become readily available to the research community. The pattern and distribution of microbes can have a tremendous effect on the environment. Understanding both the interaction of individual microbes with their host and how communities of microbes become established, communicate, and prosper are essential to elucidate the mechanisms by which microbes impact agricultural production.

This program enhances the protection and safety of the Nation's agriculture and food supply. More specifically, through science-based knowledge and education, information and technologies are developed and delivered that reduce the incidence of food-borne illnesses and contaminants and reduce the number and severity of agricultural pest and disease outbreaks. Understanding the nature of microbes and their communities will assure sustainable agricultural production systems to provide food, fiber, and biofuels for tomorrow. Additionally, aspects of these programs enhance economic opportunities for agricultural producers and protect the Nation's natural resource base and environment.

To meet these identified needs of agriculture, the long-term (10-year) goals for this program are: improved resistance to high-impact plant diseases based on knowledge of plant pathogens, their plant hosts, and host-pathogen interactions; improved methods of manipulating plant-associated microorganisms to develop more effective, environmentally sound, profitable, and safer disease management practices by interfering with microbial cell to cell signaling; and improved understanding of how pathogens spread within a plant.

FY 2009 Priorities for Research Projects – Applicants must address at least one of the following priorities.

1. Elucidation of molecular mechanisms of disease and resistance interactions between microbial plant pathogens and their host plants. This priority area will accept research applications that focus only on the microorganism, as well as applications that focus on the association between the microorganism and the plant. Applications that address plant defense or plant disease resistance genes without a significant focus on the microorganism are not appropriate for this program.

2. The determination of the molecular mechanisms of communication among members of microbial communities including discovery of new microbial members of such communities, and determination of molecular mechanisms of communication between plant-associated microorganisms (e.g. plant pathogens, endophytes, microbial biological control agents, and nitrogen-fixing bacterial endosymbionts) and their plant hosts. This priority area includes elucidation of the basis of microbial community composition, communication associated with microbial quorum sensing, and signaling between plants and their associated microbial communities.

3. Mechanisms by which pathogens spread over short distances, within a plant host or between neighboring plants. Pathogens studied under this priority area can be either plant pathogens or human food safety pathogens associated with plants.

Other Key Information

- A letter of intent is required for this program. The letter of intent deadline is **February 16, 2009, by 5:00 P.M., Eastern Time**. Format and content for the letter of intent can be found in Part II, F.

- **This is a non-integrated program. Please refer to Part III, A for eligibility criteria.**

- Applications must address microbial associations with plants using microorganisms and/or plants that are economically important or that are important to agricultural sustainability and understanding of agroecosystems (e.g. microorganisms that contribute to more environmentally sustainable crop production). In the "Rationale and Significance" section of the project description, applicants are required to include a subsection entitled "Justification of Relevance to U.S. Agriculture" providing a clear justification for the system studied in terms of economic and/or societal benefit to U.S. agriculture.

- Studies of model systems may be submitted to the program only if knowledge gained is applied to systems of economic or societal importance to U.S. agriculture within the experimental design of the submitted project and to be implemented during the project period. If the application focuses significantly on the plant side of the association in addition to the microbes, knowledge gained from a model plant must be applied to a plant of economic importance to U.S. agriculture or to agricultural sustainability.

- Applications that focus on how microbial processes affect the soil environment should consider submission to the Soil Processes program.

- Applicants proposing to study long-distance spread of plant pathogens of significant consequence should consider submission to the Plant Biosecurity program.

- Applications that do not address at least one of the stated research program priorities will not be reviewed.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

d. Microbial Genomics

National Program Leaders –
Dr. Ann Lichens-Park (202-401-6460 or apark@csrees.usda.gov)
Dr. Daniel Jones (202-401-6854 or djones@csrees.usda.gov)
Total Program Funds – approximately $11 million total
Proposed Budget Requests – This program contains two elements. See each program element for additional budgetary information.
1. Microbial Genomics: Genome Sequencing
2. Microbial Genomics: Functional Genomics of Microorganisms
Letter of Intent Deadline – See each program element for additional information
Application Deadline – See each program element for additional details.

Please Note: It is anticipated that in Fiscal Year 2010, this program will solicit applications to improve microbial genome sequence analysis by improving communication between microbial genomics databases.

Overview
The Microbial Genomics program is part of the larger effort at CSREES to use the understanding of the biological role of gene sequences and gene expression to address the CSREES strategic goals to enhance economic opportunities for agricultural producers and to enhance the protection and safety of the Nation's agriculture and food supply. Investment in microbial genomics has and will continue to enable improvements in the quality of agricultural commodities and products and the realization of more efficient and sustainable production practices. Public investment in genome sequencing of agriculturally relevant microbial species will result in improved traits of commodities and more efficient breeding programs; discovery and utilization of microbes to enhance innate properties of agriculturally important organisms; improved animal and plant production and protection; and facilitate better stewardship of land, air and water resources.

1. Microbial Genomics: Genome Sequencing
Program Code - 91311
National Program Leaders –
Dr. Ann Lichens-Park (202-401-6460 or apark@csrees.usda.gov)
Dr. Daniel Jones (202-401-6854 or djones@csrees.usda.gov)
Total Program Funds – approximately $5 million
Proposed Budget Requests –
- Proposed research project budget request should not exceed $1.2 million (including indirect costs) for research project periods of up to 3 years.
- The total amount of support available for this program from CSREES will be approximately $5 million

Letter of Intent Deadline – Not required for this program.
Anticipated Application Deadline – March 2, 2009 (5:00 P.M., ET); the firm deadline will be made available in the AFRI RFA.

This program element is offered in partnership with the National Science Foundation (NSF). Please note that proposals submitted for review in this program element must be submitted through USDA/CSREES in accordance with submission instructions outlined in the separate program solicitation for the FY 2009 USDA-CSREES/NSF Microbial Genome Sequencing Program. Visit the program website (see http://www.csrees.usda.gov/funding/microbial_genome_sequencing_program.html) for detailed application submission and project deadline information.

Background
The availability of genome sequences provides the foundation for understanding how microorganisms function and live, and how they interact with their environments and with other organisms. The sequences are expected to be available to and used by a community of investigators to address issues of scientific and societal importance including:

- Novel aspects of microbial biochemistry, physiology, metabolism, development and cellular biology;
- The diversity and the roles microorganisms play in complex ecosystems and in global geochemical cycles;
- The impact that microorganisms have on the productivity and sustainability of agriculture and natural resources (e.g., forestry, soil and water), and on the safety and quality of the nation's food supply; and
- The organization and evolution of microbial genomes, and the mechanisms of transmission, exchange and reshuffling of genetic information.

Other Key Information

- **This is a non-integrated program. Please refer to Part III, A for eligibility criteria.**

2. Microbial Genomics: Functional Genomics of Microorganisms
Program Code - 91312
National Program Leader –Dr. Ann Lichens-Park (202-401-6460 or apark@csrees.usda.gov)
Total Program Funds – approximately $6 million, including $5 million for research projects and up to $1 million for an education project.
Proposed Budget Requests –
- Proposed budgets must not exceed $1 million (including indirect costs) for project periods up to four years.
- Requests exceeding the budgetary guidelines above will be returned without review.

Letter of Intent Deadline – February 5, 2009 (5:00 P.M., ET); see Part II, F for format and submission instructions.
Anticipated Application Deadline – April 16, 2009 (5:00 P.M. ET); the firm deadline will be made available in the AFRI RFA.

Background
The Functional Genomics program element of the Microbial Genomics Program increases the understanding of the biological role of gene sequences in agriculturally important microorganisms and links these sequences to physiological functions or agricultural and food processes involving microbes. The goal of the program is to support large-scale functional analysis of genomic sequences of agriculturally relevant microbes.

To meet these identified needs of agriculture, the long-term (10-year) goals for this program are to increase the ability to manipulate microorganisms to benefit U.S. agriculture, based on improved understanding of microbial processes, create faster, more accurate and cost-effective detection and diagnosis of plant and animal pathogens, and improve methods of managing plant and animal pathogens and other agriculturally relevant microbes.

FY 2009 Priorities for Research Projects – Applicants must address at least one of the following priorities.

1. Characterization of mechanisms of pathogenicity by microorganisms;

2. Characterization of mechanisms of non-pathogenic interactions between microbes or between microbes and their hosts; and

3. Characterization of mechanisms used by microorganisms to survive or respond to environmental changes.

Other Key Information

- A letter of intent is required for this program. The letter of intent deadline is **February 5, 2009, by 5:00 P.M., Eastern Time**. Format and content for the letter of intent can be found in Part II, F.

- **This is a non-integrated program. Please refer to Part III, A for eligibility criteria.**

- The microbe(s) of study must be of importance to U.S. agriculture. Research projects are expected to utilize current and emerging high-throughput technologies such as microarrays and/or proteomics to analyze the spatial and/or temporal expression of sets of genes and/or proteins.

- Research projects are also expected to identify genes expressed or proteins present under different environmental conditions or as part of particular metabolic or regulatory pathways. If proposing microarray studies, applicants are strongly encouraged to include a statement addressing Minimum Information About Microarray Experiment (MIAME) compliance, see www.mged.org. Applications involving the development of microarrays should include plans for distributing the arrays as a community resource. Collaboration with international partners is appropriate; however, applications must be submitted by eligible U.S. institutions.

- Research in this area should address the characterization of the molecular mechanisms responsible for microbial processes enabled by the availability of a sequenced microbial genome or genomes.

- Research activities should characterize, on a large scale, the function of genes or networks of genes in microbe(s) having a completely, or almost completely, sequenced genome.

- For research projects, information (e.g. Web site addresses) necessary to access publicly available genomic sequence data of such microbe(s) should be provided in the Project Description portion of the application. Applicants are expected to explain in the Project Description if the sequence data is not publicly available or there are restrictions on its availability.

- This program will not support whole genome sequencing of microbes. Such studies should be submitted to the FY 2009 USDA-CSREES/NSF Microbial Genome Sequencing Program through USDA/CSREES in accordance with submission instructions outlined in the program solicitation available at http://www.csrees.usda.gov/funding/microbial_genome_sequencing_program.html.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

FY 2009 Priority for Education Projects – Applicants must address the following priority.

1. Development of innovative, research-based graduate education and training activities in the application of knowledge gained from microbial genome sequencing and/or microbial functional genomics to solving problems facing U.S. agriculture. Applications are encouraged to combine microbial genomics education with education about microbial detection and diagnosis in agriculturally relevant setting(s) e.g. on field crops or in facilities associated with production of livestock. Students should gain strengths in multiple disciplines relevant to this topic while maintaining competence in their major field (e.g., plant pathology, animal health or microbial genomics) by focusing on problem-oriented rather than discipline-oriented

education and research. The project should offer training and experience relevant to both academic and nonacademic careers.

Other Key Information

- A letter of intent is required for this program. The letter of intent deadline is **February 5, 2009, by 5:00 P.M., Eastern Time**. Format and content for the letter of intent can be found in Part II, F.

- **This is a non-integrated program. Please refer to Part III, A for eligibility criteria.**

- For Education projects, the contribution to the graduate stipend is up to $30,000 per year per student, accompanied with a tuition allowance of up to $12,000 per year per student.

- Please see Part IV, A. for the criteria that will be used to evaluate education proposals.

- Applications that do not address the stated education program priority will be returned without review.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

e. Plant Biology

National Program Leaders −
Dr. Liang-Shiou Lin (202-401-5042 or llin@csrees.usda.gov)
Dr. Ed Kaleikau (202-401-1931 or ekaleikau@csrees.usda.gov)
Dr. Diana Jerkins (202-401-6996 or djerkins@csrees.usda.gov)
Total Program Funds − approximately $12.25 million
Proposed Budget Requests − This program contains three elements. See each program element for additional budgetary information.
1. Plant Biology: Environmental Stress
2. Plant Biology: Biochemistry
3. Plant Biology: Growth and Development
Letter of Intent − Required for each program element. See Part II, F for format and submission instructions.
Application Deadline − See each program element for additional details.

Overview

This program supports projects that will provide fundamental knowledge for improvement and sustainability of agricultural plant and forestry production. Knowledge of plant biology from the molecular to the systems level provides the foundation for development of plants with increased productivity, fitness, and use. Such fundamental understanding of plant biology will allow scientists to make use of the increasing wealth of genomics data and tools and to develop new varieties of agricultural plants through plant breeding and biotechnology approaches. The science-based knowledge contributed by this program can lead to increased economic opportunities for producers and consumers by reducing production costs, improving quality, and increasing value of agricultural plant products. This knowledge will allow U.S. agriculture to face critical issues in bioenergy, climate change, loss of agricultural land, and increasing global competition.

1. Plant Biology: Environmental Stress
Program Code - 91412
National Program Leader – Dr. Diana Jerkins (202-401-6996 or djerkins@csrees.usda.gov)
Total Program Funds – approximately $4.0 million
Proposed Budget Requests –

- Proposed research project budget requests must not exceed $350,000 for project period of 2-4 years (including indirect costs).
- Requests exceeding the budgetary guidelines above will be returned without review.

Letter of Intent Deadline – January 30, 2009 (5:00 P.M., ET); see the Part II, F for format and submission instructions.
Anticipated Application Deadline – March 27, 2009 (5:00 P.M., ET); the firm deadline will be made available in the AFRI RFA.

Background
The future of agricultural productivity and sustainability depends on the ability of agricultural and forestry plants to grow and be productive in response to a changing environment, from short-term challenges, such as interannual climate variability and flooding, to long-term challenges, such as global climate change, sustained drought, and loss of arable land. This program supports fundamental research projects to improve and understand plant tolerance and resistance to environmental and climatic stress. These stresses can significantly reduce agricultural plant and forestry productivity Research ranging from genomics to physiology and from cell to field level will provide the basic knowledge to devise new or improved strategies for decreasing the impact of environmental stress and climate change on agricultural and forest productivity and sustainability. The knowledge of how plants respond to environmental stress will make possible economically and environmentally sustainable plant production for affordable, high quality food, feed, and fiber and to meet increasing demands for bioenergy and biobased products.

To meet these identified needs of agriculture, the long-term (10-year) goals for this program are: to generate fundamental knowledge through laboratory and field studies, when appropriate, regarding the mechanisms of plant cell abiotic stress response; to use fundamental knowledge from cell to field level to develop approaches and tools to aid agricultural plant productivity in response to reduced inputs or increased environmental stresses; and to develop, through biotechnology and/or breeding, new plant lines or populations for improved stress resistance or tolerance in agricultural plants.

FY 2009 Priorities for Research Projects – Applicants must address at least one of the following priorities.

1. Water stress, including drought, salt, and flooding stress
2. Carbon dioxide/ozone stress
3. Nutrient stress

Research should identify and/or characterize genes, proteins, processes, and/or networks that contribute to abiotic stress tolerance for the program priorities above. Applications must focus on characterization and understanding of the mechanism(s) used by particular plant species in adaptation to or tolerance of specific environmental condition(s). Such research should be hypothesis-driven and may include molecular, physiological, biochemical, and/or cell biological approaches.

Other Key Information

- A letter of intent is **required** for this program. The letter of intent deadline is **January 30, 2009, by 5:00 P.M., Eastern Time**. Format and content for the letter of intent can be found in Part II, F.
- **This is a non-integrated program. Please refer to Part III, A for eligibility criteria.**
- Proposals in the priority areas of Carbon Dioxide/Ozone Stress, Nutrient Stress, and Temperature Stress are solicited on a rotating basis. It is anticipated that proposals on Water Stress will continue to be solicited each year. The anticipated priority rotation schedule is:

FY 2010: Nutrient Stress and Temperature Stress
FY 2011: Temperature Stress and Carbon Dioxide/Ozone Stress
FY 2012: Carbon Dioxide/Ozone Stress and Nutrient Stress

- All applications must demonstrate a clear line to a realistic environmental problem and use realistic treatments and measurement of plant stress status and environmental conditions. Applications where the proposed research integrates molecular biology methods with physiological or ecophysiological approaches will be most competitive.

- Use of Plant Breeding – applications combining hypothesis-driven research and plant breeding techniques to develop products (germplasm) beneficial to the community are appropriate for this program. Projects which develop stress-tolerant varieties without proposing research to characterize plant stress response mechanisms are not appropriate for the program.

- For Postdoctoral grant applications, the program encourages projects that focus on physiology-based research or combine physiology with molecular or genomic approaches. The postdoctoral mentor should have expertise in plant physiology.

- Use of Model Species - Studies of non-agricultural model systems may still be submitted to the program if the knowledge gained is utilized for study of plants of economic or societal importance in the submitted project and such study is a significant and integral component within the experimental design. This program will no longer accept projects solely using non-agricultural model species. Importance of the proposed research to agricultural productivity and sustainability should be clearly indicated in the application.

- Functional analysis of genes involved in the processes outlined in the program priorities is appropriate for this program. Phytoremediation and adaptation to biotic stresses, such as herbivory or pests, should not be submitted to this program. For applications containing ecosystem level studies, applicants should consider submission to the Managed Ecosystems program. Functional analyses of agriculturally important genes that are not directly related to abiotic plant stress mechanisms are not appropriate for this program.

- Applications that do not address at least one of the stated research program priorities will be returned without review.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

2. Plant Biology: Biochemistry
Program Code - 91413
National Program Leader – Dr. Ed Kaleikau (202-401-1931 or ekaleikau@csrees.usda.gov)
Total Program Funds – approximately $4.25 million
Proposed Budget Requests –

- Proposed research project budget requests must not exceed $350,000 for project period of 2-4 years (including indirect costs).
- Requests exceeding the budgetary guidelines above will not be reviewed.

Letter of Intent Deadline – February 20, 2009 (5:00 P.M., ET); see the Part II, F for format and submission instructions.
Anticipated Application Deadline – April 27, 2009 (5:00 P.M., ET); the firm deadline will be made available in the AFRI RFA.

Background
Identification and characterization of biochemical processes and pathways in the cell, as well as the genes and proteins involved in biochemical processes and pathways, will facilitate development of agricultural and forestry plants with improved or optimized performance. The lack of knowledge about a biochemical pathway or process often limits the application of genomic and genetic information in improving agricultural plant and forest productivity, quality, and sustainability. The goal of this program element is to provide basic knowledge about biochemical processes, pathways, and interactions in agriculturally and economically important plants and related organisms. Fundamental knowledge in biochemistry, combined with genomics, breeding, and other crop improvement techniques, will lead to practical applications, such as enhancing the nutritional value of plant-based foods, increasing the productivity and fitness of agricultural plants and trees, better utilizing trees and agricultural plants for sustainable production of bioenergy, and developing agricultural plants as bioreactors to produce important industrial compounds.

To meet these identified needs of agriculture, the long-term (10-year) goals for this program element are: to contribute fundamental knowledge of biochemical pathways, processes, and mechanisms for potential utilization of genomic sequences in agricultural plants; to use knowledge in plant biochemistry to increase plant production, efficiency, and/or protection, to enhance nutrient content, utilization, and/or uptake and to improve or develop new plant-based products; to create improved agricultural plant lines or populations through use of basic biochemical knowledge and biotechnology; and to develop at least one reference agricultural species for biochemical studies.

FY 2009 Priorities for Research Projects – Applicants must address at least one of the following priorities.

1. Primary and secondary metabolism, with particular emphasis on improving plant productivity, fitness, or quality.

2. Plant cell wall structure, formation, and modification, such as lignin, cellulose, or hemicellulose synthesis and modification.

3. Nitrogen Fixation

For the program priorities listed above, research should be hypothesis-driven and either focus on characterization of a biochemical process or pathway important for plant agricultural production systems or address a significant problem in agricultural plant biology using a predominantly biochemical approach. Use of small-scale proteomics or metabolomics is acceptable as part of the hypothesis-driven project to gain insight into biological systems.

Other Key Information

- A letter of intent is required for this program. The letter of intent deadline is **February 20, 2009, by 5:00 P.M., Eastern Time**. Format and content for the letter of intent can be found in Part II, F.

- **This is a non-integrated program. Please refer to Part III, A for eligibility criteria.**

- Proposals in the priority areas of Cell Walls, Photosynthesis/Respiration, and Nitrogen Fixation are solicited on a rotating basis. It is anticipated that proposals on Primary and Secondary Metabolism will continue to be solicited each year. The anticipated priority rotation schedule is:
  FY 2009: Plant Cell Wall and Nitrogen Fixation
  FY 2010: Nitrogen Fixation and Photosynthesis/Respiration
  FY 2011: Photosynthesis/Respiration and Plant Cell Wall

- Use of Model Species: Importance of the proposed research to agricultural productivity and sustainability should be clearly indicated in the application. Researchers are strongly encouraged to conduct research directly in a crop or forest species important to agriculture. Use of non-agricultural model systems is acceptable if tools are not yet available in the agricultural species of interest. **However, the investigator must clearly indicate** (1) how such non-agricultural model studies are relevant to agriculture and food systems or forest species, (2) the strategy for transferring the knowledge to these species for agricultural or forestry benefit, and (3) the potential timeframe for such transfer.

- Functional analyses of genes involved in the processes outlined in the program priorities are appropriate for this program. Applications on phytoremediation and the biochemistry of pest management should not be submitted to this program. Applications that focus on plant environmental response and stress should consider submission to Plant Biology: Environmental Stress program element. Applications that focus on plant cell biology, such as studies on cytoskeleton, membrane transport, signal transduction, and macromolecular trafficking that are critical for plant development, should consider submission to the Plant Biology: Growth and Development program element unless the emphasis is on biochemistry, which will be supported by this program element. Functional analyses of agriculturally important genes related to plant disease are not appropriate for this program. For projects focused on metabolic engineering, the purposeful alteration of metabolic pathways to understand and use cellular pathways for chemical transformation, energy transduction, and supramolecular assembly, applicants may want to consider submission to the Interagency Metabolic Engineering program (see http://www.metabolicengineering.gov).

- Applications that do not address at least one of the stated research program priorities will not be reviewed.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

3. Plant Biology: Growth and Development
Program Code - 91414
National Program Leader – Dr. Liang-Shiou Lin (202-401-5042 or llin@csrees.usda.gov)
Total Program Funds – approximately $4 million
Proposed Budget Requests –

- Proposed research project budget requests must not exceed $350,000 for project period of 2-4 years (including indirect costs).
- Requests exceeding the budgetary guidelines above will not be reviewed.

Letter of Intent Deadline – March 2, 2009 (5:00 P.M., ET); see the Part II, F for format and submission instructions.
Anticipated Application Deadline – May 19, 2009 (5:00 P.M., ET); the firm deadline will be made available in the AFRI RFA.

Background
The plant research community is poised to apply recent advances in plant genomics to traits of economic value in important agricultural species. For this application to occur, the fundamental knowledge on plant growth and development must be well understood. The goal of this program element is to provide such knowledge over various phases of the plant life cycle to improve crop and forest plants through modification of plant growth patterns or developmental processes. This will provide greater profit and less risk for U.S. farmers in the ever more competitive global market.

To meet these identified needs of agriculture, the long-term (10-year) goals for this program element are: to develop agricultural models for studying plant developmental processes; to provide detailed understanding of signal transduction mechanisms, such as hormones, light, gravity, etc., in agricultural plants in order to improve their performance; and to enhance our ability to alter developmental processes of agricultural plants to improve plant characteristics.

FY 2009 Priorities for Research Projects – Applicants must address at least one of the following priorities.

1. Molecular or genetic mechanisms underlying the formation of vegetative or reproductive structures.

2. Hormonal regulation of growth and development, including studies of "cross talk" between different hormones or between hormones and other signals.

3. Characterization of cellular structures and processes that are crucial for plant development. These studies are limited to membrane transport processes, cytoskeleton, and macromolecular trafficking. Proposals that integrate cell biology with physiology are expected to be more competitive.

Other Key Information

- A letter of intent is required for this program. The letter of intent deadline is **March 2, 2009 by 5:00 P.M., Eastern Time**. Format and content for the letter of intent can be found in Part II F.

- **This is a non-integrated program. Please refer to Part III, A for eligibility criteria.**

- Functional analyses of genes involved in the processes outlined in the research priorities above are appropriate for this program.

- Use of Model Species - Studies of non-agricultural model systems may still be submitted to the program if the knowledge gained is utilized for study of plants of economic or societal importance in the submitted project and such study is a significant and integral component within the experimental design. This program will no longer accept projects solely using non-agricultural model species. Importance of the proposed research to agricultural productivity and sustainability should be clearly indicated in the application.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

f. Plant Biosecurity

Program Code - 91510
National Program Leader – Dr. Liang-Shiou Lin (202-401-5042 or llin@csrees.usda.gov)
Total Program Funds – approximately $4.3 million
Proposed Budget Requests –

- Proposed integrated project budget requests must not exceed $1million for project periods of 2-4 years (including indirect costs).
- Proposed extension project budget requests must not exceed $350,000 for project periods of 2-4 years (including indirect costs).
- Requests exceeding the budgetary guidelines above will be returned without review.

Letter of Intent Deadline – April 13, 2009 (5:00 P.M ET); see Part II, F for format and submission instructions.
Anticipated Application Deadline – June 26, 2009 (5:00 P.M. ET); the firm deadline will be made available in the AFRI RFA.

Background
This program aims at ensuring a continued supply of safe, high-quality, affordable food and fiber for consumers in the U.S. and international trade partners. The goal of the program is to harness our Nation's scientific and technological resources to help agricultural producers and professionals implement strategies to safeguard agriculture in the U.S. from critical and emerging high-consequence plant pathogens and arthropods. To accomplish this, the program will focus on integrated research and education and/or extension projects, as well as single-function extension projects that counter threats to the agriculture system in the U.S., both by stepwise improvements to current responses and by development of innovative new capabilities.

To meet these identified needs of agriculture, the long-term (10-year) goals for this program are: to provide the understanding and technologies needed to anticipate, detect, mitigate, and recover from threats to the Nation's agricultural plant security; to provide decision makers and responders with knowledge and decision support tools needed to anticipate, prevent, prepare for, and respond to agricultural threats of high-consequence plant pathogens and arthropods; and implement strategies for control and elimination of high-consequence plant pathogens and arthropods.

The proposed integrated project must address, by direct investigation of a high consequence pathogen or arthropod (or with appropriate proxy species), gaps in knowledge of pathogens and arthropods of high economic/social impact to the United States. Species of concern to U.S. plant biosecurity are characterized as emerging, invasive, or

threatening pathogens or arthropods that may be introduced through intentional or natural pathways and once in the U.S. pose a high risk of becoming established with significant consequences.

FY 2009 Priorities for Integrated Projects – Applicants must address at least one of the following priorities.

1. Development of rapid detection/diagnostic procedures to facilitate monitoring and mitigation of plant pathogens and arthropods of high consequence and importance. If genomic sequences are available for the organisms of interest, investigators are encouraged to utilize these data. The application must contain a compelling case for the proposed work relative to plant biosecurity as outlined in the "Background" section of the project description. Education and/or extension activities must be included in the project.

2. Monitoring and mitigation of diseases caused by high consequence plant pathogens and arthropods through extension/education programs to implement strategies resulting from, or developed in conjunction with, etiological and epidemiological investigations. The application must contain a compelling case for the proposed work relative to plant biosecurity as outlined in the "Background" section of the program description.

Other Key Information

- A letter of intent is required for this program. The letter of intent deadline is **April 13, 2009, by 5:00 P.M., Eastern Time**. Format and content for the letter of intent can be found in Part II, F.

- **This is an integrated program. Please refer to Part III, A for eligibility criteria.**

- Project proposals must include at least two of the three components of the agricultural knowledge system (i.e., research, education, and extension). Each component should be represented by one or more objectives within the proposal. Projects must budget sufficient resources to carry out the proposed set of research, extension and/or education activities, with **no more than two-thirds** of a project's budget being allocated to a single knowledge area. Please see Part II.C.2 for a full listing of integrated project requirements, which should be followed closely to ensure success in the peer review process.

- Please see Part IV, A for the criteria that will be used to evaluate integrated proposals. Applicants are also encouraged to see http://www.csrees.usda.gov/funding/integrated/integrated for an example of an integrated proposal and other grant-writing resources.

- Applications must include the elements of a logic model detailing the activities, outputs, and outcomes of the proposed project. This information may be provided as a narrative or formatted into a logic model chart. The logic model planning process is a tool that should be used to develop your project **before** writing your proposal. Two additional pages are allowed for this information. More information and resources related to the logic model planning process are provided at http://www.csrees.usda.gov/funding/integrated/integrated_logic_model.html.

- The AFRI encourages integrated projects that develop content suitable for delivery through eXtension. This content is for "end users" as opposed to staff development and must align with the eXtension Guiding Principles, Implementation Plan and other requirements as presented at http://about.extension.org/university-researcher/. Funds may be used to contribute to an existing Community of Practice or to form a new Community of Practice as appropriate.

- The AFRI encourages integrated projects that lead to measurable, documented changes in learning, actions or conditions in Family and Consumer Sciences disciplines and/or projects suitable for 4-H audiences and stakeholder groups while meeting identified program priorities. 4-H projects should align with 4-H Mission mandates of Science, Engineering, Technology, Healthy Living or Citizenship. See guiding principles at http://www.national4-hheadquarters.gov/ <http://www.national4-hheadquarters.gov/ or contact your university Cooperative Extension headquarters or Family and Consumer Sciences State Leaders.

- Diagnostic methods proposed should include protocols for preliminary validation with regard to specificity (the ability to consistently detect the target organism without false positives or false negatives), precision

(repeatability under the same conditions over time, and reproducibility between laboratories) and accuracy (the degree of agreement of the determined value with the true value or accepted reference value).

- When proposing management strategies, consideration may be given to decision support models such as implementation plans for the Integrated Pest Management - Pest Information Platform for Extension & Education (ipmPIPE; http://www.ipmpipe.org) or other similar models with direct benefit to producers.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

FY 2009 Priority for Extension Projects

1. Identification and prioritization of common training and extension needs for first detectors for multiple agencies, such as the Animal and Plant Health Inspection Service, Federal Parks (Department of Interior), State Departments of Agriculture, and Forest Service, and development of curriculum and certification programs to meet these needs. Project may involve the development of Web-based modules and delivery strategies as well as assessment instruments that are valid and reliable for use in certification. Inclusion of strategies for logistics of deployment and curriculum maintenance once the developmental phase is completed will strengthen the proposal. Certification programs and grower education may be delivered through outlets relevant to the target audience, which may include eXtension. The program should focus on high-consequence plant pathogens or arthropod pests that are relevant to plant biosecurity as outlined in the "Background" section of the program description.

Other Key Information

- A letter of intent is required for this program. The letter of intent deadline is **April 13, 2009, by 5:00 P.M., Eastern Time**. Format and content for the letter of intent can be found in Part II, F.

- **This is an integrated program. Please refer to Part III, A for eligibility criteria.**

- Diagnostic methods proposed should include protocols for preliminary validation with regard to specificity (the ability to consistently detect the target organism without false positives or false negatives), precision (repeatability under the same conditions over time, and reproducibility between laboratories) and accuracy (the degree of agreement of the determined value with the true value or accepted reference value).

- Please see Part IV, A for the criteria that will be used to evaluate proposals.

- Applications must include the elements of a logic model detailing the activities, outputs, and outcomes of the proposed project. This information may be provided as a narrative or formatted into a logic model chart. The logic model planning process is a tool that should be used to develop your project **before** writing your proposal. Two additional pages are allowed for this information. More information and resources related to the logic model planning process are provided at http://www.csrees.usda.gov/funding/integrated/integrated_logic_model.html.

- The AFRI encourages projects that develop content suitable for delivery through eXtension. This content is for "end users" as opposed to staff development and must align with the eXtension Guiding Principles, Implementation Plan and other requirements as presented at http://about.extension.org/university-researcher/. Funds may be used to contribute to an existing Community of Practice or to form a new Community of Practice as appropriate.

- The AFRI encourages integrated projects that lead to measurable, documented changes in learning, actions or conditions in Family and Consumer Sciences disciplines and/or projects suitable for 4-H audiences and stakeholder groups while meeting identified program priorities. 4-H projects should align with 4-H Mission mandates of Science, Engineering, Technology, Healthy Living or Citizenship. See guiding principles at http://www.national4-hheadquarters.gov/ <http://www.national4-hheadquarters.gov/ or contact your university Cooperative Extension headquarters or Family and Consumer Sciences State Leaders.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

g. Plant Genome, Genetics, and Breeding

Program Code - 91610
National Program Leader – Dr. Ed Kaleikau (202-401-1931 or ekaleikau@csrees.usda.gov)
Total Program Funds – approximately $6.5 million total
Proposed Budget Requests –

- For priorities 1, 2 and 3 proposed research project budget requests must not exceed a total budget of $450,000 for project periods of 3 years (including indirect costs).
- For priorities 4 and 5, proposed research project budget requests must not exceed a total budget of $1 million for project periods of 2 years (including indirect costs).
- Requests exceeding the budgetary guidelines above will not be reviewed.

Letter of Intent Deadline – January 16, 2009 (5:00 P.M. ET); see Part II, F for format and submission instructions.
Anticipated Application Deadline – March 11, 2009 (5:00 P.M. ET); the firm deadline will be made available in the AFRI RFA.

Overview
This program supports research projects ranging from conventional plant breeding to fundamental science in the United States. The ultimate goal of the program is to contribute knowledge about the biology of agriculturally or ecologically important plant processes and traits, which can be used to breed plants with enhanced value and expanded utilities.

To meet these identified needs of agriculture, the long-term (10-year) goals for this program include increased fundamental knowledge of the structure, function and organization of plant genomes to improve agricultural efficiency and sustainability; effective integration of modern molecular breeding technologies and classical breeding practice for U.S. crop and tree improvement; and improved U.S. varieties for agricultural growers and producers to enhance American competitiveness.

Background
The program will focus on research to advance knowledge of breeding, genetics and genomics in agriculturally significant crops in Poaceae (e.g., corn, rice, wheat, barley, sorghum, etc.), Fabaceae (e.g., soybean, peanut, alfalfa, common bean, etc), and economically or ecologically significant conifers in U.S. planted or native forests. The use of genome-wide high-throughput technologies and conventional breeding can lead to improved quality of human nutrition, health, and well-being; enhanced economic opportunities; and protection of the environment.

FY 2009 Priorities for Research Projects – Applicants must address at least one of the following priorities.

1. Conventional breeding in Poaceae, Fabaceae or Conifers including cultivar and breed development, selection theory, applied quantitative genetics, breeding for improved food quality, breeding for improved local adaptation to biotic stress and abiotic stress, and participatory breeding. This research should be developed with applied or fundamental goals in mind and may include but not limited to mapping and identification of important genes (e.g., ESTs, cDNAs, BAC libraries, SNPs, micro-arrays, TILLING, transformation technologies, etc.), MAS and QTL discovery, association genetic mapping, positional cloning, and comparative genomics. Proposed research budget requests must not exceed a total budget of $450,000 including indirect costs for project periods of 3 years for this priority.

2. Breeder centric data management and visualization tools and platforms necessary to link genomic data to phenotypic traits of economic value in Poaceae or Fabaceae (e.g., "plant breeder's tool box"). These bioinformatic tools and resources should be developed with applied goals in mind, including but not limited to mapping and deployment of beneficial QTL in conventional breeding programs and molecular identification of beneficial alleles of any particular gene of agricultural significance. Proposed research

budget requests must not exceed a total budget of $450,000 including indirect costs for project periods of 3 years for this priority

3. Functional genomics to increase understanding of the biological role of genomic sequence, including coding, regulatory and repeated sequences, and to link these sequences to physiological functions or agronomic traits for Poaceae or Fabaceae crop breeding. Proposed research budget requests must not exceed a total budget of $450,000 including indirect costs for project periods of 3 years for this priority.

4. Structural genomics to improve the physical map of barley (*Hordeum vulgare L.)* or common bean (*Phaseolus vulgaris* L.) and the utilization of next generation sequencing technologies to advance knowledge of the gene space for genomic, genetic and breeding research in Poaceae and Fabaceae. Proposed research budget requests must not exceed a total budget of $1 million ($500,000 per year) including indirect costs for project periods of 2 years for this priority.

5. Research to fill knowledge gaps and adopt new genomic technologies that significantly reduce the breeding cycle time and cost of phenotypic evaluations for improvements in U.S. wheat or rice production and health. Activities must complement ongoing efforts of Coordinated Agricultural Projects (CAPs) for wheat http://maswheat.ucdavis.edu/ or rice http://www.uark.edu/ua/ricecap/. Proposed research budget requests must not exceed a total budget of $1 million ($500,000 per year) including indirect costs for project periods of 2 years for this priority.

Other Key Information

- A letter of intent is required for this program. The letter of intent deadline is **January 16, 2009, by 5:00 P.M., Eastern Time.** See Part II, F for format and submission instructions.

- **This is a non-integrated program. Please refer to Part III, A for eligibility criteria.**

- For priorities 4 and 5, the program may make awards as continuation grants, which are grant instruments by which the Department agrees to support a specified level of effort for a predetermined project period (e.g., annually) with a statement of intention to provide additional support at a future date, provided that performance has been satisfactory, appropriations are available for this purpose, and continued support would be in the best interest of the Federal government and the public. Proposed research budget requests must not exceed a total budget of $1 million ($500,000 per year) including indirect costs for project periods of 2 years for these priorities.

- Applicants are encouraged to develop national and international collaborations with research groups already working on the species of interest to minimize duplication of effort and maximize cost effectiveness. U.S. collaboration with international partners is appropriate; however, applications must be submitted by eligible U.S. institutions.

- Applicants must justify the potential impact of the proposed research and demonstrate that they can apply the most recent technologies. If tools and resources are developed (e.g., biological materials, germplasm, software, etc.), an applicant must budget for and demonstrate an adequate and efficient storage and distribution of the tools and resources once they are available. A description of quality control measures must be included in the application.

- Applicants must include a budgeted plan for the release of the results of their research to the public in a timely manner. All sequence and expression data must be released to public repositories (e.g., Genbank under the Bermuda standards; GEO under MIAME compliance; etc.). All phenotype and map data must be deposited into an appropriate public database (e.g., major databases of the research community, etc.) in a rapid timeframe after quality control tests. Arrangements must be documented in the application.

- Researchers are encouraged to confer with the Crop Curators and Crop Germplasm Committees (CGCs) in the USDA National Plant Germplasm System (NPGS) (www.ars-grin.gov/npgs/index.html) regarding the desirability of depositing genetic stocks and experimental plant populations generated into the NPGS

genebanks. Crop curators and the researchers need to define mutual responsibilities for quality assurance, replenishing depleting stock, and the projected duration for the NPGS's commitment to curate these materials.

- Beginning in 2007, CGIAR International Agricultural Research Centers (e.g., CIMMYT, IRRI, CIAT, CIP, ICRISAT, ICARDA) and some national genebanks began distributing germplasm of certain crops accompanied by the FAO International Treaty's Standard Material Transfer Agreement (SMTA). Researchers are encouraged to confer with their host institution regarding how such materials should be handled. For further information, see the International Treaty's web site at http://www.planttreaty.org/smta_en.htm

- For issues about intellectual property policy, applicants should consult the Agency's intellectual property web page at http://www.csrees.usda.gov/business/awards/intellprop.html

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

- Applications that do not address at least one of the stated research program priorities will not be reviewed.

h. Applied Plant Genomics Coordinated Agricultural Project (CAP)

Program Code - 91710
National Program Leader – Dr. Ed Kaleikau (202-401-1931 or ekaleikau@csrees.usda.gov)
Total Program Funds – approximately $10 million which includes funding to administer continuation awards.
Proposed Budget Requests –

- Proposed integrated project budget requests for an Integrated CAP that is **NOT** crop species specific must not exceed a total budget including indirect costs of $4 million for project periods of 4 years.
- Proposed integrated project budget requests for an Integrated CAP for continuing activities must not exceed a total budget including indirect costs of $955,000 for Barley CAP for a project period of 1 year; $2.5 million for Conifer CAP for a project period of 2 years and; $3.75 million for Solanaceae CAP for a project period of 3 years.
- Requests exceeding the budgetary guidelines above will not be reviewed.

Letter of Intent Deadline – January 16, 2009 (5:00 P.M., ET); see Part II, F for format and submission instructions.
Anticipated Application Deadline – March 11, 2009 (5:00 P.M. ET); the firm deadline will be made available in the AFRI RFA.

Overview
This program supports integrated projects ranging from fundamental science to practical application for crop or forestry improvement in the United States. The ultimate goal of the program is to contribute knowledge about the biology of agriculturally important plant processes and traits, which can be used to develop plants with enhanced value and expanded utilities through a combination of research, extension and/or education.

To meet these identified needs of agriculture, the long-term (10-year) goals for this program include increased fundamental knowledge of the structure, function and organization of plant genomes to improve agricultural efficiency and sustainability; effective integration of modern molecular breeding technologies and classical breeding practice for U.S. crop and forestry improvement; and improved U.S. varieties for agricultural growers and producers to enhance American competitiveness.

Background
This program is seeking applications for a community of researchers, educators, and extension specialists, to focus on large-scale application and translation of genome discoveries and technology for U.S. crop or forestry improvement. The goal of the CAP is to move science from the lab to the field to the marketplace and, in the process, to solve real world problems. To accomplish this goal, the program is seeking applications that respond to

existing or emerging problems, opportunities, and issues through the development and application of science-based knowledge.

CAP applications are expected to demonstrate coherent and complementary activities with the ultimate goal of being a National strategy or solution that is implemented for U.S. agricultural crops or forestry improvement. Applications are expected to take advantage of recent advances in genomics and to translate basic discoveries and knowledge to practical applications. Comprehensive approaches are expected to include coordinated work on several of the following areas but not limited to: development and implementation of easy-to-use molecular markers for breeding; establishment of mapping populations; utilization of functional genomic tools, resources, and knowledge; identification of genomic intervals carrying genetic traits of interest (e.g., yield, quality, and disease and pest resistance, stress tolerance, biomass, etc.); implementation of informatics-based tools for breeding; development and use of extension tools to provide appropriate audiences with information on agricultural advances and challenges; and education of future generations of agricultural scientists in technology use and transfer.

A CAP should seek to bring together a multi-state, multi-institutional, and multi-disciplinary team to integrate genomic discoveries and technology with breeding practice; accelerate identification of traits of interest directly useful to breeders to develop improved varieties; and develop education and /or extension efforts to complement these activities. The intent of the CAP is to promote collaboration, open communication, the exchange of information and the development of resources that accelerate application of genome discovery and technology to plant improvement. The CAP aims to reduce duplication of efforts and integrate activities among individuals, institutions, states, and regions. Therefore, applications should clearly articulate how a CAP grant will complement and/or link with existing programs or projects.

CAP participants would serve as a team comprised of members working in discovery, learning, and engagement to conduct research, education or extension on an emerging or priority area to improve plants important to U.S. agriculture. This team may contain expertise in genomics, genetics, breeding, genetic resources, bioinformatics, plant biology, curriculum development, extension, outreach, program evaluation, economics, sociology, and human sciences, as appropriate. Expertise from principal stakeholders and partnerships with end user groups (e.g., industry, processors, growers, etc.) is strongly encouraged. The application should outline the potential of the CAP team, its structure, coordination and plan of implementation.

FY 2009 Priority for <u>Integrated CAP Projects</u> – Applicants must address the following priority.
Improvements in U.S. crops through the application and translation of knowledge generated via genome-wide discoveries and high-throughput technologies for traditional breeding practice in one of the following 2 areas:

1. An Integrated CAP that is **<u>NOT</u>** crop species specific. Proposed project budget requests must not exceed $4 million including indirect costs for project periods of 4 years. Proposals must include the following activities: (a) Research programs to fill knowledge gaps and adopt new genomic technologies that significantly reduce the breeding cycle time and cost of phenotypic evaluations for improvements in U.S. plant production and health **and**; (b) Extension programs to deliver timely, sound and objective translation of genomic, genetic and breeding information such that the needs of U.S. growers and producers to make informed decisions and adopt new technologies are met **and** (c) Education programs to train the next generation of contemporary plant breeders in modern molecular breeding technologies, including the use of genomic tools to strengthen U.S. plant breeding capacity

2. An Integrated CAPs to support continuing activities in currently funded CAPs for Barley, Conifer and Solanaceae. Proposals must include the following activities: (a) Research programs to fill knowledge gaps and adopt new genomic technologies that significantly reduce the breeding cycle time and cost of phenotypic evaluations for improvements in U.S. plant production and health **and**; (b) Extension programs to deliver timely, sound and objective translation of genomic, genetic and breeding information such that the needs of U.S. growers and producers to make informed decisions and adopt new technologies are met **and**; (c) Education programs to train the next generation of contemporary plant breeders in modern molecular breeding technologies, including the use of genomic tools to strengthen U.S. plant breeding capacity.

Other Key Information

- A letter of intent is required for this program. The letter of intent deadline is **January 16, 2009, by 5:00 P.M., Eastern Time**. See Part II, F for format and submission instructions.

- **This is an integrated program. Please refer to Part III, A for eligibility criteria.**

- Integrated CAP Project proposals must include the three components of the agricultural knowledge system (i.e., research, education, and extension). Each component should be represented by one or more objectives within the proposal. Projects must budget sufficient resources to carry out the proposed set of research, extension and/or education activities, with **no more than two-thirds** of a project's budget being allocated to a single knowledge area. Please see Part II.C.2 for a full listing of integrated project requirements, which should be followed closely to ensure success in the peer review process.

- Please see Part IV, A. for the criteria that will be used to evaluate integrated proposals. Applicants are also encouraged to see http://www.csrees.usda.gov/funding/integrated/integrated for an example of an integrated proposal and other grant-writing resources.

- Applications must include the elements of a logic model detailing the activities, outputs, and outcomes of the proposed project. This information may be provided as a narrative or formatted into a logic model chart. The logic model planning process is a tool that should be used to develop your project **before** writing your proposal. Two additional pages are allowed for this information. More information and resources related to the logic model planning process are provided at http://www.csrees.usda.gov/funding/integrated/integrated_logic_model.html.

- The AFRI encourages integrated projects that develop content suitable for delivery through eXtension. This content is for "end users" as opposed to staff development and must align with the eXtension Guiding Principles, Implementation Plan and other requirements as presented at http://about.extension.org/university-researcher/. Funds may be used to contribute to an existing Community of Practice or to form a new Community of Practice as appropriate.

- The AFRI encourages integrated projects that lead to measurable, documented changes in learning, actions or conditions in Family and Consumer Sciences disciplines and/or projects suitable for 4-H audiences and stakeholder groups while meeting identified program priorities. 4-H projects should align with 4-H Mission mandates of Science, Engineering, Technology, Healthy Living or Citizenship. See guiding principles at http://www.national4-hheadquarters.gov/ <http://www.national4-hheadquarters.gov/ or contact your university Cooperative Extension headquarters or Family and Consumer Sciences State Leaders.

- Support will be provided in 2 areas: (1) New Coordinated Agricultural Project (CAP) grants that have not been previously funded and will not exceed a total budget including indirect costs of $4 million ($1.0 million per year) for a period of time not to exceed 4 years and; (2) New Coordinated Agricultural Project (CAP) grants for continuing CAP activities that will not exceed a total budget including indirect costs of $955,000 for Barley http://barleycap.org/ for a period of time not to exceed 1 year; $2.5 million for Conifer http://www.pinegenome.org/ctgn/ for a period of time not to exceed 2 years ($1.25 million per year) and; $3.75 million for Solanceae http://solcap.msu.edu for a period of time not to exceed 3 years ($1.25 million per year).

- The program anticipates making awards as continuation grants, which are grant instruments by which the Department agrees to support a specified level of effort for a predetermined project period (e.g., annually) with a statement of intention to provide additional support at a future date, provided that performance has been satisfactory, appropriations are available for this purpose, and continued support would be in the best interest of the Federal government and the public.

- Applicants are encouraged to develop national and international collaborations with research groups already working on the species of interest to minimize duplication of effort and maximize cost

effectiveness. U.S. collaboration with international partners is appropriate; however, applications must be submitted by eligible U.S. institutions.

- Applicants must justify the potential impact of the proposed research and demonstrate that they can apply the most recent technologies. If tools and resources are developed (e.g., biological materials, germplasm, software, etc.), an applicant must budget for and demonstrate an adequate and efficient storage and distribution of the tools and resources once they are available. A description of quality control measures must be included in the application.

- Applicants must include a budgeted plan for the release of the results of their research to the public in a timely manner. All sequence and expression data must be released to public repositories (e.g., Genbank under the Bermuda standards; GEO under MIAME compliance; etc.). All phenotype and map data must be deposited into an appropriate public database (e.g., major databases of the research community, etc.) in a rapid timeframe after quality control tests. Arrangements must be documented in the application.

- Researchers are encouraged to confer with the Crop Curators and Crop Germplasm Committees (CGCs) in the USDA National Plant Germplasm System (NPGS) (www.ars-grin.gov/npgs/index.html) regarding the desirability of depositing genetic stocks and experimental plant populations generated into the NPGS genebanks. Crop curators and the researchers need to define mutual responsibilities for quality assurance, replenishing depleting stock, and the projected duration for the NPGS's commitment to curate these materials.

- Beginning in 2007, CGIAR International Agricultural Research Centers (e.g., CIMMYT, IRRI, CIAT, CIP, ICRISAT, ICARDA) and some national genebanks began distributing germplasm of certain crops accompanied by the FAO International Treaty's Standard Material Transfer Agreement (SMTA). Researchers are encouraged to confer with their host institution regarding how such materials should be handled. For further information, see the International Treaty's web site at http://www.planttreaty.org/smta_en.htm

- For issues about intellectual property policy, applicants should consult the Agency's intellectual property web page at http://www.csrees.usda.gov/business/awards/intellprop.html

- Applications that do not address at least one of the stated program priorities will not be reviewed.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

- In a single application, applied plant genomic, genetic and breeding projects are requested that incorporate the following areas as **appropriate for priorities listed above**:

  (a) A budgeted plan and timeline for extension initiatives leading to measurable behavior change or adoption of technology in an identified audience or stakeholder group. Collaboration with extension personnel is encouraged to transform developed plant genomics information into eXtension Communities of Practice http://about.extension.org/university-researcher/ ;

  (b) A budgeted plan and timeline for education initiatives must include approaches to evaluate deliverables (e.g., curricula design and exceptional core competencies in plant genomics, genetics or breeding) for expertise development through student training. A broadening educational experience for students to participate in the CAP should be included (e.g., provide innovative frameworks for curriculum development and/or exceptional learning opportunities in emerging knowledge areas for postdoctoral research associates and others). The plan should also include education opportunities with measurable outcomes for groups underrepresented in science.

  (c) A budgeted project management plan and timeline to ensure efficient functioning of the CAP team that includes an organizational chart, administrative timeline, a description of how the project will be governed,

and identification of short-, medium- and long-term metrics to be evaluated, what expectations are required from each team member, a mechanism whereby progress metrics can be evaluated for future budgetary allocations, and how the project will complement and/or link to existing programs or projects to include multi-disciplinary, multi-institutional, multi-state and international collaborations. The plan must include an exit strategy beyond the requested grant period, without assuming long-term AFRI support. The management of the research, education, and extension activities must be clearly incorporated in the overall management plan as appropriate;

(d) A budgeted data management plan and timeline that includes a description of how project information, data, and results will be made publicly available (e.g., capacity to freely interface with major community databases and with all project locations), a description of the database development, deployment, nomenclature standardization, data mining and analysis, interoperability, web presentation, etc. Applicants must aim to release the results of their research to the public in a timely manner and in an accessible and usable form. If a professional managed database for a community of researchers exists, the plan must demonstrate coordination to that database and a letter of support submitted with the application. To the extent possible, the plan should adapt software and data structures already available through an open source system, adopt a LIMS convention for the project with breeder input into the ontogeny and design of the system, include training for key project personnel who will generate or analyze data, agree on nomenclature at every level, assure that the data are compatible with databases or information services for long-term curation and storage, dedicate personnel to provide day-to-day management of the database and compliance monitoring, etc.;

(e) A budgeted plan and timeline to develop or improve high-throughput mapping and marker development, establish mapping populations, and identify genomic intervals carrying traits of agronomic interest directly useful to breeders and to other biologists for fundamental plant science research. The plan may include production of localized or total-genome maps that will be useful in improvement or in cloning genes of agricultural importance. The application should clearly justify the nature of the map to be constructed (e.g., genetic, physical, or comparative); as well as indicate if high density or low density. Applications must include an assessment of the present state of the genome map; the availability of existing genetic materials and technologies; the rationale for choice of the mapping population, genotype or breeding line; and the short- and long-term applications of the map for plant breeding or other research;

(f) A budgeted plan and timeline to develop or improve web accessible informatics-based tools for plant breeders that enable efficient access to genetic, trait, physical, and expression data, etc. The plan may focus on providing informatics training opportunities that foster a collaborative interface between CAP participants, breeders, biologists, computational scientists, and end users; the improvement of statistical and computational methods for analyzing genome/genetic data critical for plant breeding objectives that include controlled vocabularies; the improvement of resources for the acquisition, management, storage, and interoperability of genome/genetic data that can incorporate increasingly diverse information for plant improvement; the enhancement of tools for analysis of plant genome sequence data including quantitative and graphical representation of germplasm relatedness, comparison of data across species, and QTL analysis; and the improvement of resource Web pages for specific classes of traits, proteins, genes, or metabolic pathways for plant improvement, etc.;

(g) A budgeted plan and timeline to develop or improve molecular markers and apply marker-assisted breeding/selection to U.S. plant breeding objectives and to utilize new genome technologies to address problems not readily solved by conventional breeding methods;

(h) A budgeted plan and timeline for sharing results and management of intellectual property that includes a description of what, how, and when the user community would have public access to the deliverables and outcomes of the project; and

(i) A budgeted plan and timeline for an advisory group of principal stakeholders and professionals for the proposed research, education, and extension projects to assess and evaluate the quality, potential outcomes, and impacts. Please include letters of commitment, rationale for their role, and how they could function effectively to support the goals and objectives of the CAP.

i. Plant Breeding and Education

Program Code - 91810
National Program Leaders – Dr. Liang-Shiou Lin (202-401-5042 or llin@csrees.usda.gov)
Total Program Funds – approximately $6.5 million
Proposed Budget Requests –

- Proposed integrated project budget requests must not exceed $500,000 for project periods of 2-4 years (including indirect costs).
- Requests exceeding the budgetary guidelines above will not be reviewed.

Letter of Intent Deadline – March 16, 2009 (5:00 P.M. ET); see the Part II, F for format and submission instructions.
Anticipated Application Deadline – June 15, 2009 (5:00 P.M. ET); the firm deadline will be made available in the AFRI RFA.

Background
Plant breeding provides the genetic resources and diversity needed for agricultural plant and forestry production to face challenges such as global change, increasing population size, decreasing land availability and quality, and sustainable production of bioenergy and biobased products. Whether through traditional classical approaches or a combination of classical breeding with newer biotechnology approaches such as marker-assisted selection, plant breeding can enable development of new plant and forestry varieties with desired traits, including improved pest and plant disease resistance, enhanced flavor and nutritional content, increased fecundity and productivity, enhanced environmental stress tolerance, and new, alternative uses. These new varieties can provide producers with increased economic opportunities and consumers with affordable food, fiber, fuel, and other products with new qualities. Education activities in plant breeding will aid in the transfer of science-based knowledge to agricultural producers by providing necessary expertise for plant breeding approaches and by training future generations of plant breeders. The goal of this program element is to support integrated research and education projects to enhance germplasm and advance training in plant breeding in agriculturally and economically important plant and forestry species.

To meet these identified needs of agriculture, the long-term (10-year) goals for this program element are: to increase the number of students and scientists trained in plant breeding and in careers requiring plant breeding expertise; and to improve transfer benefits derived from science-based knowledge to producers and consumers through classical breeding or breeding combined with biotechnology.

FY 2009 Priorities for Integrated Projects – Applicants must address at least one of the following priorities.

1. Education and training in an academic setting to build expertise in plant breeding combined with research focusing on germplasm enhancement for abiotic environmental stress tolerance, with particular emphasis on drought tolerance.

2. Education and training in an academic setting to build expertise in plant breeding combined with research focusing on germplasm enhancement for improved nutrient uptake and/or utilization, with particular emphasis on nitrogen.

3. Education and training in an academic setting to build expertise in plant breeding combined with research focusing on germplasm enhancement for biotic stress, with particular emphasis on plant disease resistance.

Other Key Information

- A letter of intent is required for this program. The letter of intent deadline is **March 16, 2009 by 5:00 P.M., Eastern Time**. Format and content for the letter of intent can be found in Part II F.

- **This is an integrated program. Please refer to Part III, A for eligibility criteria.**

- Project proposals must include at least two of the three components of the agricultural knowledge system (i.e., research, education, and extension). Each component should be represented by one or more objectives within the proposal. Projects must budget sufficient resources to carry out the proposed set of research,

extension and/or education activities, with **no more than two-thirds** of a project's budget being allocated to a single knowledge area. Please see Part II.C.2 for a full listing of integrated project requirements, which should be followed closely to ensure success in the peer review process.

- Please see Part IV, A. for the criteria that will be used to evaluate integrated proposals. Applicants are also encouraged to see http://www.csrees.usda.gov/funding/integrated/integrated for an example of an integrated proposal and other grant-writing resources.

- Applications must include the elements of a logic model detailing the activities, outputs, and outcomes of the proposed project. This information may be provided as a narrative or formatted into a logic model chart. The logic model planning process is a tool that should be used to develop your project **before** writing your proposal. Two additional pages are allowed for this information. More information and resources related to the logic model planning process are provided at http://www.csrees.usda.gov/funding/integrated/integrated_logic_model.html.

- The AFRI encourages integrated projects that lead to measurable, documented changes in learning, actions or conditions in Family and Consumer Sciences disciplines and/or projects suitable for 4-H audiences and stakeholder groups while meeting identified program priorities. 4-H projects should align with 4-H Mission mandates of Science, Engineering, Technology, Healthy Living or Citizenship. See guiding principles at http://www.national4-hheadquarters.gov/ <http://www.national4-hheadquarters.gov/ or contact your university Cooperative Extension headquarters or Family and Consumer Sciences State Leaders.

- Integrated projects for this program element should include mutually dependent research and education objectives. These include: a) hypothesis-driven research to fill knowledge gaps that are critical to the development of practices and programs to address the problem area in biology and/or in education; and b) educational deliverables (e.g. interdisciplinary curricula and/or experiential learning for graduate and undergraduate students) that will train the next generation of scientists and educators who will work in the problem area.

- Projects should: (1) provide a plan for creating a stakeholder advisory board (if not already in place), including the types of stakeholders who are expected to be involved and how their input would be used; and (2) include a management plan (developed with input from stakeholder advisory groups) that leads to measurable improvements in the problem area and that provides information on how the team members will communicate including a schedule for communication.

- The education component of an integrated application (1) must go beyond the level of laboratory training for graduate students or postdoctoral researchers supported by the grant, for example curriculum and/or degree program development, multi-college/university approaches to regional or interstate curriculum development, faculty sharing, and joint degrees; (2) describe institutional resources and clearly indicate how and why the proposed new curriculum or degree will complement, enhance, or replace any existing curriculum or programs at the institution; and (3) include plans for assessment and performance outcome measurement, for continuation or expansion beyond the period of USDA support and potentially for tracking of participant accomplishments after course completion.

- Integrated projects are encouraged that (1) utilize germplasm from the National Plant Germplasm System (NPGS); (2) identify and recruit undergraduate students for careers in plant breeding and for pipelining into graduate training in plant breeding; and/or (3) use internships to place graduate or undergraduate students in industry, academic, or government settings for experiential learning in plant breeding technology.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

E.2 Animal Health and Production and Animal Products

The Animal Health and Production and Animal Products program area primarily addresses CSREES' strategic goals to enhance protection and safety of the Nation's agriculture and food supply, to enhance competitiveness and sustainability of rural and farm economies, and to enhance international competitiveness of American agriculture. It also supports CSREES' strategic goals of improving the Nation's nutrition and health, and protecting and enhancing the Nation's natural resource base and environment by reducing the output of nutrients into the environment as animal waste products.

Agriculturally important animal species, including equine and aquaculture, play a crucial role in the success and growth of the Nation's economy. For example, the USDA Economic Research Service projects that cash receipts for livestock, poultry, and dairy alone will reach a record high of $146 billion in 2008. Maintaining a strong, internationally-competitive animal agriculture industry and consumer access to safe and affordable animal products, however, faces increasing challenges from animal diseases, reduced fertility in several animal species, suboptimal nutrition and growth, and non-tariff trade barriers.

The overall goals of the Animal Health and Production and Animal Products program area are to:

1. Increase the knowledge and technology needed to help prevent or reduce the severity of animal diseases, including costly endemic diseases, new and re-emerging disease threats, and foreign diseases that may be introduced accidentally or intentionally; and, investigate alternatives to antibiotics to control disease outbreaks.

2. Enhance animal well-being throughout the food production cycle by providing information on how animals of agricultural importance in the U.S. interact with the production environment and respond to animal management practices; where appropriate, management practices will be developed that improve animal well-being.

3. Increase the knowledge and tools needed to improve agricultural efficiency, sustainability and product quality through enhanced animal growth, reproduction, genetics and breeding, while reducing production costs and minimizing impact on the environment.

In FY 2009, the AFRI invites applications in the following programs in the Animal Health and Production and Animal Products area:

a. Animal Genome, Genetics, and Breeding
b. Animal Growth and Nutrient Utilization
c. Animal Reproduction
d. Animal Biosecurity CAP
e. Animal Heath and Well-Being
f. Integrated Solutions for Animal Agriculture

The following cross-cutting AFRI programs also contribute to the goals of the Animal Health and Production and Animal Products program area:

Agribusiness Markets and Trade
Air Quality
Arthropod and Nematode Biology and Management
Food Safety and Epidemiology
Improving Food Quality and Value
Managed Ecosystems
Microbial Genomics
Nanoscale Science and Engineering

a. Animal Genome, Genetics, and Breeding

Program Code - 92120
National Program Leaders –
Dr. Peter J. Burfening (202-401-5823 or pburfening@csrees.usda.gov)
Dr. Muquarrab Qureshi (202-401-4895 or mqureshi@csrees.usda.gov)
Total Program Funds – approximately $11.0 million total
Proposed Budget Requests –

- For priority 1 proposed research project budget requests must not exceed a total budget of $450,000 for project periods of up to 3 years (including indirect costs).
- For priorities 2 and 3, proposed research project budget requests must not exceed a total budget of $1 million for project periods of 4 years (including indirect costs).
- For priority 4 proposed research project budget requests must not exceed a total budget of $750,000 for project periods of up to 3 years (including indirect costs).
- For priority 5 proposed research project budget requests must not exceed $1.25 million per year for up to 3 years in duration for a total request of $4.0 million (including indirect costs).
- Requests exceeding the budgetary guidelines above will not be reviewed.

Letter of Intent Deadline – March 5, 2009 (5:00 P.M. ET) required for Priorities 1, 2, 3, and 4. See Part II, F for format and submission instructions.
Anticipated Application Deadline – May 14, 2009 (5:00 P.M., ET) for Priorities 1, 2, 3, and 4 and April 17, 2009 for Priority 5; the firm deadline will be made available in the AFRI RFA.

Overview
The Animal Genome, Genetics and Breeding program provides science-based knowledge and technologies to generate new or improved high-quality products/processes and to promote the efficiency of agricultural production systems. This information will also enhance protection and safety of the Nation's agriculture and food supply through development and delivery of information/technologies to genetically improve animals of agricultural importance. Program success will result in a reduction in the number and severity of animal disease outbreaks and a decreased dependence on the widespread use of antibiotics. These program priorities will also contribute to the protection and enhancement of the Nation's natural resource base and environment by increasing productivity while minimizing the environmental consequences.

To meet these identified needs of agriculture, the program's near-term goals (1-3 years) include using the genomic sequence information in an increasing number of ways, particularly as mapping tools and for the development of SNP and gene expression profiling tools. In addition, the program aims to continue the development and use of micro-arrays and SNP panels to further our understanding of gene function, develop computational and biological tools necessary to proceed in the post sequence era, and identify QTL and ETL and candidate genes for traits of importance to improve livestock production efficiency, product quality and animal health. The mid-term (five year) goals include developing *in silico* methods that pave the 'virtual path' leading from sequence to global function identifying, validating, and fine mapping of new QTL or ETL for use in genetic improvement and developing high density SNP maps for important livestock species and incorporation of genomic information into traditional (performance based) animal improvement programs to accelerate animal genetic improvement. The long-term goals (10 years) include using sequence information to identify new genes, discover and understand regulatory elements, and study individual genes, their functional products on a molecular level, and their interactions with other genes or gene networks. Additional long-term goals include identifying candidate genes for economically important traits that can be quickly tracked and identified to improve animal health, product quality, and production efficiency, deliver these technologies available to producers and other end users and develop methods to enhance prediction of performance using genomic, pedigree, and/or phenotypic resources that have significant impacts on animal agriculture.

Background
Mapping of the genome is only the first step. Research is now needed to translate variations in animal genes to understand the fundamental biology of agriculturally important animals and to aid in the discovery of the underlying cause for differences in the efficiency of production, susceptibility or resistance to disease, and improved and/or

healthier products from animals. Although many pieces of the animal's genetic make-up have been identified and animal breeders have made tremendous changes in the production efficiencies of animals of agricultural importance, scientists now have the formidable task of interpreting how they fit together in order to apply the genome information to improve animal production. Cutting edge breeding and genomic research will allow investigators to unravel the genetic components of common and complex traits and use this information in breeding programs to improve animal of agricultural importance.

FY 2009 Priorities for Research Projects – Applicants must address at least one of the following priorities.

1. Conventional Breeding and Translational Animal Genomics includes selection theory, applied quantitative genetics, and breeding for more efficient animal production, breeding for improved food quality, breeding for improved local adaptation, and participatory breeding. This research should be developed with applied or fundamental breeding goals in mind and may include but not limited to mapping and identification of important genes (e.g., ESTs, cDNAs, BAC libraries, SNPs, micro-arrays, TILLING, transformation technologies, etc.), MAS and QTL discovery, association genetic mapping, and comparative genomics. Development of approaches and methods to enhance prediction of performance using applicable pedigree, phenotypes and/or genomic resources in the more traditional (performance based) large-scale genetic evaluation programs. This program priority provides the opportunity to develop new approaches to improve agriculturally important animals and their products or to aid in disease prevention. Proposed research budget requests must not exceed a total budget of $450,000 including indirect costs for project periods of up to 3 years for this priority.

2. Tools and Resources priority emphasizes the development of basic tools and resources to accelerate research in agricultural animal genomics. The goal is to develop state-of-the-art tools and resources that will advance the understanding of animal genomes in terms of organization and function. Goals of this priority are develop comparative maps (contig maps and high density linkage maps) for use in comparative genomics and high density SNP maps and chips where these do not already exist. This priority will provide funding for low level sequencing or improvement of draft genome sequence coverage quality in animals of agricultural importance, including aquaculture species, where sequence information does not already exist in concordance with the "Blueprint of USDA Efforts in Agricultural Genomics 2008-2017". This includes additional sequencing to fill gaps and obtain a higher quality of coverage of more deeply sequenced species. Proposed research budget requests must not exceed a total budget of $1 million including indirect costs for project periods of up to 4 years for this priority.

3. Bioinformatics program requests applications for the development of bioinformatic tools that will assist in functional genomics, annotation and comparative genomics, *in silico* analysis, and use of genomic data in genetic improvement programs of agriculturally important animals. These tools need to be designed to integrate with existing data/databases (not create new ones), serve as tools for genome analysis, provide for practical applications of genomic data, and have a biological framework. Development of tools to integrate the use of genomic data (i.e. SNPs, haplotypes, and/or whole animal genotypes) into large-scale performance based genetic evaluation programs and the use of genomic information to design precision mating systems. Proposed research budget requests must not exceed a total budget of $1 million including indirect costs for project periods of up to 4 years for this priority.

4. Functional Genomics program aims to assess gene function through development and application of global (genome-wide or system-wide) experimental approaches. Such approaches should make use of the information and reagents provided by genome sequencing and mapping and should employ high-throughput innovative technologies for genome-wide analysis supported by information technology. This priority is intended to increase the understanding of mechanisms that regulate agriculturally relevant genes in a systems biology framework in the context of the whole animal. Expression profiling of large numbers of genes across diverse tissues, animal populations and environmental conditions using DNA chips or microarrays to identify and characterize spatial and temporal expression of these genes. Proposed research budget requests must not exceed a total budget of $750,000 including indirect costs for project periods of up to 3 years for this priority.

Other Key Information

- **This is a <u>non-integrated program</u>. Please refer to Part III, A for eligibility criteria.**

- In a one-page appendix to the proposal titled "Meeting Program Goals", PDs are expected to articulate how their proposal meets the near-, mid-, and long-term goals of the Animal Genome program. It is not anticipated that any particular proposal will meet all of the program goals but each should meet at least one of the near-, mid-, and long-term program goals. Attach as a PDF to the R&R Other Project Information form in Field 11. Other Attachments. Proposals failing to include this appendix will not be reviewed.

- Investigators applying under this program element must make a strong case that the tools and /or bioinformatic resources developed are needed by the community of scientists involved and that they do not duplicate resources available elsewhere.

- Those projects developing bioinformatic resources must include an exit strategy for maintaining the resources developed beyond the requested award period, without assuming long-term AFRI support.

- A significant bioinformatics component is expected for applications that use high-through-put methods in animals such as but not limited to micro arrays or high density SNP chips and must be budgeted for appropriately. The bioinformatics component of the application must include:
    - Data collection protocols;
    - Curation protocols, including quality assessment and quality control;
    - Procedures for archiving of data to prevent accidental loss;
    - Protocols and policies related to release of data and submission of raw and processed data to public database; and
    - Data warehousing for online-access, including web-interfaces and bulk download capability.

- Collaboration with international partners is appropriate; however, applications must be submitted by eligible U.S. institutions.

- All model systems, especially the use of laboratory animals, cell cultures, etc., must be thoroughly justified in terms of the program guidelines and relevance to U.S. animal agriculture. This program will no longer accept applications whose studies primarily utilize non-agricultural or non-aquacultured species as animal models.

- Applications whose primary aim is to improve the efficiency in the production of clones or transgenic animals through manipulation of the nucleus will no longer be accepted by the Animal Genome program.

- Applications that do not address at least one of the stated research program priorities will not be reviewed.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

5. <u>Whole Genome Enabled Animal Selection</u> priority is seeking new applications from a community of researchers to focus on large-scale application and translation of genome discoveries and technologies for whole genome animal selection for animals. The goal of the project is to move animal genome science from the laboratory to the field to the marketplace and, in the process, to solve real world problems. To accomplish this goal, the program is seeking applications that respond to existing or emerging problems, opportunities, and issues through the development and application of science-based knowledge to whole genome animal selection. This priority invites applications for Whole Genome Enabled Animal Selection Project that focus on the application of genome discoveries and technology applied to whole genome animal selection for U.S. beef and dairy cattle and poultry improvement.

Proposed Budget Requests –

- Proposed project budget requests for a new whole genome animal selection project for continuing activities must not exceed a total budget including indirect costs of $1,875,000 for the dairy and beef whole genome animal selection for a project period of 3 years and $1,625,000 for poultry whole genome animal selection project for a project period of 3 years.
- Requests exceeding the budgetary guidelines above will be returned without review.

Other Key Information (Priority 5 Only)

- **This is a non-integrated program. Please refer to Part III, A for eligibility criteria.**

- Applicants interested in submitting an application to this priority must contact the National Program Leader prior to the submission deadline.

- The program anticipates making grants as a continuation grant, which is a grant instrument by which the Department agrees to support a specified level of effort for a predetermined project period (e.g. annually) with a statement of intention to provide additional support at a future date provided that performance has been satisfactory, appropriations are available for this purpose, and continued support would be in the best interest of the Federal government and the public.

- In a one-page appendix to the proposal titled "Meeting Program Goals", PDs are expected to articulate how the proposal meets the near-, mid-, and long-term goals of the Animal Genome program. It is not anticipated that any particular proposal will meet all of the program goals but each should meet at least one of the near-, mid-, and long-term program goals.

- An aim of this grant is to encourage maximum flexibility in translational animal genomics and breeding research. Applications will be evaluated based on how well their goals and objectives respond to current needs utilizing genomic tools and resources. As an award's comprehensive approach unfolds, unexpected advances and promising leads, or unforeseen new National needs related to project goals and objectives, may be identified. The project management plan is expected to be capable of responding to these opportunities.

- Applications for the Whole Genome Enabled Animal Selection Project should include the following information in a single project:
    - A budgeted project management plan to ensure efficient functioning of the project team that includes an organizational chart, administrative timeline, a description of how the project will be governed, identification of short-, medium- and long-term metrics to be evaluated, what expectations are required from each team member, a mechanism whereby progress metrics can be evaluated for future budgetary allocations, and how the project will complement and/or link to existing programs or projects to include multi-disciplinary, multi-institutional, multi-state and international collaborations. The plan must include an exit strategy beyond the requested grant period, without assuming long-term AFRI support;

    - A budgeted data management plan that includes a description of how project information, data, and results will be made publicly available. The plan must include capacity to freely interface with major community databases and with all project locations, a description of the database development, deployment, nomenclature standardization, data mining and analysis, interoperability, web presentation, etc. Applicants must aim to release the results of their research to the public in a timely manner and in an accessible and usable form. If a professional managed community database exists, the plan must demonstrate coordination with that database and a letter of support submitted with the application. The plan should adapt software and data structures already available through an open source system, training for all project personnel who will generate or analyze data, agreement on nomenclature at every level, assurance that the data are compatible with databases or information services for long-term curation and storage, dedicated personnel to provide day-to-day management of the database and compliance monitoring, etc.;

- Applications must include an assessment of the present state of the genome map, the availability of existing genetic materials and technologies, the rationale for choice of the population, genotypes or breeding line, and the short and long-term applications for animal breeding or other research;

- If needed for successful completion of the objectives of this research a budgeted plan to develop or improve web accessible informatics-based tools for animal breeders that enable efficient access to genetic, trait, physical, and expression data, etc. The plan may focus on: providing informatics training and education opportunities that foster a collaborative interface between project participants, computational scientists, and end users; the improvement of statistical and computational methods for analyzing genome/genetic data critical for animal breeding objectives that include controlled vocabularies; the improvement of resources for the acquisition, management, storage, and interoperability of genome/genetic data that can incorporate increasingly diverse information for animal improvement;

- If needed for successful completion of the objectives of this research, a budgeted plan to develop or improve Single Nucleotide Polymorphism (SNP) panels and/or molecular markers needed to apply whole genome selection to U.S. animal breeding objectives and to utilize new genome technologies to address problems not readily solved by conventional quantitative breeding methods. To prevent duplication of effort, applicants are strongly encouraged to use the available genetic tools and resources, such as existing genomic/genetic maps, SNPs, molecular markers or other existing information and technologies to locate, identify and isolate traits for selection that are directly useful to breeders;

- A budgeted plan for sharing results and management of intellectual property that includes a description of what, how, and when the user community would have public access to the research, education and extension deliverables and outcomes of the project; and

- A budgeted plan and timeline for an advisory group of principal stakeholders and scientists relevant to the proposed research projects (e.g. include letters of commitment and rationale for their role) to assess and evaluate the quality, potential outcomes and impacts, and how they could function effectively to support the goals and objectives of the projects.

b. Animal Growth and Nutrient Utilization

Program Code - 92220
National Program Leader – Dr. Mark Mirando (202-401-4336 or mmirando@csrees.usda.gov)
Total Program Funds – approximately $4.5 million
Proposed Budget Requests –

- Proposed research project budget requests must not exceed $350,000 for a project period of 2-4 years (including indirect costs).
- Requests exceeding the budgetary guidelines above will not be reviewed.

Letter of Intent Deadline – Not required for this program.
Anticipated Application Deadline – July 8, 2009 (5:00 P.M., ET); the firm deadline will be made available in the AFRI RFA.

Background
Suboptimal nutrition and growth are limiting factors in animal productivity. New information regarding these processes in agriculturally important animals, including aquaculture and aquacultured species, is lacking. The primary objective of the program is to increase our understanding of the biological mechanisms underlying animal growth, development of skeletal muscle, lactation, and nutrient digestion and metabolism. New knowledge for contemporary and future agricultural systems is needed to improve animal production and control muscling, growth,

metabolism, and mammary function. Novel research is also needed to identify biological mechanisms for improving dietary nutrient availability, directing nutrient partitioning toward more protein and less fat, and minimizing excretion of nutrients as waste products.

To meet these identified needs of agriculture, the long-term (10-year) goals for this program are to improve quality and efficiency of meat, milk, and egg production; improve animal utilization of nutrients; and reduce output of nutrients into the environment as animal waste products.

FY 2009 Priorities for Research Projects – Applicants must address at least one of the following priorities.

1. Improve quality and efficiency of meat, milk, and egg production.

2. Control of nutrient intake, digestion, absorption, and availability to improve nutrient utilization and minimize excretion of nutrients as waste products.

Other Key Information

- **This is a non-integrated program. Please refer to Part III, A for eligibility criteria.**

- All model systems, especially the use of laboratory animals, cell cultures, etc., must be thoroughly justified in terms of the program guidelines and relevance to U.S. animal agriculture. This program will no longer accept applications whose studies primarily utilize non-agricultural or non-aquacultured species as animal models.

- Applications that involve transcriptional profiling or sequencing of genes involved in animal growth, lactation, or nutrient utilization must also include physiological or functional studies at the cellular, systemic, or whole-animal level.

- Applications concerning the developmental biology or nutritional regulation of the immune system should be submitted to the Animal Protection and Biosecurity: Animal Health program element. Applications addressing developmental biology of the reproductive system, including embryonic, gonadal, and placental development, and applications dealing with nutritional regulation of reproduction, should be submitted to the Animal Reproduction program . Applications focusing on the effects of diseases or alterations in the immune system on animal growth, lactation or nutrient utilization, or those that emphasize nutritional regulation of animal health or immune function should not be submitted to this program. Applications seeking to create functional foods (e.g., to increase the amount of omega-3 fatty acids, conjugated linoleic acids, or nutritional components in meat, milk, or eggs) should not be submitted to this program.

- Applications that do not address at least one of the stated research program priorities will not be reviewed.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

c. Animal Reproduction

Program Code - 92320
National Program Leader – Dr. Mark Mirando (202-401-4336 or mmirando@csrees.usda.gov)
Total Program Funds – approximately $4.5 million
Proposed Budget Requests –

- Proposed research project budget requests must not exceed $350,000 for a project period of 2-4 years (including indirect costs).
- Requests exceeding the budgetary guidelines above will not be reviewed.

Letter of Intent Deadline – Not required for this program.
Anticipated Application Deadline – March 3, 2009 (5:00 P.M., ET); the firm deadline will be made available in the AFRI RFA.

Background
Reducing infertility and improving fertility in breeding populations of agriculturally important animals, including aquacultured species, is of major importance for efficient animal production. In several species, fertility has declined significantly over the past several decades. New knowledge is needed to improve fertility and facilitate implementation of integrated animal production systems that will contribute to sustainability of the animal production unit. Approaches to managing animal reproduction also are key to future application of biotechnologies. Therefore, the objective of this program is to increase the knowledge base for reproductive biology of agriculturally important animals with the goal of reducing infertility and improving overall reproductive management in animal production systems.

To meet these identified needs of agriculture, the long-term (10-year) goals for this program are to improve fertility and decrease infertility; develop improved methods for sterilization and production of monosex populations of animals; and improve reconstitution of germplasm from preserved sources, including cryopreserved gametes and embryos.

FY 2009 Priorities for Research Projects – Applicants must address at least one of the following priorities.

1. Gonadal function, including production, function, and preservation of gametes.

2. The hypothalamic-pituitary axis.

3. Embryonic and fetal development, including interaction between the conceptus and its uterine environment.

Other Key Information

- **This is a non-integrated program. Please refer to Part III, A for eligibility criteria.**

- All model systems, especially the use of laboratory animals, cell cultures, etc., must be thoroughly justified in terms of the program guidelines and relevance to U.S. animal agriculture. This program no longer accepts applications whose studies primarily utilize non-agricultural or non-aquacultured species as animal models.

- Applications that involve transcriptional/expression profiling or sequencing of genes involved in reproduction must include physiological or functional studies at the cellular, systemic, or whole animal level.

- Applications that focus on uterine defense mechanisms (e.g., non-disease specific immunology) should be submitted to the Animal Protection and Biosecurity program (44.0). Applications addressing the effects of disease, animal health, or alterations in the immune system on reproduction should not be submitted to this program.

- Applications that do not address at least one of the stated research program priorities will not be reviewed.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

d. Animal Biosecurity CAP

Program Code - 92420
National Program Leader –
Dr. Peter J. Johnson (202-401-1896 or pjohnson@csrees.usda.gov)
Total Program Funds – approximately $4 million

NOTE: Animal Biosecurity is not soliciting proposals in Fiscal Year 2009, but the program anticipates soliciting new Integrated CAP applications in Fiscal Year 2010. No applications will be accepted or reviewed in Fiscal Year 2009.

Overview
Strengthening the Nation's capacity to protect animal agriculture from disease losses and threats arising from high impact endemic diseases, new or re-emerging challenges, or foreign diseases accidentally or intentionally introduced is a major challenge facing the United States. The National Research Initiative's Animal Biosecurity Coordinated Agricultural Project (CAP) Program was initiated in FY 2004 and has served as a catalyst to bring the larger animal health community together for three specific diseases. Active awards include: Avian Influenza: http://www.aicap.umd.edu; Johne's Disease: http://www.jdip.org; and PRRS: http://www.prrs.org . The program develops and delivers science-based information and technologies to reduce the number and severity of agricultural disease outbreaks. Studies of zoonotic diseases, such as Avian Influenza, also benefit public health. Results better integrate, coordinate, and complement current and future programs or projects related to that area beyond those objectives supported by an Animal Biosecurity award. The Agriculture and Food Research Initiative's (AFRI) Animal Biosecurity Program anticipates continuing this successful approach by supporting Coordinated Agricultural Projects in FY 2010 based on priorities that will appear in the FY 2010 program description.

The long-term (10-year) goal for this program is to implement biosecurity protocols on a national scale for program-identified issues that detect, contain, minimize, and eliminate the spread of diseases from animal to animal, site to site, and animal to human (where applicable). This will include improving the management of program-identified animal diseases that represent a threat to animal production, biosecurity, and public health. It will also include major progress towards diminishing the economic impact of animal diseases, and/or eradicating selected diseases, or preventing disease introduction into the United States.

FY 2009 Priority for Integrated Projects:
This program is NOT soliciting proposals this Fiscal Year.

e. Animal Health and Well-Being

National Program Leader – Dr. Peter J. Johnson (202-401-1896 or pjohnson@csrees.usda.gov)
Total Program Funds – approximately $11 million
Proposed Budget Requests – Requests exceeding the budgetary guidelines below will not be reviewed. This program contains three elements:

1. *Animal Health and Well-Being: Animal Health*
2. *Animal Health and Well-Being: Animal Well-Being*
3. *Animal Health and Well-Being: Tools and Resources*

Letter of Intent Deadline – See each program element for additional details.
Application Deadlines – See each program element for additional details.

Overview
This program supports CSREES' Animal Systems portfolio through research projects ranging from fundamental science to practical application for the protection and well-being of agriculturally important animal species, including equine and aquaculture species. It also supports the development of essential veterinary reagents and tools that will accelerate the development of vaccines, diagnostics and other disease control and prevention strategies. The ultimate goal of the program is to contribute knowledge about agriculturally important animal diseases that can be applied to reduce their severity and economic impacts through significant reduction or elimination. In addition, the program will contribute to knowledge that will improve the well-being of agriculturally important animals.

1. Animal Health and Well-Being: Animal Health
Program Code - 92521
National Program Leader – Dr. Peter J. Johnson (202-401-1896 or pjohnson@csrees.usda.gov)
Total Program Funds – approximately $9 million
Proposed Budget Requests –

- Proposed research project budget requests must not exceed $375,000 for a project period of 2-4 years (including indirect costs).
- Requests exceeding the budgetary guidelines above will not be reviewed.

Letter of Intent Deadline – January 16, 2009 (5:00 P.M., ET); **Priority 2 ONLY;** See the Part II, F for format and submission instructions.
Anticipated Application Deadlines – March 13, 2009 (5:00 P.M., ET); the firm deadline will be made available in the AFRI RFA.

Background
The Animal Health element focuses on a select group of high priority infectious and metabolic diseases of economic importance to U.S. animal agriculture, including equine and aquaculture species. Applications will increase knowledge and technology needed to prevent or reduce the severity of animal diseases. They will also contribute to an increase in the efficiency of animal production systems, a reduction in non-tariff trade barriers, and safe guard high-quality foods for consumers.

The element addresses a major limiting factor in animal agriculture; insufficient basic and applied information is currently available about diseases in animals of agricultural importance. This knowledge gap impedes our ability to reduce costly economic losses from animal diseases present in the United States and to prepare for foreign diseases that may enter accidentally or intentionally. Information gaps also jeopardize food security and the future viability of animal industries.

Applications should focus on one or more of the following: pathogen biology; host/pathogen interactions; immunology; etiology; prevention; control; epidemiology; or ecology. Applicants proposing immunology and vaccine objectives are strongly encouraged to include one or more of the research priorities identified in "Advances in Immunology and Vaccine Discovery" (Report of the United States-European Union Commission Workshop; http://www.theaavi.org/EU-US_Report.doc). Applicants proposing objectives that include epidemiology, modeling, mathematics and/or ecology are strongly encouraged to also investigate partnering opportunities with the National Institute for Mathematical and Biological Synthesis (NIMBioS) http://nimbios.org .

FY 2009 Priorities for Research Projects – Applicants must address at least one of the following priorities.

1. Species-Specific High Priority Areas **(This priority does NOT require a letter of intent).**
    a. Aquaculture: Enteric Septicemia of Catfish (*Edwardsiella ictaluri)*[*] ; Bacterial Coldwater Disease, Rainbow Trout Fry Syndrome (*Flavobacterium psychrophilum)*; Viral Hemorrhagic Septicemia (VHS)-Great Lakes Strain*;* and, Visceral Toxicosis of Channel Catfish (VTC);
    [*] NOTE: The program plans to remove *E. ictaluri* from the high priority area in FY10. Proposals on *E. ictaluri* this year should focus on understanding how best to use currently available prevention and control tools (e.g. vaccines, treatments), as well as vaccine proposals close to translational application that can be subsequently continued with other funding sources (e.g., CSREES Small Business Innovation Research (SBIR) Program).
    b. Equine: Laminitis; Strangles (*Streptococcus equi)*; and *Rhodococcus equi* foal pneumonia;
    c. Poultry: Necrotic enteritis (*Clostridium perfringens)*; Marek's Disease; and *Avian pneumovirus* respiratory disease;
    d. Ruminants: Bovine and ovine respiratory disease complex (including Bovine viral diarrhea); Infectious causes of dairy cattle mastitis; and, Johne's Disease (*Mycobacterium paratuberculosis*);
    e. Swine: Porcine Reproductive and Respiratory Syndrome (PRRS); Porcine Circovirus 2 associated disease; and Swine influenza; and

2. Non-Species-Specific High Priority Areas. **(This priority requires a Letter of Intent prior to application submission.** See the Part II, F for format and submission instructions).
    a. Endemic:
        i. Diseases that may be introduced to agriculturally important animals through interactions with wildlife (e.g., tuberculosis, brucellosis, chronic wasting disease), with a required emphasis on the interface between agriculturally important animals and the relevant wildlife species; Model species are not appropriate (e.g. for Chronic Wasting Disease non-cervid models are not appropriate).

        ii. An immunologic approach that seeks to develop a novel vaccine or control strategy involving a disease agent other than one of the listed species-specific high-priority agents if convincing justification is presented that the outcome will be broadly applicable to multiple diseases. Also, immunology applications that do not include work with a specific disease agent provided there is convincing justification for broad applicability.
    b. Foreign or Emerging/ Re-emerging:
        iii. High consequence, economically relevant Foreign Animal Diseases of agricultural species (e.g. Foot and Mouth Disease, Avian Influenza, Exotic Newcastle Disease, or Classical Swine Fever), as well as high consequence, economically relevant Emerging/Re-emerging Animal Diseases* of agricultural species.
            * NOTE: Emerging/Re-emerging proposals that would assess or survey whether the disease is a significant problem are not solicited. Documentation of disease importance to the industry is required.
    c. Topics NOT listed in any priority area if they meet ALL the following conditions:
        Some previous CSREES grants may be close to translation to a new industry disease control tool or management strategy but are not eligible to submit proposals based on current priorities. To maximize past CSREES investments in research close to fruition, the program will consider proposals if each of the following five conditions are adequately justified: (1) CSREES grant was initiated by the Animal Protection program after January 1, 2003; (2) topic is not currently identified as program priority; (3) high productivity demonstrated; (4) continued support is expected to translate results into an application of benefit to the animal agriculture industry (e.g., development by industry or other funding sources; veterinary extension development of an improved disease management strategy); and (5) additional AFRI Animal Health & Well-Being funding beyond this year's proposal would not be needed to lead to an industry application.

Other Key Information:

- A letter of intent is required for Priority 2. The letter of intent deadline is **January 16, 2009, by 5:00 P.M., Eastern Time**. Format and content for the letter of intent can be found in Part II, F.

- **This is a non-integrated program. Please refer to Part III, A for eligibility criteria.**

- Inclusion of **power analyses is required** if a research project uses experimental animals. Failure to do so may result in a lower proposal ranking.

- Applications involving **livestock arthropods or nematodes (including arthropods that vector livestock disease)** should consider submission to Arthropod and Nematode Biology and Management.

- **Animal genetics** applications (i.e. applications with a primary focus on identifying, isolating, and characterizing the genetic basis for disease resistance in the host animal) should consider submission to the Animal Genome, Genetics, and Breeding program.

- Applications that develop new or improved **diagnostic tests** are expected to include an appropriate validation plan.

- Applications that address **Avian Influenza**, **Johne's Disease**, and **Porcine Reproductive and Respiratory Syndrome (PRRS)** remain a high priority for funding within the program, which seeks to support and strengthen efforts initiated under the Coordinated Agricultural Projects (CAPs). Applications on Avian Influenza, Johne's Disease, or Porcine Reproductive and Respiratory Syndrome (PRRS) are expected to document in the Project Description: (1) how the proposed work fits within the framework of the community objectives established for the CAPs in the relevant area; (2) that the Project Director is not already funded by the CAP for the specific proposed objectives; and (3) the Project Director will participate in reporting and coordinating activities associated with those projects. Project Directors submitting applications on the three diseases who are not already affiliated with the projects should consult the websites established for these community efforts. Avian Influenza: http://www.aicap.umd.edu; Johne's Disease: http://www.jdip.org; and PRRS: http://www.prrs.org.

- The following areas are NOT suitable for this program:
  (1) Surveillance as a principal objective;
  (2) Studies of secondary effects or indirect effects of disease (e.g. muscle growth); and,
  (3) Proposals studying plant-based vaccines for animal diseases.

- The program encourages applicants to take advantage of genomic approaches (e.g. functional genomics and proteomics) in order to accelerate the discovery of new targets for diagnostics, vaccines, and treatments. The program supports international efforts to better capture the current and future value of microarray data. If proposing microarray studies, applicants are required to include a statement addressing Minimum Information about Microarray Experiment (MIAME) compliance, see: http://www.mged.org. Applicants must plan to release the results of their research to the public in a timely manner.

- Vaccine development applications that may approach or enter the commercialization stage are also encouraged to explore the USDA Small Business Innovation Research program for possible funding in FY 2010. The FY 2009 RFA for that program is available at http://www.csrees.usda.gov/funding/sbir/sbir.html.

- Applications that do not address at least one of the stated research program priorities will not be reviewed.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget. For Animal Health awardees, meetings are expected to be held in conjunction with the Conference of Research Workers in Animal Disease (CRWAD) in early December.

2. Animal Health and Well-Being: Animal Well-Being
Program Code - 92522
National Program Leader –Dr. Peter J. Johnson (202-401-1896 or pjohnson@csrees.usda.gov)
Total Program Funds – approximately $1.5 million
Proposed Budget Requests –

- Proposed research project budget requests must not exceed $375,000 for a project period from 2-4 years (including indirect costs).
- Requests exceeding the budgetary guidelines above will not be reviewed.

Letter of Intent Deadline – January 16, 2009 (5:00 P.M., ET); see Part II, F for format and submission instructions.
Anticipated Application Deadline – March 13, 2009 (5:00 P.M., ET); the firm deadline will be made available in the AFRI RFA.

Background
This element focuses on enhancing animal well-being throughout the food production cycle by providing information on how animals of agricultural importance in the U.S. interact with the production environment and respond to animal management practices. Where appropriate, management practices will be developed that improve

animal well-being. Such knowledge is needed to remain competitive globally and to maintain consumer trust through science-based studies. Research to ensure animal well-being may also help decrease animal management and health-care costs. This area addresses agricultural food security by helping to assure continued access of U.S. animal products to National and International markets.

FY 2009 Priority for Research Projects – Applicants must address one or both of the following priorities.

1. Develop science-based criteria to standardize measurements of well-being, including pain, stress, fear, and behavioral needs; and, assess how each impact animal well-being.

2. Develop and test alternative management practices to promote animal well-being and adaptability. Areas of interest include housing, handling, transportation, and harvest, for example gas stunning/slaughter procedures for food animals.

Other Key Information:

- A letter of intent is required for this program. The letter of intent deadline is **January 16, 2009, by 5:00 P.M., Eastern Time**. Format and content for the letter of intent can be found in Part II, F.

- **This is a non-integrated program. Please refer to Part III, A for eligibility criteria.**

- Inclusion of **power analyses is required** if a research project uses experimental animals. Failure to do so may result in a lower proposal ranking.

- **Animal genetics** applications (i.e. applications with a primary focus on identifying, isolating, and characterizing the genetic basis for stress resistance in the host animal) should consider submission to the Animal Genome, Genetics, and Breeding program.

- Applications that do not address at least one of the stated research program priorities will not be reviewed.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget. For Animal Well-Being awardees, the project director will be required to attend annual investigator meetings associated with the most relevant Multistate Research Committee (such as NC 1029: Applied Animal Behavior and Welfare http://nimss.umd.edu/homepages/home.cfm?trackID=7016).

3. Animal Health and Well-Being: Tools and Resources
Program Code - 92523
National Program Leader –Dr. Peter J. Johnson (202-401-1896 or pjohnson@csrees.usda.gov)
Total Program Funds – approximately $575,000
Proposed Budget Requests –

- Proposed research project budget request must not exceed $550,000 per year, not to exceed four years, providing a total grant of $2.3 million (including indirect costs).
- Requests exceeding the budgetary guidelines above will not be reviewed.

Letter of Intent Deadline- June 1, 2009 (5:00 P.M., ET)
Application Deadline – August 14, 2009 (5:00 P.M., ET)

Background
Strengthening the Nation's capacity to protect animal agriculture from disease losses and threats arising from high impact endemic diseases, new or re-emerging challenges, or foreign diseases accidentally or intentionally introduced is a major challenge facing the United States. A major obstacle to advances in veterinary immunology and disease control is the lack of sufficient publicly available immunological reagents specific for ruminants, swine, poultry, equine and aquaculture species

FY 2009 Priority – for Research Projects applicants must address the following priority.

1. Develop publicly accessible veterinary immunological reagents that address the priority needs of research communities working to solve disease problems of ruminants, swine, poultry, equine and aquaculture species.

Other Key Information

- **This is a non-integrated program. Please refer to Part III, A for eligibility criteria.**

- *Applications are required to:*

  (a) Address **ALL five species groups in a single application**. The application should clearly outline how the Project Directors will determine the U.S. immunology research communities' highest priority needs for ruminants, swine, poultry, equine and aquaculture species;

  (b) Include a strong management plan to assure close communication/coordination among all project collaborators that establishes a sound decision process for funds distribution among the 5 species;

  (c) Address quality control of developed reagents, as well as the distribution and maintenance of the developed reagents. All reagents must be made publicly available, reasonably priced, and readily accessible;

  (d) Establish an Advisory Board/Committee within the proposed management structure that includes principal national stakeholders/ partners for the 5 species group that also incorporates international representation. The Advisory Board/Committee will help assure a high degree of accountability among each of the benefited species communities.

  (e) Coordinate the group's efforts with similar national and international activities developing veterinary immunological reagents; and

  (f) Outline the strategy for an annual assessment. PDs should plan to present an annual progress report to the U.S. veterinary immunology community and other interested stakeholders and partners (e.g., in conjunction with a national meeting, workshop, conference). At the project's conclusion, the project team must also present a final report to the principal stakeholders and partners.

- Proposed project budget request must not exceed $550,000 per year, not to exceed four years, providing a total award of $2.2 million (including indirect costs).

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget. For Animal Health awardees, meetings are expected to be held in conjunction with the Conference of Research Workers in Animal Disease (CRWAD) in early December.

f. Integrated Solutions for Animal Agriculture

Program Code - 92620
National Program Leaders –
Dr. Peter J. Johnson (202-401-1896 or pjohnson@csrees.usda.gov)
Dr. Mark A. Mirando (202-401-4336 or mmirando@csrees.usda.gov)
Total Program Funds – approximately $4 million
Proposed Budget Requests –

- Proposed integrated project budgets must not exceed $1,000,000 (including indirect costs) for a project period up to 5 years.
- Requests exceeding the budgetary guidelines above will not be reviewed.

Letter of Intent Deadline – March 16, 2009 (5:00 P.M., ET); see the Part II, F for format and submission instructions.
Anticipated Application Deadlines – June 30, 2009 (5:00 P.M. ET); the firm deadline will be made available in the AFRI RFA.

Overview
The solution to most animal agriculture problems is very complex and requires not only a robust research effort, but also strong translational outreach that integrates the most up to date knowledge into cost effective strategies that producers and other decision makers can adopt. Even before all the remaining gaps have been filled to fully solve a particular problem, there often is enough knowledge to begin to significantly improve production efficiency and/or reduce the impact of costly animal diseases. To be most successful in bringing new and improved solutions to the field and into academic curriculums, strong multidisciplinary teams must be initiated and sustained for multiple years. Such teams must include not only those with expertise in animal production and/or animal disease, but also trained evaluators, economists, social scientists, and/or others to assess the cost-benefit of various approaches, effects on behavior modification (e.g., adoption of new management recommendations), etc. The goal of the Integrated Solutions for Animal Agriculture Program is to implement projects that are responsive to high priority, economically relevant needs of the animal agriculture sector.

FY 2009 Priorities for Integrated Projects – Applicants must address one of the following priorities:

1. *Improving fertility in agricultural animals:* Implement an extension/outreach or education program or practice to improve fertility of agricultural animals, especially those targeting infertility in dairy cattle or photorefractoriness in turkeys.

2. *Preventing and Controlling On Farm Disease:* Implement an extension/outreach program that focuses on delivery of science-based recommendations and/or technologies to producers, veterinarians, and allied industry to reduce the impact of, or prevent the introduction or reintroduction of, an economically important animal disease or diseases.

3. *Minimizing nitrogen and/or phosphorus output in animal waste:* Implement an extension/outreach program or practice to improve nitrogen and/or phosphorus utilization by agricultural animals and reduce output of these nutrients as endogenous waste products.

Other Key Information

- A letter of intent is required for this program. The letter of intent deadline is **March 16, 2009, by 5:00 P.M., Eastern Time**. See Part II, F for format and submission instructions.

- **This is an integrated program. Please refer to Part III, A for eligibility criteria.**

- Project proposals must include at least two of the three components of the agricultural knowledge system (i.e., research, education, and extension). Each component should be represented by one or more objectives within the proposal. Projects must budget sufficient resources to carry out the proposed set of research, extension and/or education activities, with **no more than two-thirds** of a project's budget being allocated to a single knowledge area. Please see Part II.C.2 for a full listing of integrated project requirements, which should be followed closely to ensure success in the peer review process.

- Please see Part IV, A. for the criteria that will be used to evaluate integrated proposals. Applicants are also encouraged to see http://www.csrees.usda.gov/funding/integrated/integrated for an example of an integrated proposal and other grant-writing resources.

- Applications must include the elements of a logic model detailing the activities, outputs, and outcomes of the proposed project. This information may be provided as a narrative or formatted into a logic model chart. The logic model planning process is a tool that should be used to develop your project **before** writing your proposal. Two additional pages are allowed for this information. More information and resources related to the logic model planning process are provided at http://www.csrees.usda.gov/funding/integrated/integrated_logic_model.html.

- The AFRI encourages integrated projects that develop content suitable for delivery through eXtension. This content is for "end users" as opposed to staff development and must align with the eXtension Guiding Principles, Implementation Plan and other requirements as presented at http://about.extension.org/university-researcher/. Funds may be used to contribute to an existing Community of Practice or to form a new Community of Practice as appropriate.

- The AFRI encourages integrated projects that lead to measurable, documented changes in learning, actions or conditions in Family and Consumer Sciences disciplines and/or projects suitable for 4-H audiences and stakeholder groups while meeting identified program priorities. 4-H projects should align with 4-H Mission mandates of Science, Engineering, Technology, Healthy Living or Citizenship. See guiding principles at http://www.national4-hheadquarters.gov/ <http://www.national4-hheadquarters.gov/ or contact your university Cooperative Extension headquarters or Family and Consumer Sciences State Leaders.

- **Required Focus: Impact assessment that determines the cost-benefit to industry and measures producer behavioral changes that result from implementation of the proposed program is a required focus area.** This should inform the project's evolution and not be done exclusively in the final year. For example, impact assessment of a pilot area(s) may be helpful prior to larger scale implementation. Applied or short-term basic research studies may be pursued to fill key knowledge gaps to enhance an outreach program, as long as a robust impact assessment is not compromised. Long term, fundamental research studies are not appropriate; such studies are best supported in other AFRI Animal Health and Production and Animal Products programs.

- **Inclusion of, or applications from, USDA EPSCoR institutions, small or mid-sized institutions that historically have not been as competitive, and/or minority-serving institutions is STRONGLY encouraged.**

- Programs should **include small producer audiences**, where applicable.

- **A project management plan** must be presented including milestones for principal activities, and how the project will engage partners and stakeholders such that they contribute to project assessment on an annual basis.

- Proposals will need to indicate how the project expects to coordinate and/or leverage funds with other USDA and/or non-USDA efforts for the same area in **one page**.
- **Appropriate mechanisms of information delivery** for the target audiences are required. Field-based programs, conferences, workshops, lay and peer-reviewed publications, websites with various software tools, and new or improved curriculum, are just a few of the strategies that may be helpful to elicit positive change.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

E.3. Food Safety, Nutrition, and Health

The Food Safety, Nutrition and Health program area addresses CSREES' strategic goals to improve the Nation's nutrition and health, to enhance protection and safety of the Nation's agriculture and food supply and to enhance economic opportunities for agricultural producers by improving the quality and value of food products.

The maintenance of human health is significantly affected by the quantity and quality of food consumed and by foods that are contaminated with disease-causing microorganisms or toxins. Nutrition, obesity prevention, and food quality and safety are of paramount importance to the producer, processor, distributor, and consumer. The overall goals of the Food Safety, Nutrition and Health program area are to:

1. Improve our understanding of the behavioral and environmental factors that influence obesity and use this new information to develop and evaluate effective interventions for obesity prevention.

2. Contribute to our knowledge of the requirements and bioavailability of nutrients and other beneficial food components and factors, including food processing technologies and interrelationships among dietary components that impact optimal human nutrition or food quality.

3. Increase our understanding of disease-causing pathogens and toxins, the risk factors that influence food-borne organisms and food safety, and the risk factors that lead to the development and implementation of mitigation or control strategies.

Data generated from these studies will be used for updating dietary recommendations, formulating National nutrition and food safety policy, and stimulating new product developments by the food industry.

In FY 2009 the AFRI invites applications in the following programs in the Food Safety, Nutrition and Health area:

a. Bioactive Food Components for Optimal Health
b. Food Safety and Epidemiology
c. Human Nutrition and Obesity
d. Improving Food Quality and Value

The following cross-cutting AFRI programs also contribute to the goals of the Food Safety, Nutrition and Health area:

Agribusiness Markets and Trade
Animal Protection and Biosecurity
Microbial Genomics
Nanoscale Science and Engineering
Water and Watersheds

a. Bioactive Food Components for Optimal Health

Program Code - 93130
National Program Leader – Dr. Etta Saltos (202-401-5178 or esaltos@csrees.usda.gov)
Total Program Funds – approximately $4.6 million, with up to 4.1 million for research projects and up to $500,000 for an education project.
Proposed Budget Requests –

- Proposed research project budget requests must not exceed $500,000 for project period of 2-4 years (including indirect costs).
- Proposed education project budget requests must not exceed $1 million for project periods of 4 years (including indirect costs). This project will be funded jointly by the Bioactive Food Components for

Optimal Health and Improving Food Quality and Value programs with $500,000 contributed by each program.

- Requests exceeding the budgetary guidelines above will be returned without review.

Letter of Intent Deadline– January 22, 2009 (5:00 P.M., ET) (for research projects only); see Part II, F for submission format and instructions.

Anticipated Application Deadline – April 7, 2009 (5:00 P.M., ET); the firm deadline will be made available in the AFRI RFA.

Background

The consumption of a nutritious diet is important for maintaining long-term health and decreasing the risk for chronic disease. The primary objective of this program is to support research to improve our understanding of the role of nutrients and other biologically active components in foods in promoting health throughout the life cycle, including pregnancy, early development and growth, and aging. Projects that support the update of Dietary Reference Intake recommendations are especially encouraged. Program objectives are relevant to the research recommendations outlined in the Report of the Dietary Guidelines Advisory Committee on the Dietary Guidelines for Americans, 2005 and to the Dietary Reference Intakes Research Synthesis published by the National Academy of Sciences.

To meet these identified needs of agriculture, the long-term (10-year) goal of the program is to provide evidence concerning health effects of nutrients and other bioactive food components that can be used by scientific organizations in revising or selecting endpoints for setting dietary reference intakes and tolerable upper limits for such components (e.g. omega-3 fatty acids, vitamin D, calcium, soy phytoestrogens, and resveratrol). Additionally, the program will coordinate with other CSREES programs in supporting integrated projects (announced in a separate RFA) to develop novel and health-enhancing foods.

FY 2009 Priorities for Research Projects – Applicants must address at least one of the following priorities.

1. Studies of the function and efficacy of nutrients and/or other dietary bioactive components in promoting health. Projects to develop biomarkers to measure human health outcomes and projects using dose-response methodology are encouraged. For FY 2009, proposals must focus on one of the following health concerns:
    a. Prevention of inflammation.
    b. Promotion of bone health.

2. Development of animal models to assess the safety of biologically active ingredients added to foods. When appropriate, the use of agriculturally important domestic species as models for human health outcomes is encouraged.

Other Key Information

- A letter of intent is required for this program. The letter of intent deadline is **January 22, 2009, by 5:00 P.M., Eastern Time**. Format and content for the letter of intent can be found in Part II, F.

- **This is a non-integrated program. Please refer to Part III, A for eligibility criteria.**

- Applications dealing with food processing techniques should consider submission to the Improving Food Quality and Value program unless they are clearly oriented toward dietary effects on optimal human health. Projects to identify process and tailor functional foods to promote energy balance should be submitted to the joint priority with the Improving Food Quality and Value program, which will be announced in a separate AFRI RFA for Integrated Projects.

- Support will not be provided for research on the development of dietary supplements, research on dietary therapies for existing disease, or for the establishment, expansion, or maintenance of dietary databases**.**

- Surveys of the nutritional status of population groups are not acceptable for this program.

- Applications that do not address at least one of the stated research program priorities will be returned without review.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

FY 2009 Priority for Education Projects – Applicants must address the following priority.

1. *This is a shared priority of the Bioactive Food Components for Optimal Health and Improving Food Quality and Value Programs.* Development of innovative, research-based, graduate education and training activities in the area of functional foods for improved human health. Faculty from nutrition and food science departments must be represented in each grant application; participation by faculty from other departments (e.g. plant science, animal science, engineering, marketing) is encouraged, as is submissions involving multiple institutions. Students should gain strengths in multiple disciplines while maintaining competence in their major field by focusing on problem-oriented rather than discipline-oriented education and research. The project should offer training and experience relevant to both academic and nonacademic careers by linking graduate education and research, through internships and mentoring, with research and extension in industry, national laboratory, or other settings. Students supported by the project should choose a research problem that integrates multiple disciplines (including food science and nutrition) in working toward a tangible solution to a practical problem.

Other Key Information for Education Projects

- A letter of intent is **not** required for education projects submitted to this program.
- **This is a non-integrated program. Please refer to Part III, A for eligibility criteria.**
- Proposals may request up to $1 million for four years, including indirect costs. The contribution to the graduate stipend is up to $30,000 per year per student, accompanied with a tuition allowance of up to $12,000 per year per student.
- Please see Part IV, A. for the criteria that will be used to evaluate education proposals.
- Applications that do not address the stated education program priority will be returned without review.
- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

b. Food Safety and Epidemiology

National Program Leaders – Dr. Nancy Cavallaro (202-401-4082 or ncavallaro@csrees.usda.gov)
Total Program Funds – approximately $11.2 million
Proposed Budget Requests – This program contains three elements. See each program element for additional budgetary information.

1. Food Safety and Epidemiology: Biological Approaches for Food Safety
2. Food Safety and Epidemiology: Epidemiological Approaches for Food Safety
3. Food Safety and Epidemiology: Practical Approaches to Food Protection

Letter of Intent Deadline – Required for all elements of this program.
Application Deadline – See each program element for additional details.

Overview

The area of food safety remains a high National priority. This is especially true given recent concerns with bioterrorism and food-borne outbreaks in produce, seafood, and other foods. Food safety research is necessary to fill data gaps and reduce the incidence of food-borne disease on the health care system. Research is needed to understand the emergence, persistence, and transmission of food-borne organisms, as well as to develop better interventions and control and prevention strategies along the entire food safety continuum. Food production is a

highly complex set of systems that spans microbial, chemical, and physical hazards. Therefore, improved food safety is a shared responsibility.

The complex nature of food safety necessitates multi-disciplinary solutions. Integration of microbiology, epidemiology, animal science, plant pathology, veterinary medicine, food science, virology, and many other disciplines are vital for the success of research and educational outcomes. The goal of this program is to fund research efforts that provide an increased knowledge of food-borne organisms and disease, and reduce food-borne illness.

1. Food Safety and Epidemiology: Biological Approaches for Food Safety
Program Code - 93231
National Program Leader – Dr. Nancy Cavallaro (202-401-4082 or ncavallaro@csrees.usda.gov)
Total Program Funds – approximately $5.2 million
Proposed Budget Requests –

- Proposed research project budget requests must not exceed $400,000 for project period of 2-4 years (including indirect costs).
- Requests exceeding the budgetary guidelines above will not be reviewed.

Letter of Intent Deadline – March 4, 2009 (5:00 P.M., ET); Part II, F for format and submission instructions
Anticipated Application Deadline – May 6, 2009 (5:00 P.M. ET); the firm deadline will be made available in the AFRI RFA.

Background
One of the main objectives of this program is to fund research efforts that result in a demonstrable reduction in food-borne illness. This program supports hypothesis driven research that seeks to increase our knowledge of microbial ecology with regard to the routes of contamination of food; this includes on-farm investigations, post-harvest incidence, processing, and distribution of food. Aspects of microbial ecology that provide for avenues of intervention and mitigation of food-borne illnesses or toxicities are also relevant to this program.

The long-term (10-year) goals of this program are to reduce the number of food-borne illnesses in the U.S. and provide for the safe and economic regulation of food safety issues. A primary function of this program is to provide data and information to risk assessors investigating emerging and ongoing food safety problems. In this regard, areas of focus will be assessed year to year to re-examine priorities and adjust the emphasis in response to emerging issues, as appropriate.

FY 2009 Priorities for Research Projects – Applicants must address at least one of the following priorities.

1. Human enteric viruses, *E. coli, Vibrio* spp., *Salmonella spp.*, Listeria, or microbial toxins associated with seafood or on fresh fruits, nuts, and vegetables: Proposed studies need to address mitigation measures aimed at reducing colonization by these pathogens in shellfish, finfish, and derived products, cross contamination during packaging and processing of fresh produce, including fruits, nuts, vegetables, and sprouts, which undergo minimal processing post-harvest; multiplication on or within produce; or sensor/detection methodologies linked to practical mitigation measures. Studies elucidating the source and persistence of pathogens in the environment, as they relate to fresh produce and production of toxins, are included. Focus on harvesting methods, post-harvest storage, or processing technologies should include practical methods to reduce pathogen load.

2. *E. coli, Salmonella spp.* or *Campylobacter spp.* in poultry, swine and cattle: Proposed studies need to address the pathogen load of *E. coli, Salmonella spp.* or *Campylobacter spp.* on farm and the methods of transmission to poultry, swine and cattle; effective mitigation measures during processing and distribution; or genetics of strain development for antibiotic resistance as it relates to enhanced colonization or pathogen load and other virulence determinants.

Other Key Information

- A letter of intent is required for this program. The letter of intent deadline is **March 4, 2009, by 5:00 P.M., Eastern Time**. Format and content for the letter of intent can be found in Part II, F.

- **This is a non-integrated program. Please refer to Part III, A for eligibility criteria.**

- Fresh fruits, nuts, and vegetables include those sold without processing and fresh-cut: fresh fruits and vegetables for human consumption that have been peeled, sliced, chopped, shredded, cored, trimmed, or mashed, with or without washing, prior to being packaged (e.g. pre-cut, packaged, ready-to-eat salad mixes). Studies directed at irrigation, water re-use, and related hydrological issues as they pertain to food safety should consider submission to the Water and Watersheds program. Proposed studies that focus on worker hygiene as it relates to produce contamination or contain an integrated approach involving extension or educational components should consider submission to the Integrated Research, Education, and Extension Competitive Grants Program National Integrated Food Safety Initiative for submission of applications (http://www.csrees.usda.gov/funding/rfas/food_safety.html).

- Surveillance as a principal objective is not
- Research targeting improved or novel detection methods for the designated microorganisms will be considered for funding; however, they must be of direct value in suitable for this program. Research to quantify or monitor the incidence of organisms or toxins responsible for food-borne illness must also seek to ascertain other aspects of virulence, pathogenicity, biochemistry of toxin production, ecology, or genetics in addition to the enumeration of incidence, pathogen load, or frequency.

- Research proposed to examine antibiotic resistance mechanisms must include a direct connection to food safety. Studies which focus on an examination of molecular mechanisms or incidence of antibiotic resistance within populations will not be considered for funding unless they consider aspects of antibiotic resistance associated with increased probability of food-borne illness (e.g. colonization potential, increased pathogen load, persistence, and viability). Antibiotic resistance as it relates to therapeutic treatment of humans or the etiology of pathogenesis will not be considered within this program.

- Applications that contain hypothesis driven mitigating, reducing, or managing the offending agent or disease causing entity or in providing a greater understanding of the routes of food contamination, environmental persistence, and the biology of the offending agent. Research aimed solely at development of a detection methodology will not be considered for review. Applicants are encouraged to speak with the National Program Leader before submission of applications regarding detection methodologies. Coordinating the proposed study with the appropriate industry is highly recommended.

- Applications may be structured from a pre-harvest or post-harvest approach as appropriate. Economic or model-based analyses of these priority areas will also be considered for review, especially if they address issues of regulatory burden and impacts on trade.

- Applications dealing with food processing techniques or the utilization and production of foods designed to improve food quality should consider submission to the Improving Food Quality and Value program. Food safety applications examining the epidemiological aspects of microbes associated with food-borne illness should consider submission to the Epidemiological Approaches for Food Safety program.

- Applications that do not address at least one of the stated research program priorities will not be reviewed.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

2. Food Safety and Epidemiology: Epidemiological Approaches for Food Safety Solutions
Program Code - 93232
National Program Leader – Dr. Nancy Cavallaro (202-401-4082 or ncavallaro@csrees.usda.gov)
Total Program Funds – approximately $4.5 million
Proposed Budget Requests –

- Proposed integrated project budget requests must not exceed $1.25 million for project period of 3-4 years (including indirect costs).
- Requests exceeding the budgetary guideline above will be returned without review.

Letter of Intent – March 4, 2009 (5:00 P.M., ET); Part II, F for format and submission instructions.
Anticipated Application Deadline – May 6, 2009 (5:00 P.M., ET); the firm deadline will be made available in the AFRI RFA.

Background
Epidemiological studies are necessary to develop an understanding of the factors involved in food safety, provide the science-based data for policy decisions, and develop intervention and outreach programs. Epidemiological studies of pre- and post-harvest areas are vital to identify and characterize pathogenic organisms, including their sources and reservoirs, and to understand the transmission of the pathogen along the entire continuum. Environmental and ecological data are needed to increase our understanding of disease-causing microorganisms, their products, and naturally occurring contaminants in meats, poultry, seafood, and fresh fruits and vegetables. Understanding the distribution and determinants of disease and health-related events in a population should be used for prevention and control. Projects should focus on interactions among the environment, agriculture, and human populations with the goal of decreasing food-borne disease, as well as antimicrobial resistance.

The long term goals (10-year) for this program include enhancing the epidemiologic methods available for the study of food-borne diseases and other public health issues, advancing the understanding of the epidemiology of food-borne disease and the food system on a continuum, and using this new information to develop and evaluate specific intervention strategies/prevention and control programs for food-borne disease and antimicrobial resistance.

FY 2009 Priorities for Integrated Projects – Applicants must address at least one of the following priorities.

1. Development of novel epidemiologic approaches that include evaluation of the impact of intervention or management strategies on microbial contamination or food safety. These may include epidemiological methods that will facilitate the understanding of quantitative data on pathogen load within the farm-to-fork continuum, facilitate the linking of pre-harvest and post-harvest food safety outcomes to public health outcomes, and/or identify new risk factors.

2. Innovative studies which seek to quantify the effectiveness of existing interventions or management strategies in reducing pathogen loads across farm-to-fork. Projects addressing this priority must also apply the finding by developing outreach programs to appropriate audiences.

Other Key Information

- A letter of intent is required for this program. The letter of intent deadline is **March 4, 2009, by 5:00 P.M., Eastern Time**. Format and content for the letter of intent can be found in Part II, F.

- **This is an integrated program. Please refer to Part III, A for eligibility criteria.**

- Project proposals must include at least two of the three components of the agricultural knowledge system (i.e., research, education, and extension). Each component should be represented by one or more objectives within the proposal. Projects must budget sufficient resources to carry out the proposed set of research, extension and/or education activities, with **no more than two-thirds** of a project's budget being allocated to a single knowledge area. Please see Part II.C.2 for a full listing of integrated project requirements, which should be followed closely to ensure success in the peer review process.

- Please see Part IV, A for the criteria that will be used to evaluate integrated proposals. Applicants are also encouraged to see http://www.csrees.usda.gov/funding/integrated/integrated for an example of an integrated proposal and other grant-writing resources.

- Applications must include the elements of a logic model detailing the activities, outputs, and outcomes of the proposed project. This information may be provided as a narrative or formatted into a logic model chart. The logic model planning process is a tool that should be used to develop your project **before** writing your proposal. Two additional pages are allowed for this information. More information and resources related to the logic model planning process are provided at http://www.csrees.usda.gov/funding/integrated/integrated_logic_model.html.

- The AFRI encourages integrated projects that develop content suitable for delivery through eXtension. This content is for "end users" as opposed to staff development and must align with the eXtension Guiding Principles, Implementation Plan and other requirements as presented at http://about.extension.org/university-researcher/. Funds may be used to contribute to an existing Community of Practice or to form a new Community of Practice as appropriate.

- The AFRI encourages integrated projects that lead to measurable, documented changes in learning, actions or conditions in Family and Consumer Sciences disciplines and/or projects suitable for 4-H audiences and stakeholder groups while meeting identified program priorities. 4-H projects should align with 4-H Mission mandates of Science, Engineering, Technology, Healthy Living or Citizenship. See guiding principles at http://www.national4-hheadquarters.gov/ <http://www.national4-hheadquarters.gov/ or contact your university Cooperative Extension headquarters or Family and Consumer Sciences State Leaders.

- Near term goals that will help fulfill the long term goals include: 1) emphasizing new innovative epidemiologic and statistical methodology; 2) emphasizing intervention and outreach projects and discouraging simple prevalence studies; and 3) emphasizing potential projects/methodologies for emerging issues in food safety and public health, including food biosecurity and antimicrobial resistance.

- Proposals should involve collaboration with institutions, organizations, and communities of interest. Strong partnerships are required, such as those that form consortiums or collaborative networks. Innovative multidisciplinary collaborations and partnerships are those designed to build solutions to understanding the interrelationships of the various factors that affect the safety of our food supply. Applicants must combine the knowledge of multiple disciplines (i.e. veterinarians, food microbiologists, epidemiologists, public health specialists, or other scientific disciplines) in the proposal. Engagement with partners and stakeholders is required to solve these complex problems.

- Applications must have a primary focus on epidemiological studies and develop and assess novel outreach components. The applications must have an epidemiologist and extension personnel as Project director or co-project director.

- Applications concentrating on laboratory methods or techniques prevalence studies or studies that have already been done, pure risk assessment methodologies or modeling studies, and surveillance studies without additional components are **NOT** eligible.

- Applications that do not address at least one of the stated program priorities will be returned without review.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

3. Food Safety and Epidemiology: Practical Approaches for Food Protection
Program Code - 93233
National Program Leader – Dr. Nancy Cavallaro (202-401-4082 or ncavallaro@csrees.usda.gov)
Total Program Funds − approximately $1.4 million, of which $900,000 will be provided by the Food and Drug Administration (FDA)
Proposed Budget Requests −

- Proposed research project budget requests must not exceed $300,000 for project period of 2-3 years (including indirect costs).
- Requests exceeding the budgetary guidelines above will not be reviewed.

Letter of Intent Deadline − March 4, 2009 (5:00 P.M., ET); Part II, F for format and submission instructions
Anticipated Application Deadline − May 6, 2009 (5:00 P.M., ET); the firm deadline will be made available in the AFRI RFA.

Background
This program element is in partnership with the Food and Drug Administration (FDA), at the U.S. Department of Health and Human Services. FDA is committed to reducing the incidence of food-borne illness to the greatest extent possible, and to protecting the integrity of the nation's food supply. CSREES and FDA support research that includes, but is not limited to: 1) improving the detection and quantification of food-borne contaminants (pathogens, toxins, and chemicals) that could jeopardize the safety and security of the food supply; 2) finding new and improved ways to control food-borne contaminants; and 3) safely producing, processing and handling food and food products. These research activities often provide information critical to food safety guidance and policymaking.

The FDA Center for Food Safety and Applied Nutrition (CFSAN) focuses specifically on programs, activities, and resources that promote food protection. In an effort to expand the scope of this program, CSREES and FDA are initiating a collaborative, interagency research program targeted to two specific food protection priorities.

FY 2009 Priorities for Research Projects – Applicants must address at least one of the following priorities.

1. Studies to integrate food system signals with geospatial or other innovative technologies that may indicate contamination leading to a food-borne outbreak associated with fresh produce (leafy greens; tomatoes; or melons). Food system signals include but are not limited to problems identified through routine testing or clusters of illnesses reported by government authorities. Geospatial technologies include a range of tools that allow the mapping and analysis of data derived from natural resource information such as climate and environmental monitoring to predict a future event.

2. Studies to develop and validate methods and/or processes for sampling plans for produce and environmental samples. The sampling plans should include how to interpret the data from studies with a large number of samples with very few positive results and should assist in validating the metrics used in Good Agricultural Practices (GAPs). Positive results are the presence of microbial or chemical contaminants in produce and environmental samples.

Other Key Information

- A letter of intent is required for this program. The letter of intent deadline is **March 4, 2009, by 5:00 P.M., Eastern Time**. Format and content for the letter of intent can be found in Part II, F.

- **This is a non-integrated program. Please refer to Part III, A for eligibility criteria.**

- Applications that do not address at least one of the stated research program priorities will not be reviewed.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

c. Human Nutrition and Obesity

Program Code - 93330
National Program Leaders –
Dr. Etta Saltos (202-401-5178 or esaltos@csrees.usda.gov)
Dr. Susan Welsh (202-720-5544 or swelsh@csrees.usda.gov)
Total Program Funds – approximately $11 million, with $10 million for integrated projects and $1million for extension projects
Proposed Budget Requests –

- Proposed integrated project budget requests must not exceed $1,500,000 for project period of 2-4 years (including indirect costs).
- Proposed extension project budget requests must not exceed $500,000 for project period of 2-4 years (including indirect costs).
- Requests exceeding the budgetary guideline above will be returned without review.

Letter of Intent Deadline – Not required for this program.
Anticipated Application Deadline – June 15, 2009 (5:00 P.M. ET); the firm deadline will be made available in the AFRI RFA.

Background
This crosscutting program addresses the complex problem of obesity prevention. Projects funded by this program should lead to the development and evaluation of effective programs to prevent obesity. Obesity is the number one nutritional problem in America. Food is an integral part of the process that leads to obesity and USDA has a unique responsibility for the food system in the United States.

To meet the identified needs of agriculture, the long-term (10-year) goals for this program include identifying the behavioral factors that influence obesity to develop effective obesity prevention strategies; developing valid behavioral and environmental instruments for measuring progress in obesity prevention efforts; and promoting effective strategies for preventing overweight and obesity. The ultimate goal of the program is to stem the rising tide of obesity.

The milestones toward reaching these long-term goals include developing theories on how behavioral factors influence obesity; testing validity of behavioral measures for evaluating progress in obesity prevention efforts; and testing the effectiveness of strategies for preventing overweight and obesity.

FY 2009 Priority for Integrated Projects – Applicants must address the following priorities.

1. Improve understanding of the behavioral (not metabolic) factors that influence obesity. Additionally, use this new information to develop effective programs for ***preventing*** overweight and obesity or to help prepare the next generation of researchers and educators to address the complex problem of obesity. Potential study areas for factors influencing obesity may include social and psychological factors, the role of lifestyle, including physical activity, as well as the influence of family, peers, and community, the influence of economic factors, and agricultural and public policy issues. Because food is an integral part of the development of obesity, all projects should address some aspect of food from production to consumption.

2. Develop and implement behavioral and environmental instruments to measure progress in obesity prevention efforts, for example, develop impact indicators for Cooperative Extension System education programs. This activity may necessitate the development of new instruments or the modification and validation of existing ones.

Other Key Information

- Project proposals must include at least two of the three components of the agricultural knowledge system (i.e., research, education, and extension). Each component should be represented by one or more objectives within the proposal. Projects must budget sufficient resources to carry out the proposed set of research,

extension and/or education activities, with **no more than two-thirds** of a project's budget being allocated to a single knowledge area. Please see Part II.C.2 for a full listing of integrated project requirements, which should be followed closely to ensure success in the peer review process.

- **This is an integrated program. Please refer to Part III, A for eligibility criteria.**

- Please see Part IV, A. for the criteria that will be used to evaluate integrated proposals. Applicants are also encouraged to see http://www.csrees.usda.gov/funding/integrated/integrated for an example of an integrated proposal and other grant-writing resources.

- Applications must include the elements of a logic model detailing the activities, outputs, and outcomes of the proposed project. This information may be provided as a narrative or formatted into a logic model chart. The logic model planning process is a tool that should be used to develop your project **before** writing your proposal. Two additional pages are allowed for this information. More information and resources related to the logic model planning process are provided at http://www.csrees.usda.gov/funding/integrated/integrated_logic_model.html.

- The AFRI encourages integrated projects that develop content suitable for delivery through eXtension. This content is for "end users" as opposed to staff development and must align with the eXtension Guiding Principles, Implementation Plan and other requirements as presented at http://about.extension.org/university-researcher/. Funds may be used to contribute to an existing Community of Practice or to form a new Community of Practice as appropriate.

- The AFRI encourages integrated projects that lead to measurable, documented changes in learning, actions or conditions in Family and Consumer Sciences disciplines and/or projects suitable for 4-H audiences and stakeholder groups while meeting identified program priorities. 4-H projects should align with 4-H Mission mandates of Science, Engineering, Technology, Healthy Living or Citizenship. See guiding principles at http://www.national4-hheadquarters.gov/ <http://www.national4-hheadquarters.gov/ or contact your university Cooperative Extension headquarters or Family and Consumer Sciences State Leaders.

- High priority will be given to projects involving population groups at risk for obesity, such as those served by USDA programs (e.g., Expanded Food and Nutrition Education program, Cooperative Extension, nutrition assistance programs). The rationale for the selection of any population for study or intervention should be documented.

- Because obesity is such a multifaceted problem, it is expected that the project team will have appropriate training and experience in multiple disciplines, ***especially nutrition***.

- Applications that focus primarily on weight loss, medical therapies for disease or metabolic aspects of diet and energy balance should ***not*** be submitted to this program.

- Applications that do not address at least one of the stated program priorities will be returned without review.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

FY 2009 Priority for Extension Projects – Applicants must address the following priority

1. Expand and disseminate results of intervention projects which have demonstrated success in obesity prevention. This may include development of toolkits, demonstration projects and eXtension Communities of Practice.

Other Key Information for Extension Projects

- **This is an integrated program. Please refer to Part III, A for eligibility criteria.**

- Please see Part IV, A. for the criteria that will be used to evaluate proposals.

- Applications must include the elements of a logic model detailing the activities, outputs, and outcomes of the proposed project. This information may be provided as a narrative or formatted into a logic model chart. The logic model planning process is a tool that should be used to develop your project **before** writing your proposal. Two additional pages are allowed for this information. More information and resources related to the logic model planning process are provided at http://www.csrees.usda.gov/funding/integrated/integrated_logic_model.html.

- The AFRI encourages projects that develop content suitable for delivery through eXtension. This content is for "end users" as opposed to staff development and must align with the eXtension Guiding Principles, Implementation Plan and other requirements as presented at http://about.extension.org/university-researcher/. Funds may be used to contribute to an existing Community of Practice or to form a new Community of Practice as appropriate.

- The AFRI encourages integrated projects that lead to measurable, documented changes in learning, actions or conditions in Family and Consumer Sciences disciplines and/or projects suitable for 4-H audiences and stakeholder groups while meeting identified program priorities. 4-H projects should align with 4-H Mission mandates of Science, Engineering, Technology, Healthy Living or Citizenship. See guiding principles at http://www.national4-hheadquarters.gov/ <http://www.national4-hheadquarters.gov/ or contact your university Cooperative Extension headquarters or Family and Consumer Sciences State Leaders.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

d. Improving Food Quality and Value

Program Code - 93430
National Program Leader –
Dr. Ram Rao (202-401-6010 or rrao@csrees.usda.gov)
Dr. Dionne Toombs (202-401-2138 or dtoombs@csrees.usda.gov)
Dr. Hongda Chen (202-401-6497 or hchen@csrees.usda.gov)
Total Program Funds – approximately $ 6.5 million
Proposed Budget Requests –

- Proposed research project budget requests must not exceed $ 500,000 for project period of 2-4 years (including indirect costs) for multidisciplinary projects involving more than one investigator
- Proposed research project budget request must not exceed $ 300,000 for project period of 2-4 years for single investigator-led projects
- Requests exceeding the budgetary guidelines above will not be reviewed.

Letter of Intent Deadline – January 21, 2009 (5:00 P.M, ET); see Part II, F for format and submission instructions.
Anticipated Application Deadline – **March 31, 2009** (5:00 P.M., ET); the firm deadline will be made available in the AFRI RFA.

Background
Improving food quality and value is driven by the application of physical, chemical, and biological principles and is essential in meeting the needs of the consumer, as well as enhancing competitiveness in global markets.

The long term goals (10-year) of this program are to formulate ingredients based on the knowledge of chemical and physical interactions for better functionality of foods; develop new and improved technologies to produce better foods; and produce foods to promote optimum health of individual citizens.

FY 2009 Priorities for Research Projects – Applicants must address at least one of the following priorities.

1. Basic mechanisms involved in the interaction of micro- and macro-molecules in the food matrix in controlling structure, texture, stability, and flavor delivery in foods. This includes (a) the fundamental understanding of the mechanism of interaction of proteins, polysaccharides, and lipids in foods (e.g. covalent, ionic, hydrophilic, and hydrophobic structures and kinetics) and (b) factors influencing the complexation and segregation of these macromolecules (e.g. processing environment, storage conditions, other food ingredients), and the resultant quality of foods (such as predictive modeling and food product quality).

2. Generating the knowledge base for advanced and innovative processing, engineering, and technologies that enhance food quality attributes and development and application of analytical characterization techniques of physical, chemical, biological, and sensory natures.

3. Physico-chemical characteristics and bioavailability of proven bioactive health components during conversion of raw ingredients into foods (food processing, packaging, distribution, storage, and consumption) and development of relevant food technologies to enhance the stability, bioavailability, and targeted delivery of bioactive components.

Other Key Information

- A letter of intent is required for this program. The letter of intent deadline is **January 21, 2009 by 5:00 P.M., Eastern Time**. See Part II, F for format and submission instructions.

- **This is a non-integrated program. Please refer to Part III, A for eligibility criteria.**

- For priority 3, applications that foster collaborations between nutrition scientists and food scientists are encouraged as long as they are clearly oriented toward foods for health. Applications dealing solely with bioavailability, efficacy and safety should consider submission to the Bioactive Food Components.

- Proposals addressing food components with equivocal or no evidence of bioactivity and building databases will not be considered.

- Improving Food Quality and Value program funds applications in the post harvest area only.

- Multi-disciplinary approaches are highly encouraged. Proposals should include at least two disciplines related to food science (chemistry, biochemistry/biology, physics, engineering/processing, microbiology, biometry, sensory science, and nutrition).

- Applications addressing combined and inseparable quality and safety objectives will be entertained in this program. However, applications dealing primarily with issues of food safety should consider submission to the Food Safety and Epidemiology program. Applications dealing solely with bioavailability, metabolism, and mechanism of action of bioactive food components should be sent to the Bioactive Food Components for Optimal Health program. For proposals addressing both Food Science and Nutrition, check priority # 2.

- Applications that do not address at least one of the stated research program priorities will not be reviewed.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

E.4. Renewable Energy, Natural Resources, and Environment

The Renewable Energy, Natural Resources, and Environment area primarily addresses CSREES' strategic goals to protect and enhance the Nation's natural resource base and environment and to support increased economic opportunities and improved quality of life in rural America. It also supports CSREES' strategic goal of enhancing protection and safety of the Nation's agriculture and food supply and energy self-sufficiency.

The fundamental concept behind this area of programs is the application of ecological, economic, and sociological principles to agricultural production systems. The concept of agroecosystems or agricultural working lands can be applied within agriculture, rangeland, forested, or community systems at a range of spatial scales including the field, family, the farm level enterprise, the landscape, watershed, institution, or community. Agriculture as managed systems involves human interactions and use of inputs. These production systems are influenced by and, in turn, influence the natural systems surrounding them.

Human well-being is inextricably linked to the sustainable use and management of agroecosystems. The fundamental purpose of agriculture is to manage ecological structures, functions, and processes to favor human needs. The concept of sustainable agroecosystem management allows for achieving the traditional agricultural goal of production while balancing the goals of conservation and protection of natural resources, mitigation of environmental impacts, maintenance of ecosystem services, and rural community viability. One benefit of the agroecological approach is that it accommodates a broad range of performance criteria in addition to increased production, such as ecological goods and services, sustainability, food security, energy resources, environmental quality, economic viability, and resource conservation. These criteria provide focus for the various programs.

The overall goal of the Renewable Energy, Natural Resources, and Environment area is to support research and integrated projects that will address the design or function of productive agriculture and rural communities that sustains yields and rural prosperity while minimizing the negative environmental impacts of agricultural practices and technologies on surrounding natural ecosystems. Addressing the degree to which agriculture and rural communities are sustainable is a critically important goal relevant to all USDA mission areas.

In FY 2009, AFRI invites applications in the following area of programs related to Renewable Energy, Natural Resources, and Environment:

- **a. Air Quality**
- **b. Biology of Weedy and Invasive Species in Agroecosystems**
- **c. Managed Ecosystems**
- **d. Soil Processes**
- **e. Water and Watersheds**
- **f. Global and Climate Change**
- **g. Sustainable Agroecosystems Science and Long-Term Agroecosystem Program**
- **h. Enhancing Ecosystem Services from Agricultural Lands**: Management, Quantification, and Developing Decision Support Tools

The following cross-cutting AFRI programs also contribute to the goals of the Renewable Energy, Natural Resources, and Environment area:

Microbial Genomics
Plant Biology: Environmental Stress
Agribusiness Markets and Trade
Biobased Products and Bioenergy Production Research

a. Air Quality

Program Code - 94140
National Program Leader – Dr. Ray Knighton (202-401-6417 or rknighton@csrees.usda.gov)
Total Program Funds – approximately $5 million, with approximately $3.8 million for integrated projects
Proposed Budget Requests –

- Proposed integrated project budget requests must not exceed $600,000 for project period of 2-4 years (including indirect costs).
- Proposed research project budget requests must not exceed $400,000 for project period of 2-4 years (including indirect costs).
- Requests exceeding the budgetary guidelines above will be returned without review.

Letter of Intent Deadline – March 5, 2009 (5:00 P.M., ET) for **integrated projects only**; see Part II, F for format and submission instructions.
Anticipated Application Deadline – June 5, 2009 (5:00 P.M. ET); the firm deadline will be made available in the AFRI RFA.

Background
Agriculture, forest, and range production practices have increasingly become subject to state and federal regulations aimed at protecting air resources. In many instances, data do not exist or are not representative of agricultural industries for the purpose of estimating emissions to the atmosphere of regulated pollutants and greenhouse gases, other than carbon dioxide, from agriculture, as well as public nuisances, such as odors and fugitive dust. In addition, there is a need to develop practices and technologies to assist producers in preventing or mitigating air emissions.

The long-term (10 year) goals of this program are: 1) to develop emission data for agriculture, forest, and range production practices leading to science-based emission reduction targets to improve air quality and protect human and environmental health; 2) to develop effective mitigation strategies and increase adoption of best management practices to reduce agricultural emissions; and 3) to improve understanding of the measurement, production, flux, and fate and transport of odor, gases, and particulate matter (PM) leading to knowledge of the environmental fate of agricultural atmospheric emissions.

FY 2009 Priorities for Integrated Projects – Applicants must address at least one of the following priorities.

1. Measurement and Monitoring Integrated projects are solicited to improve inventories and emission rates of particulate matter and gases for within field/facility and edge-of-field/facility boundaries. Emission data for particulates, odors, and gases is of primary concern and is needed for all aspects of production practices and naturally occurring events such as wind and wet/dry deposition to update existing inventories. Educational product (curriculum, publications, demonstrations, and programs) development, delivery, and evaluation targeting priority emissions is needed. Extension/educational application of predictive tools for quantifying rural community impact or risk for exposure to priority emission sources are needed at the farm and community level. Projects are especially encouraged that focus on crop production practices with special emphasis given to emissions from the conversion of Conservation Reserve Program (CRP) land to crop production. High priority emission sources and corresponding constituents are:
    a. tillage, nutrient management, and pest management, practices that emit PM, ammonia, nitrous oxide, and highly reactive volatile organic compounds (VOCs).
    b. crop harvest and post-harvest practices that emit PM and gases.
    c. controlled burning practices as sources of PM, gases, and smoke.
    d. animal feeding operations as sources of ammonia, PM, VOCs, hydrogen sulfide, methane, odor and odorants.

    For projects addressing emissions from animal feeding operations, measurement and monitoring projects that complement and do not duplicate the National Air Emissions Monitoring Study (NAEMS) are encouraged. Projects that include the same animal species, production practices, geographic regions, and analytes currently in the NAEMS study will not be considered for funding.

2. Mitigation Integrated projects should examine the efficacy of new and existing methods for mitigating emissions of reactive nitrogen and other agricultural air pollutants to the atmosphere and the development of best management practices. Projects are especially encouraged that evaluate the efficacy of conservation practices and other control technologies to reduce particulate and gaseous emissions. To ensure the relevance and adoption of practices, these projects should also analyze economic, behavioral, cultural, or policy barriers to implementing practices that reduce emissions. Evidence of commensurate investigator expertise to address and evaluate the human dimensions of the above mentioned barriers is required. Educational products that introduce and define value of mitigation technologies and that contribute to the development of farm management plans are solicited.

Other Key Information for Integrated Projects

- A letter of intent is **required** for **integrated projects** in this program. The letter of intent deadline is **March 5, 2009, by 5:00 P.M., Eastern Time**. See Part II, F for format and submission instructions.

- **This is an integrated program. Please refer to Part III, A for eligibility criteria.**

- Project proposals must include at least two of the three components of the agricultural knowledge system (i.e., research, education, and extension). Each component should be represented by one or more objectives within the proposal. Projects must budget sufficient resources to carry out the proposed set of research, extension and/or education activities, with **no more than two-thirds** of a project's budget being allocated to a single knowledge area. Please see Part II.C.2 for a full listing of integrated project requirements, which should be followed closely to ensure success in the peer review process.

- Please see Part IV, A. for the criteria that will be used to evaluate integrated proposals. Applicants are also encouraged to see http://www.csrees.usda.gov/funding/integrated/integrated for an example of an integrated proposal and other grant-writing resources.

- Applications must include the elements of a logic model detailing the activities, outputs, and outcomes of the proposed project. This information may be provided as a narrative or formatted into a logic model chart. The logic model planning process is a tool that should be used to develop your project **before** writing your proposal. Two additional pages are allowed for this information. More information and resources related to the logic model planning process are provided at http://www.csrees.usda.gov/funding/integrated/integrated_logic_model.html.

- The AFRI encourages integrated projects that develop content suitable for delivery through eXtension. This content is for "end users" as opposed to staff development and must align with the eXtension Guiding Principles, Implementation Plan and other requirements as presented at http://about.extension.org/university-researcher/. Funds may be used to contribute to an existing Community of Practice or to form a new Community of Practice as appropriate.

- The AFRI encourages integrated projects that lead to measurable, documented changes in learning, actions or conditions in Family and Consumer Sciences disciplines and/or projects suitable for 4-H audiences and stakeholder groups while meeting identified program priorities. 4-H projects should align with 4-H Mission mandates of Science, Engineering, Technology, Healthy Living or Citizenship. See guiding principles at http://www.national4-hheadquarters.gov/ <http://www.national4-hheadquarters.gov/ or contact your university Cooperative Extension headquarters or Family and Consumer Sciences State Leaders.

- Applications that do not address at least one of the stated integrated or research program priorities will be returned without review.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

FY 2009 Priorities for Research Projects – Applicants must address the following priority.

1. Fate and transport research projects should examine the fate and transport of emitted particulates and gases with specific emphasis placed on ammonia, nitrous oxide, and methane. Improved models are needed to predict movement and dispersion of air pollutants from agricultural production practices and management operations at both the local and regional scale. Process-based mechanistic models using mass balance techniques for component processes of the whole enterprise are of specific interest. Projects to better understand the processes controlling wet and dry deposition of reactive nitrogen compounds from agricultural sources are solicited.

Other Key Information for Research Projects

- **This is an integrated program. Please refer to Part III, A for eligibility criteria.**

- Applications that do not address at least one of the stated research program priorities will be returned without review.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

b. Biology of Weedy and Invasive Species in Agroecosystems

Program Code - 94240
National Program Leader – Dr. Michael Bowers (202-401-4510 or mbowers@csrees.usda.gov)
Total Program Funds – approximately $4.6 million
Proposed Budget Requests

- Proposed integrated project budget requests must not exceed $500,000 for project period of 2-4 years (including indirect costs).
- Requests exceeding the budgetary guidelines above will not be reviewed

Letter of Intent Deadline - April 20, 2009 (5:00 P.M., ET); see Part II, F for format and submission instructions
Anticipated Application Deadline - June 19, 2009 (5:00 P.M., ET); the firm deadline will be made available in the AFRI RFA.

Background

It has been estimated that approximately 50,000 species of plants and animals have been introduced into the United States resulting in more than $100 billion in losses and damage each year. Invasive species threaten biodiversity, habitat quality, and ecosystem function. It is estimated that invasive species have contributed to the decline of 42 percent of the endangered and threatened species in the United States . Non-indigenous weeds alone cost U.S. agriculture $7-27 billion per year. Exotic, invasive species are a particularly prevalent feature of agroecosystems and a major threat to food and fiber production. Increased globalization and climate change will likely increase the introduction, spread, and impact of invasive species.

The long-term (10-year) goal of the program is to provide ecologically and economically rational strategies for management, control, or elimination of weedy or invasive species in agroecosystems. The priorities for FY2009 focus on measuring impact of exotic and invasive species on ecosystem function and services.

FY 2009 Priorities for Integrated Projects - Applicants must address one of the following priorities which include research, extension, and education activity options:

1. Projects that focus on the abundance of weedy and invasive species and the individual and/or collective impacts of these species on a broad suite of ecosystem services, both market and non-market, and that can be used to evaluate tradeoffs of different management strategies Projects might investigate how different cultivation and *nutrient management* regimes/practices, past and current land use, or disturbance, including fire, pests, and grazing, affects the abundance of weedy and invasive species and how these species, in turn, impact the conditions and processes through which agroecosystems provide food, fuel, fiber, and fresh water or by regulating air quality, climate, *erosion control*, and human diseases. The education and/or

extension components should, through curriculum development, participatory workshops, demonstration projects, etc. provide farmers, the public and land managers with an understanding of the diverse and various impacts that weedy and invasive species have on ecosystem services under different management scenarios and programs.

2. Development, delivery, and implementation of ecologically-based, invasive species management programs (e.g. use of cover crops, grazing, tillage, and biocontrol agents) that include economic decision support tools to evaluate tradeoffs of different management strategies.

Other Key Information

- A letter of intent is required for this program. The letter of intent deadline is **April 20, 2009, by 5:00 P.M., Eastern Time**. See Part II, F for format and submission instructions.

- **This is an integrated program. Please refer to Part III, A for eligibility criteria.**

- The program will only consider projects that focus on the biology of weedy and invasive plant and animal species of economic importance to agriculture **and** that have direct and obvious relevance to the elimination, management, or control of invasive species in agroecosystems, which includes cropping systems, managed forests, conservation lands, or rangeland. Successful applications will establish links between fundamental biological or ecological relationships and invasive species management plans and strategies. Applications that do not meet the above criteria or do not address one of the priority areas will not be reviewed.

- **Appropriate mechanisms of information delivery** for the target audiences are required. Field-based programs, conferences, workshops, lay and peer-reviewed publications, websites with various software tools, and new or improved curriculum, are just a few of the strategies that may be helpful to elicit positive change.

- Project proposals must include at least two of the three components of the agricultural knowledge system (i.e., research, education, and extension). Each component should be represented by one or more objectives within the proposal. Projects must budget sufficient resources to carry out the proposed set of research, extension and/or education activities, with **no more than two-thirds** of a project's budget being allocated to a single knowledge area. Please see Part II.C.2 for a full listing of integrated project requirements, which should be followed closely to ensure success in the peer review process.

- Please see Part IV, A. for the criteria that will be used to evaluate integrated proposals. Applicants are also encouraged to see http://www.csrees.usda.gov/funding/integrated/integrated for an example of an integrated proposal and other grant-writing resources.

- Applications must include the elements of a logic model detailing the activities, outputs, and outcomes of the proposed project. This information may be provided as a narrative or formatted into a logic model chart. The logic model planning process is a tool that should be used to develop your project **before** writing your proposal. Two additional pages are allowed for this information. More information and resources related to the logic model planning process are provided at http://www.csrees.usda.gov/funding/integrated/integrated_logic_model.html.

- The AFRI encourages integrated projects that develop content suitable for delivery through eXtension. This content is for "end users" as opposed to staff development and must align with the eXtension Guiding Principles, Implementation Plan and other requirements as presented at http://about.extension.org/university-researcher/. Funds may be used to contribute to an existing Community of Practice or to form a new Community of Practice as appropriate.

- The AFRI encourages integrated projects that lead to measurable, documented changes in learning, actions or conditions in Family and Consumer Sciences disciplines and/or projects suitable for 4-H audiences and stakeholder groups while meeting identified program priorities. 4-H projects should align with 4-H Mission mandates of Science, Engineering, Technology, Healthy Living or Citizenship. See guiding principles at http://www.national4-hheadquarters.gov/ <http://www.national4-hheadquarters.gov/ or contact your university Cooperative Extension headquarters or Family and Consumer Sciences State Leaders.

- **New Project Opportunity: REE-NET –** The program will accept proposals that coordinate networking activities directed towards the research priority. These projects should move the field forward or create new research directions or opportunities through increased coordination, networking and synthesis. Moreover, these projects should: foster communication and promote collaboration among Research, Education, and Extension (REE) faculty with common interests across disciplinary, geographical, and organizational boundaries; establish networks and collaborations between faculty at Tier 1and 2 intuitions, and faculty at small, mid-size, and minority serving institutions (1890 land-grant institutions, Hispanic-serving Institutions, 1994 land-grant institutions); minimize isolation and maximize cooperation so as to eliminate unnecessary duplication of efforts; and coordinate the development of new tools and methods and generate community resources such as databases. Additional considerations include:

    - The size of a group/network will vary depending on the theme and needs of the proposed activity and may be regional, national, or international in scope.

    - Each network will include a diversity of members—from established researchers at tier 1 and 2 schools to new researchers, post-docs, graduate students, and faculty at small, mid-size, and minority serving institutions.

    - Each project will include a clearly defined management plan that includes a description of the specific roles and responsibilities of the PD/Coordinator and other members of the group/network. The management plan should include provisions for flexibility to allow the structure of the group to change over time as membership and the network's foci evolve.

    - Grants are expected to be no more than $50,000/yr for three or four years. Although REE-Net activities are expected to involve investigators from multiple sites, a single organization must serve as the submitting organization for each proposal. When the proposed activity involves generation of community resources such as databases, a plan for their timely release and the mechanism of sharing must be in place. In addition, there must be a plan for the long-term maintenance of such resources. The application must state in the first sentence in the summary that the project is a REE-Net proposal.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

c. Managed Ecosystems

Program Code - 94340
National Program Leader – Dr. Diana Jerkins (202-401-6996 or djerkins@csrees.usda.gov)
Total Program Funds – approximately $4.5 million for priorities from AFRI and $800,000 for priority 2 from NRCS-CEAP
Proposed Budget Requests –

- Proposed integrated project budget requests must not exceed $500,000 (including indirect costs).
- Requests exceeding the budgetary guidelines above will not be reviewed.

Letter of Intent Deadline – March 3, 2009 (5:00 P.M., ET); see Part II, F for format and submission instructions.
Anticipated Application Deadline – June 2, 2009 (5:00 P.M., Eastern Time); the firm deadline will be made available in the AFRI RFA.

Background
The goals of the Managed Ecosystems program are to protect and enhance agricultural production and the natural resource base and environment through the appropriate use and management of agricultural production systems; enhance economic opportunities by increasing productivity and ecosystem services; and improve the quality of life in rural America through improved environmental quality. The primary problem to be addressed is how to improve multi-functional agricultural production systems to be more economically and environmentally sustainable.

To meet these identified needs of agriculture, the long-term (10-year) goals for this program are: to develop, quantify, and verify predictive, multifunctional agroecosystem management systems and conduct experimental studies that will concurrently optimize resource use efficiency while increasing product and environmental quality; and develop indicators for land resource use assessment and quantify agroecosystem changes. Over the long term, projects will involve the design and verification of managed ecosystems, dissemination of decision support tools, and education about innovative management strategies and multi-functional research training.

This program will take a systems approach. Systems research is multidisciplinary and focuses on the interrelationship between management practices and response to biological, physical, economic, and social processes. A systems approach will be able to demonstrate agricultural sustainability and identify points of sensitivity and synergy between system components. Managed ecosystems that will be designed and evaluated must be multi-functional, i.e. provide agricultural products and other ecosystem services and lead to increased sustainability (system balance) over time.

For FY 2009, the program will be supporting two integrated priorities.

FY 2009 Priorities for <u>Integrated Projects</u> –

1. Understanding, delivery, and implementation of multifunctional agricultural production management systems. – **Research** should lead to a better understanding of the function and structure of key agroecosystems processes and mechanisms to produce agricultural products and ecosystem services in a non-polluting, resource enhancing agricultural production system. Example of activities could include: monitoring and quantification of ecosystem services provided under multi-functional agroecosystem management; identifying indicators appropriate to indicate agroecosystem sustainability: and management and economic trade-offs between functions. Research projects should be hypothesis-driven. Research should lead to management recommendations which are multifunctional (production and ecosystem services) and lead to improved ecosystem services and environmental quality. Valuation of potential economic return for production of agricultural and environmental services is strongly encouraged. **Extension** activities should develop management strategies, guidelines, decision support tools for producers. Extension efforts should lead to the development of programs to train producers about the use and value of new systems and how ecosystems function. These activities should lead to the adoption of new management strategies to improve the productivity and environmental quality of the agroecosystem. **Education** activities should develop educational methodologies for trans-disciplinary education for multi-functional agricultural management and production systems. Development of curricula on systems research procedures and/or ecological systems functions is encouraged. Systems production training and curricula that integrate economic analysis of ecosystem services, stakeholder decision making, and analysis of project outcomes is also encouraged. All activities **must** include multiple ecosystem services.

2. Biodiversity in working agroecosystems – What are the measurable biological responses to conservation activities in working range and pasture land agroecosystems at watershed or landscape scale? Projects should utilize interdisciplinary, mechanistic approaches to quantify the response of native or naturalized terrestrial and aquatic plant and animal species biodiversity to conservation practices applied in working range and pasture land agroecosystems. Priority will be given to projects that quantify biological responses involving multiple species at watershed or landscape scale. Findings on the biological effects of conservation practices in these agroecosystems must be translated into adaptive management recommendations and protocols for sustaining species studied.

Other Key Information for Integrated Projects

- A letter of intent is required for this program. The letter of intent deadline is March 3, 2009 **by 5:00 P.M., Eastern Time**. Format and content for the letter of intent can be found in Part II F.

- **This is an integrated program. Please refer to Part III, A for eligibility criteria.**

- Project proposals must include at least two of the three components of the agricultural knowledge system (i.e., research, education, and extension). Each component should be represented by one or more objectives within the proposal. Projects must budget sufficient resources to carry out the proposed set of research, extension and/or education activities, with **no more than two-thirds** of a project's budget being allocated to a single knowledge area. Please see Part II.C.2 for a full listing of integrated project requirements, which should be followed closely to ensure success in the peer review process.

- Please see Part IV, A. for the criteria that will be used to evaluate integrated proposals. Applicants are also encouraged to see http://www.csrees.usda.gov/funding/integrated/integrated for an example of an integrated proposal and other grant-writing resources.

- Applications must include the elements of a logic model detailing the activities, outputs, and outcomes of the proposed project. This information may be provided as a narrative or formatted into a logic model chart. The logic model planning process is a tool that should be used to develop your project **before** writing your proposal. Two additional pages are allowed for this information. More information and resources related to the logic model planning process are provided at http://www.csrees.usda.gov/funding/integrated/integrated_logic_model.html.

- The AFRI encourages integrated projects that develop content suitable for delivery through eXtension. This content is for "end users" as opposed to staff development and must align with the eXtension Guiding Principles, Implementation Plan and other requirements as presented at http://about.extension.org/university-researcher/. Funds may be used to contribute to an existing Community of Practice or to form a new Community of Practice as appropriate.

- The AFRI encourages integrated projects that lead to measurable, documented changes in learning, actions or conditions in Family and Consumer Sciences disciplines and/or projects suitable for 4-H audiences and stakeholder groups while meeting identified program priorities. 4-H projects should align with 4-H Mission mandates of Science, Engineering, Technology, Healthy Living or Citizenship. See guiding principles at http://www.national4-hheadquarters.gov/ <http://www.national4-hheadquarters.gov/ or contact your university Cooperative Extension headquarters or Family and Consumer Sciences State Leaders.

- Applicants must specify type of production system and ecosystem services being investigated.

- Applications must address agricultural production systems. Development of management strategies should be limited to the following areas: **Focus area 1:** 1) crop, 2) range, 3) forest, 4) shrub and grassland, 5) mixed land use. These systems may be at the rural level or urban agricultural interface. Animal systems may be incorporated as part of the listed production systems. **Focus area 2:** 1) rangeland, 2) pasture land.

- In **Focus area 1**, to better understand the interrelationship between agroecosystem functions, management systems being investigated must include multiple ecosystem services which are considered stacked or bundled. In **Focus area 2**, the primary required ecosystem service for investigation is biodiversity, but may also include other ecosystem services.

- For examples of ecosystem services see the Millennium Ecosystem Assessment reports, www.millenniumassessment**.**org

- If the project involves model development, the model should conceptualize either new or improve existing models. The project must include field testing for verification of the model. If model development is part of

the research effort, models should be predictive to allow for changes in the system over time as system functions respond/adapt to management practices and external drivers.

- **A project management plan** must be presented including milestones for principal activities, and how the project will engage partners and stakeholders such that they contribute to project assessment on an annual basis

- Proposals should indicate how the project expects to coordinate / synergize with other USDA and/or non-USDA efforts for the same area in a **one page PDF appendix file titled "Coordination with others"**.

- **Appropriate mechanisms of information delivery** for the target audiences are required. Field-based programs, conferences, workshops, lay and peer-reviewed publications, websites with various software tools, and new or improved curriculum, are just a few of the strategies that may be helpful to elicit positive change.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

d. Soil Processes

Program Code - 94440
National Program Leader − Dr. Nancy Cavallaro (202-401-4082 or ncavallaro@csrees.usda.gov)
Total Program Funds − approximately $4.1 million, including up to $450,000 for education projects
Proposed Budget Requests −

- Proposed research project budget requests must not exceed $450,000 for multi-institution proposals, or $350,000 for single institution projects for project periods of 2-4 years (including indirect costs).
- Proposed education project budget requests must not exceed $150,000 for a period of 2-3 years (including indirect costs).
- Requests exceeding budgetary guidelines above will not be reviewed.

Letter of Intent Deadline − January 16, 2009 (5:00 P.M., ET) **for research proposals only**; see Part II, F for format and submission instructions.
Anticipated Application Deadline − March 17, 2009 (5:00 P.M., ET); the firm deadline will be made available in the AFRI RFA.

Background
Soil is a vital natural resource that not only sustains plant and animal productivity, but also has profound effects on the health and quality of the environment. As such, agriculturally-related sustainability hinges on the interactions among the biological, chemical, and physical properties and processes in this below-ground ecosystem. Research is needed to fill knowledge gaps regarding interactions of the many dynamic soil properties and processes affecting soil quality as it relates to agricultural sustainability and agroecosystem goods and services in order to better manage this critical resource.

Soils play an important role in ecosystem scale processes and biogeochemical cycles at the catchment to regional scales, but it is critical to recognize the spatial and temporal variability of soil properties and processes, many of which occur only at microsites within the soil. These small-scale interfaces are of central importance to understanding the soil's role in many larger scale biogeochemical cycles and to improving soil management in field, plot, and farm. Soil scientists have the opportunity to significantly improve our understanding of the role soil plays in large scale environmental processes through utilization of ground-based observations and remotely sensed spatial data in concert with advanced tools to analyze microsite-, as well as meso-scale processes in these complex systems. Science-based knowledge is needed that leads to the clarification and understanding of the interactions among soil physical, chemical, and biological processes, their responses to changing conditions, and their impact on agroecosystems. Understanding these complex interactions related to isolated, as well as coupled processes requires an interdisciplinary approach that recognizes the unique matrix of the soil in place. Ultimately, this approach should lead to the development of practical tools, strategies, and predictive models that enhance sustainable agricultural

productivity at the farm level, while avoiding or ameliorating detrimental effects on natural resources and environmental health.

The long-term goal (10-year) for this program is to generate science-based knowledge that will lead to the development, adoption, and implementation of practices and tools that will ensure improved soil health and productivity and enhance soil-based ecosystem services. This means reduced contamination and increased efficiency of resource management and agricultural production, while maintaining soil and ecosystem health. It also will require improved predictive and conceptual models of dynamic soil properties and soil change for reducing negative impacts and feedbacks under changing conditions. Improving soil quality and health will increase productivity and enhance sustainability while protecting and enhancing the Nation's natural resources and environment. Important issues include a) carbon, nitrogen, and related nutrient dynamics under changing land use and management, b) trace gas exchange, and c) coupled physical, chemical, and biological processes including soils at depths beyond surface layers and thresholds of disturbance and recovery.

FY 2009 Priorities for Research Projects − Applicants must address at least one of the following priorities.

1. Interdisciplinary studies involving the interrelationships among soil physical, chemical, and biological characteristics and processes related to soil quality and sustainability, especially regarding water and nutrients in relation to agricultural quality, productivity, and environmental health.

2. Multi-scale research that can help bridge the gap between molecular and microscopic site process studies and field landscape and/or watershed-scale studies relating to soil quality.

3. Development and/or application of new or improved technologies, methodologies, tools, or strategies to enhance our understanding of biological, biogeochemical, and physical processes. In addition, these methods or tools should be used to enhance our understanding of dynamic properties in soils related to agricultural production, as well as soil and environmental health, focusing specifically on water, carbon, and nutrient cycles at multiple scales where appropriate.

Other Key Information

- A letter of intent is required for this program. The letter of intent deadline is **January 16, 2009, by 5:00 P.M., Eastern Time**. Format and content for the letter of intent can be found in Part II F.

- **This is a non-integrated program. Please refer to Part III, A for eligibility criteria.**

- **Applicants must articulate the relevance of their research to agriculture, range, and/or forestry.**

- Project results should have implications beyond the specific location(s) and time frame of the study. To that end, incorporation of process-based modeling into projects is encouraged.

- Proposed projects should be interdisciplinary and address relevant biotic and abiotic factors and processes. Projects may be fundamental or applied, but must address physical, chemical, and biological aspects from a point of view of the soil in situ.

- Model systems are appropriate, but must articulate steps needed to validate interpretations for application to the field.

- **REE-NET Proposals:** In 2009, this program will accept proposals that coordinate networking activities around one of the research priorities, specifically related to soil carbon stabilization and vulnerability. These projects should move the field forward or create new research directions or opportunities though increased coordination, networking, and synthesis. Moreover, these projects should foster communication and promote collaboration among research, education, and extensions (REE) faculty and research agencies and institutions with common interests across disciplinary, geographical, and organizational boundaries; establish networks and collaborations between Tier 1 and Tier 2 institutions or large research facilities and faculty at small, mid-sized, and minority serving institutions (1890s, HSIs and 1994s); minimize isolation and maximize cooperation so as to eliminate unnecessary duplication of efforts; and coordinate the

development of new tools and methods and generate community resources such as databases, sample archives, or instructional materials or facilities. Additional considerations include:

- The size of a group/network will vary depending on the theme and needs of the proposed activity, and may be regional, national or international in scope
- Each network will include a diversity of members – from established researchers to new researchers, post-docs, graduate students and faculty at small, mid-size, and minority serving institutions.
- Each project will include clearly defined management plans that include a description of the specific roles and responsibilities of the PD/Coordinator and other members of the group/network. The management plan should include provisions for flexibility to allow the structure or the group to change over time as membership and the network's foci evolve.
- Awards are expected to be no more that $50,000/yr for three or four years. Although REE NET activities are expected to involve investigators from multiple sites, a single organization must serve as the submitting organization for each proposal. When the proposed activity involves generation of community resources such as databases, a plan for their timely release and the mechanism of sharing must be in-place. In addition, there must be a plan for the long-term maintenance of such resources. The application must state in the first sentence of the project summary that the project is a REE NET proposal.

- Fate and transport of hormones and veterinary pharmaceutical will be addressed in the Water and Watersheds program. Applications addressing water quality combined with extension and education components should consider submission to the CSREES Integrated Research, Education, and Extension Competitive Grants Program National Integrated Water Quality program (http://www.csrees.usda.gov/funding/rfas/water_quality.html).

- Applications addressing soil insect and arthropod pests or soil-borne plant pathogens should consider submission to the CSREES Integrated Research, Education, and Extension program in Pest Management. From the Funding Ops Web page (www.csrees.usda.gov/fo/funding.cfm) select 'Pest Management' from the Emphasis Area pull down box and 'Integrated Programs' from the Program Group pull down box.

- Applications addressing interactions of plants and soil microbes should focus on the soil process. Interdisciplinary rhizosphere process studies are appropriate to this program, while studies focused on plant-microbe interactions or root processes within the plants and removed from the influence of the soil, should consider the Microbial Biology or Plant Biology programs.

- Applications that do not address at least one of the stated research program priorities will be returned without review.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

Soil Processes and Global Change Education:
Background and goals:
Soil processes exert a major influence on terrestrial carbon accumulation and loss, as well as on CO_2, methane, nitrous oxide, and other greenhouse gas fluxes from terrestrial ecosystems, and on water quality and availability. Thus they have a strong link to climate change. But many university soil science departments are being lost, renamed or merged with other disciplines, resulting in less national visibility. At the same time, there has been an overall decline in undergraduate student enrollment in soil science both nationally and internationally. Many professors note that graduate students in soil science often do not receive their undergraduate degree in soils and thus many lack the fundamental coursework required in undergraduate soils programs. Despite this, there is a growing recognition among earth systems scientists that soil science plays a major role in understanding many environmental problems, and major strides have been made in developing new methods and applying sophisticated and non traditional methods to the study of soil science.

One way to address these issues is to highlight and improve the relevance of soil science courses and curricula to emerging and urgent environmental and socio-economic issues such as global and climate change. In addition, there

is a particular need to incorporate fundamental soil science education into climate/global change analyses in order to understand the long-and short term consequences of climate change and to evaluate adaptation and mitigation strategies that would include land use, land management, and soil fertility management. The 2007 NRC recommendations to the U.S. Climate Change Science Program include addressing the need of the education community for a climate education framework, tools, and other resources for both formal and informal education. Whether students move on to careers in research, education, extension, business, policy or government, they will need a clear understanding of the links between climate change and soil processes and soil management to make responsible and environmentally sound decisions in the context of changing environmental conditions.

The goal of this education section of the Soil Processes Program is to promote graduate and undergraduate education in the area of soil science as it relates to global and climate change, and to highlight the importance of a strong understanding of soil processes in the development of models, scenarios, predictions, monitoring and analysis of climate impacts, adaptations, and mitigation strategies including related alternative energy options.

FY 2009 Priorities for Education Projects − Applicants must address the following priority

1. Development of innovative activities, courses or programs for either graduate and/or undergraduate students to incorporate climate change issues into soil science programs or integrate soil science curricula into climate change related courses, majors, or programs. Since soil science encompasses many sub-disciplines, activities should be interdisciplinary in nature. Integration of advanced and emerging research techniques such as advanced modeling methods, synchrotron radiation based techniques, visualizations, nanotechnology, genomics, and remote sensing is strongly encouraged.

Other Key Information for Education Projects

- **This is a non-integrated program. Please refer to Part III, A for eligibility criteria.**
- A letter of intent is not required for education projects submitted to this program.
- Proposals may request up to $150,000 for two to three years, including indirect costs.
- Please see Part IV, A. for the criteria that will be used to evaluate education proposals.
- Applications that do not address the stated education program priority will be returned without review.
- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

e. Water and Watersheds

Program Code - 94540
National Program Leaders –
Dr. James P. Dobrowolski (202-401-5016 or jdobrowolski@csrees.usda.gov)
Ms. Mary Ann Rozum (202) 401 – 4533 or mrozum@csrees.usda.gov
Total Program Funds – approximately $4.3 million
Proposed Budget Requests –

- Proposed research project budget requests must not exceed $400,000 for project period of 2-4 years (including indirect costs)
- Requests exceeding the budgetary guidelines will not be reviewed

Letter of Intent Deadline – Not required for this program.
Anticipated Application Deadline – April 15, 2009 (5:00 P.M., ET); the firm deadline will be made available in the AFRI RFA.

Background
The goals of the Water and Watersheds program are to protect and enhance the natural resource base and environment by improving and maintaining healthy watershed habitat and water supply protection; improve the quality of life in rural America through clean irrigation and livestock drinking water supplies.

The long term (10-year) goals for this program are 1) reduce veterinary pharmaceuticals and farm animal hormones in soil and water; 2) maintain adequate water supplies for agricultural crop and livestock production and rural water supplies; and 3) reduce pathogens such as bacteria, viruses, and protozoa in waters derived from agricultural and rural watersheds.

FY 2009 Priorities for Research Projects – applicants must address at least one of the following priorities:

1. Understand the source, fate and transport of veterinary pharmaceuticals and farm animal hormones in soil, surface and ground water, and irrigation systems of agricultural and rural watersheds to reduce their impact on human and aquatic habitat health.

2. Identify, evaluate and understand producer management behaviors that improve agricultural water conservation in crop, livestock and poultry, forest and range production with a multidisciplinary emphasis on a) projects that integrate hydrologic, economic, and policy components; b)social determinants of water use; and c)documented water savings, especially at spatial scales greater than a single field.

3. A national synthesis workshop proposal is requested for calendar year 2010 to summarize existing research on rural and agricultural pathogens of bacteria, viruses and protozoa to document the latest understanding of their sources, fate and transport, and possible mitigation measure, not to exceed $300,000.

Other Key Information

- **This is a non-integrated program. Please refer to Part III, A for eligibility criteria.**

- Applications addressing integrated research, education and extension for water resources should consider submission to the CSREES National Integrated Water Quality Program.

- Applications that do not address at least one of the stated research program priorities will not be reviewed.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

f. Global and Climate Change

Program Code - 94640
National Program Leaders –
Dr. Nancy Cavallaro (202-401-4028 or ncavallaro@csrees.usda.gov)
Dr. Louie Tupas (202-401-4926 or ltupas@csrees.usda.gov)
Total Program funds – Approximately $4.5 million will be available:

- Approximately $3.5 million total from AFRI
- Approximately $1 million total from EPA

Proposed budget requests-

- Proposed research project budget requests must not exceed $500,000 for projects up to 4 years (including indirect costs).

Letter of intent Deadline – Not required for this program.
Anticipated Application Deadline – For FY 2009 funds, this program element is in partnership with the Environmental Protection Agency (EPA) for the priority involving ecosystem services. Please note that proposals submitted for review for this program element must be submitted through EPA, in accordance with submission instructions outlined in a separate program solicitation. The program deadline can be found in the EPA solicitation.

Background
The Global and Climate Change program will support a joint NIFA-EPA request for applications on Enhancing Ecosystem Services from Agricultural Lands: Management, Quantification, and Developing Decision Support Tools. The sustainability of agriculture, forest and rangelands depends on understanding the factors that influence climate change, the mechanisms that may enhance or mitigate this change, and its effects on food and fiber production and natural resources. Program priorities are drawn primarily from the US Climate Change Strategic Plan (CCSP) (http://www.climatescience.gov/Library/stratplan2003/default.htm), and include human dimensions of these issues. Priorities are also guided by the CCSP Synthesis and Assessment Product 4.3: The Effects of Climate Change on Agriculture, Biodiversity, Land and Water Resources (http://www.climatescience.gov/Library/sap/sap4-3/default.php) The full Request for Applications will be released on the EPA Program website: http://es.epa.gov/ncer/rfa/. It may also be accessed from the AFRI website.

This year's solicitation will address issues of at risk ecosystem services in agricultural settings, including both agroecosystems and ecosystems that are impacted by agriculture, with the goal of quantifying these services, identifying risks due to different stressors, and developing strategies to reduce negative environmental impacts while enhancing ecosystem services provided by working lands. In addition to Climate Change, research addressing other stressors will also be supported by CSREES and EPA: Water Availability; Reactive Nitrogen; Pests, weeds and Invasive Species; and Soil and Land Degradation.

Past solicitations in CSREES's Global and Climate Change Program have included priorities in the areas of carbon cycle science, land use and land cover change, and invasive species.

Other Key Information
This is a non-integrated program. Please refer to Part III, A for eligibility criteria.

g. Sustainable Agroecosystems Science Long-Term Agroecosystem Program: Proof of Concept

Program Code - 94740
National Program Leader – Dr. Michael Bowers (202-401-4510 or mbowers@csrees.usda.gov)
Total Program Funds – approximately $1 million
Proposed Budget Requests –

- Proposed research project budget requests must not exceed $200,000 for project period of 2 years (including indirect costs).
- Requests exceeding the budgetary guidelines above will not be reviewed

Letter of Intent Deadline – not required for this program
Anticipated Application Deadline – March 2, 2009 (5:00 P.M., ET); the firm deadline will be made available in the AFRI RFA.

Background
With 50 percent of the land in the US categorized as agricultural, and an anticipated doubling of the agricultural yield by 2050 needed to support a growing human population, working lands will be under increasing pressure to produce fuel, fiber, and food. To meet this demand, agronomic systems may become increasingly dependent on inputs of fertilizer, water and pesticides. Such intensification of farming and the consequences to long-term ecological and economic sustainability are largely unknown. There is an urgent and pressing need to develop multidisciplinary research, education and extension programs that work continuously to link ecological, production and social processes in the long-term examination of agroecosystem dynamics. A program that holistically connects land management practices, human behavior and biogeochemistry should continually improve best management practices that are relevant, feasible and that are ecologically, economically and culturally sustainable.

Two interrelated goals of the Sustainable Agroecosystem Science (SAS) - Long-Term Agroecosystem Program **(**LTAP) are to: 1) connect land managers with researchers in the scientific and cultural assessment of current and novel farming practices; and 2) working to educate and extend this scientific knowledge to improve cropping and tillage systems such that they are ecologically, economically and culturally sustainable. A critical part of the

program is to engage extension to establish a network of land managers and farmers and connect them with researchers in the collective and collaborative study of long-term processes and the coupled dynamics of ecological, production, and socio-economic systems. The research should be hypothesis driven, inter-disciplinary, and employ experimental, observational, theoretical, and/or modeling approaches.

The Long Term Agroecosystem Program is relevant to all agency mission areas (Food and Fiber, Natural Resources and Environment, etc.), and most of the CSREES strategic goals, especially Goal 4, "Enhance protection safety of the nation's agriculture and food supply," and Goal 6, "Protect and enhance the nation's natural resource based and environment."

SAS-LTAP focus

The program is using an interdisciplinary, research, education and extension approach to understand the biophysical, ecological and cultural factors influencing soil ecology, especially those processes affecting soil carbon within and across farms, as well as the effect of soil carbon on agroecosystem functionality. An LTAP site will be comprised of a distributed system of farms that collectively capture at the watershed/regional scale the variation in existing conditions and management approaches practiced within a particular agriculture production system. Depending on funding, the budget for a SAS-LTAP team would be approximately $1 million/yr with duration of 10 years. This year, however applicants are limited by the proof of concept restrictions on budget and project period described above.

A detailed program of education can extend current knowledge to improve soil carbon storage. However, understanding the mechanisms and processes involved in soil ecosystems and the accumulation and loss of stored soil carbon provides an opportunity to refine and improve management strategies that increase carbon storage and decrease carbon loss, with potential long-term impacts on food security, economic viability and sustainability of farms and climate change. Soil is the largest reservoir of carbon in terrestrial ecosystems. Organic carbon in agricultural soils contributes positively to soil fertility and crop production. Changes in agricultural management to improve soil biotic and physical structure can increase or decrease soil organic carbon while, respectively, decreasing or increasing atmospheric carbon dioxide. Moreover, soil carbon plays central roles in the flow of energy through agroecosystems, and in defining the physical, chemical, and biological attributes of soils. Considering that the gross turnover of soil organic carbon can be more than 20 years in temperate regions, practices aimed at carbon management need to be evaluated on a decadal time scale or longer.

The focus of the program is to seek an improved understanding of the biogeochemical and socioeconomic mechanisms and processes governing soil ecological and carbon dynamics in order to better formulate soil carbon sequestration and production management strategies. Concomitant with this will be an effort to educate farmers and extend this knowledge while also providing valuable feedback to adjust research priorities among many unknowns. There is a need to approach the problem hierarchically: to understand how biogeochemical processes vary spatially and temporally across different management regimes; to understand how carbon sequestration influences and is influenced by the social and economic aspects of farming; and how this collective understanding might be incorporated into best management practices.

Key unanswered questions about the biogeochemical aspects of soil systems management include:

- How do agronomic inputs and extractable yield associated with different kinds of management impact soil biology and carbon storage in the short and long-term?

- What is the maximum potential carbon storage of a soil? How long does it take to attain the storage potential? How long does it reside there?

- How do changes in the global environment, such as increased atmospheric carbon dioxide levels and weather patterns (especially drought), impact soil carbon cycling?

- What is the relationship between the carbon-to-nitrogen ratio of crop residue to greenhouse gas emissions;

- What is the relationship between soil carbon and ecosystem functionality, especially soil biodiversity.

Key unanswered questions about soil systems from the land manager's perspective include:

- How does soil carbon management affect the short and long-term economics of farming, especially relative to yield and the costs of water, energy, fertilizer, and the control of weeds and pests, etc.?
- How is soil carbon management related to risk mitigation practices and the need to control short and long-term agronomic outputs?
- What is the potential to develop models and standards allowing carbon credits from agricultural systems to be traded on a carbon marketplace?
- What is the relationship between environmental stewardship, values, and soil carbon management? How might this change under different land ownership and changing social networks and demographics?

The interdisciplinary nature of the questions and the focus on problem-solving creates unique opportunities for education and extension.

Critical questions from an extension perspective might include:

- How best to establish a dynamic knowledge network of farmers, researchers and extension personnel around the issue soil carbon management that could work to immediately implement and evaluate current best management practices, identifying knowledge gaps for research ?

- Identify incentives for farmers to try new management methods. Critical questions from an education perspective might include:

- How do we train students to conduct transdisciplinary analyses of both the natural and human components of farming systems?

- How do we design student theses and dissertation projects around long-term integrated agroecosystem studies?

- How do we implement changes in curricula, hiring and reward at colleges and universities required to achieve this transdisciplinary approach to training and research?

It is assumed that an improved scientific-based understanding of the social, economic, and environmental benefits of managing carbon will eventually lead to local understanding, acceptance and support of novel farming strategies. Knowledge related to the biophysical dimensions of agroecosystems is useful only if people "choose" to use this knowledge to guide their actions. Employing a participatory approach and a partnership involving farmers, land managers, and faculty engaged in research, teaching and extension, guarantees the LTAP will be stakeholder driven and, therefore, stakeholder relevant.

SAS-LTAP Proof of Concept Proposals

In this RFA we are exploring the feasibility of SAS-LTAP projects through two-year, proof-of concept proposals that will develop the intellectual, analytical, and organizational structure that could form the foundation for a full SAS-LTAP site proposal. A SAS-LTAP Proof of Concept proposal should: i) develop the intellectual context for the development of a SAS- LTAP site including the major question(s) to be addressed around the topic of soil ecosystems and carbon management, ii) justify focusing on a particular production system (or systems) and a particular site comprised of a network of farms (combining local studies in a regional approach); and 3) plan for innovative and/or integrative approaches, and the anticipated roles of training, education, and extension.

More specifically, proof of concept proposals should describe approaches, activities and timelines that would:

- Establish an interdisciplinary team of researchers, a community of land managers, farmers, etc., and extension personnel and educators. Detail the methods and approaches that will be used to communicate

between and within the distributed network of sites/farms in a region in the creation of a dynamic and collaborative knowledge system.

- Establish a unifying conceptual framework and a detailed strategy for integrating the ecological and biophysical processes impacting soil carbon with the socioeconomic and cultural processes that underlies soil management. This should include explicit consideration of scale issues (e.g., field versus farm level approaches), experimental design, and an identification of the externalities.
- Establish an analytic strategy for comparing and synthesizing data both temporally and spatially with explicit treatment of 1) how the distributed network of sites/farms in a region figure into the statistical design; and 2) the questions being asked and the statistical power associated with each. Moreover, since initially there will be only one LTAP in one particular region, probably representing a single production system, what would the strategy be for expanding the domain of the study so that hypotheses are generalizable to other regions and perhaps even other production systems? This strategy might include documenting, collating and performing meta-analysis of existing data, forming collaborations with ARS, LTER, or NEON sites or cooperating Agricultural Experiment Stations.
- Explain how the resulting data may inform existing models or lead to the development of new models that address the issue of soil carbon management.
- Establish a plan for data quality assurance and control, archiving, and availability to the public.
- Explain the organizational and management structure to reach your research, extension and educational objectives.
- Establish short and long-term (10 year) expected deliverables, outcomes and impacts using a logic model approach. Deliverables might include research to fill knowledge gaps that are critical to the development of practices and programs addressing soil carbon management, educational deliverables (e.g., interdisciplinary curricula and/or experiential learning for graduate and undergraduate students) that will train the next generation of scientists and educators, and best management practices that extension can help land managers implement.

Other Key Information

- **This is a non-integrated program. Please refer to Part III, A for eligibility criteria.**

h. Enhancing Ecosystem Services from Agricultural Lands: Management, Quantification, and Developing Decision Support Tools

Program Code - 94340
National Program Leader –
Dr. Diana Jerkins (202-401-6996 or djerkins@csrees.usda.gov)
Dr. Anne Sergeant (202-343-9661 or sergeant.anne@epa.gov)
Total Program Funds – approximately $4.5 million
Proposed Budget Requests –

- Proposed research project budget requests must not exceed $500,000 for project period of 4 years (including indirect costs).
- Requests exceeding the budgetary guidelines above will not be reviewed

Letter of Intent Deadline – no required for this program
Anticipated Application Deadline – See the Enhancing Ecosystem Services from Agricultural Lands: Management, Quantification, and Developing Decision Support Tools RFA at the EPA Web site: http://es.epa.gov/ncer/rfa/forms/. RFA is anticipated December 2009.

The U. S. Department of Agriculture (USDA), as part of its AFRI Competitive Grants Program and the U.S. Environmental Protection Agency (EPA), as part of its Science to Achieve Results (STAR) program, are seeking

applications proposing research on the ecosystem services provided by agricultural lands. Ecosystem services are the goods and services derived from natural and managed ecosystems upon which human welfare depends. Because of the global intensification of land use, these services are in decline, especially in agricultural ecosystems. Ecosystem services are essential in maintaining both human welfare as well as ecological integrity, yet these services can be affected by natural changes and management actions. In addition, agricultural lands are experiencing significant land use changes as demonstrated by the rapid conversion of these lands from traditional farming use, to alternate farming practices, to urban development, and to non-agricultural use.

This program is being co-supported by multiple AFRI programs: Global and Climate Change, Water Management, Air Quality, Biology of Weedy and Invasive Species in Agroecosystems, Soil Processes, and Managed Ecosystems. Ecosystem services of interested will be related to climate change, water availability, reactive nitrogen, pests, weeds, and invasive species, and soil and land degradation.

Other Key Information

- **This is a <u>non-integrated program</u>. Please refer to Part III, A for eligibility criteria.**

E.5. Agriculture Systems and Technology

The Agriculture Systems and Technology area addresses agency strategic goals to enhance the competitiveness and sustainability of rural and farm economies and to enhance international competitiveness of American agriculture. Activities supported in this area also generate knowledge that support agency strategic goals to support increased economic opportunities, improved quality of life in rural America, to enhance protection and safety of the Nation's agriculture and food supply, and improve human health and wellness.

Programs in this cluster range from fundamental research to applied research on product development, process improvement, and engineering technologies, including:

- New uses and new products from traditional and nontraditional crops, animals, byproducts, and natural resources
- Novel tools and products based on nanoscale understanding and control of materials
- Robotics, energy efficiency, computing, and expert systems
- New hazard and risk assessment and mitigation measures
- Water quality and management

The scientific knowledge generated will lead to new and improved uses for agricultural and forestry biomass in bioenergy and industrial applications and apply cutting edge technologies and tools, such as nanotechnology, genomics, proteomics, and metabolic engineering, to ensure that agricultural production in the U.S. remains competitive, innovative, and sustainable.

In FY 2009 the AFRI invites applications in the following programs in the Agriculture Systems and Technology area:

a. Biobased Products and Bioenergy Production Research
b. Nanoscale Science and Engineering for Agriculture and Food Systems

The following cross-cutting AFRI programs also contribute to the goals of the Agriculture Systems and Technology area:

Managed Ecosystem
Water and Watersheds
Food Safety and Epidemiology
Markets and Trade
Improving Food Quality & Value
Disaster Resilience in Rural Communities

a. Biobased Products and Bioenergy Production Research

Program Code - 95150
National Program Leader – Dr. Chavonda Jacobs-Young (202-401-6188 or cjacobs@csrees.usda.gov)
Total Program Funds – approximately $5.4 million, with up to $4.4 million for research projects and up to $1million for education projects.
Proposed Budget Requests –

- Proposed research project budget requests must not exceed $500,000 for project period of 2-4 years (including indirect costs).
- Proposed education project budget requests must not exceed $1million for project periods of 4 years (including indirect costs).
- Requests exceeding the budgetary guidelines above will be returned without review.

Letter of Intent Deadline – February 11, 2009 (5:00 P.M. ET) **for research projects only**; see Part II, F for format and submission instructions.

Anticipated Application Deadline – April 2, 2009 (5:00 P.M., ET); the firm deadline will be made available in the AFRI RFA.

Background
The Biobased Products and Bioenergy Production Research Program promotes the production of economically and environmentally sustainable biobased industrial products and fuels. Program activities will expand science-based knowledge and technologies needed to advance the conversion of post harvest agricultural and forestry residuals into value-added industrial products and biofuels.

The long term goals (10-years) for the program include increasing the sustainable production of fuels, chemicals, and materials from biomass; increasing the inventory of biobased products for replacement of petroleum based products; and the reduction of costs associated with the conversion of biomass to fuels and industrial products by developing biocatalysts that can convert low cost agricultural and forestry feedstocks.

FY 2009 Priorities for Research Projects – Applicants must address at least one of the following priorities.

1. Improvement/Development of economically and environmentally sustainable biocatalysts. The program is specifically seeking applications which produce biocatalysts that are more resistant to inhibitors, capable of degrading multiple sugar types and capable of increasing product yield in the biological conversion of agricultural and forestry lignocellulosic biomass to value-added industrial products and fuels.

2. Improved production and processing technologies for the economically and environmentally sustainable biological conversion of agricultural and forestry lignocellulosic biomass for the production of high-value industrial biobased products and fuels. The program is seeking applications which specifically address the long term goal of single stage fermentation, and other conversion steps that limit the efficiency of the biological production of fuels and industrial biobased products from agricultural and forestry residuals.; and

3. Novel, economically and environmentally sustainable agriculturally based industrial biobased products which are direct substitutes for traditionally petroleum based products. Products must be innovative and demonstrate the potential for economic competitiveness within the next 10 years.

Other Key Information for Research Projects

- A letter of intent is required for this program. The letter of intent deadline is **February 11, 2009 by 5:00 P.M., Eastern Time**. Format and content for the letter of intent can be found in Part II, F.

- **This is a non-integrated program. Please refer to Part III, A for eligibility criteria.**

- Applications that focus on plant biochemistry should be submitted to the Plant Biology: Biochemistry Program. Animal feed, fertilizer, bioremediation, thermo-chemical processes (i.e., pyrolysis, gasification), syngas production or conversion, algae, market analysis, and economic analysis applications should not be submitted to this program.

- Engine performance testing and emissions characterization will not be supported.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

FY 2009 Priority for Education Projects – Applicants must address the following priority.

1. Development of innovative, multidisciplinary, research-based, graduate education and training activities to support the production of sustainable value-added biobased products and fuels. Participation by faculty from collaborative departments (e.g. plant science, microbiology, engineering, marketing) is encouraged, as are submissions involving multiple institutions. Students should gain strengths in multiple disciplines while maintaining competence in their major field by focusing on problem-oriented rather than discipline-oriented education and research. The project should offer training and experience relevant to both academic and nonacademic careers by linking graduate education and research, through internships and

mentoring, with research and extension in industry, national laboratory, or other settings. Students supported by the project should choose a research problem that integrates multiple disciplines (including biological sciences, chemistry, and engineering) in working toward a tangible solution to a practical problem.

Other Key Information for Education Projects

- A letter of intent is not required for education projects submitted to this program.
- **This is a non-integrated program. Please refer to Part III, A for eligibility criteria.**
- Proposals may request up to $1 million for four years, including indirect costs. The contribution to the graduate stipend is up to $30,000 per year per student, accompanied with a tuition allowance of up to $12,000 per year per student.
- Please see Part IV, A. for the criteria that will be used to evaluate education proposals.
- Applications that do not address the stated education program priority will be returned without review.
- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

b. Nanoscale Science and Engineering for Agriculture and Food Systems

Program Code - 95250
National Program Leader – Dr. Hongda Chen (202-401-6497 or hchen@csrees.usda.org)
Total Program Funds – anticipated funding at approximately $ 5 million in FY 2010
Proposed Budget Requests – **Not accepting applications for FY 2009**
Letter of Intent – Not required for this program.
Application Deadline – Nanoscale Science and Engineering for Agriculture and Food Systems will not be offered in FY 2009. This program will be offered in alternate years and will be accepting applications for the first time in FY 2010.

E.6. Agriculture Economics and Rural Communities

Perhaps at no other time in recent history have there been so many different social, economic, and technological challenges and opportunities affecting agriculture and rural communities as evidenced in recent years. Therefore, the focus of the Agricultural Economics and Rural Communities Area is on the following four topics: (1) increasing the competitiveness of US agriculture; (2) enhancing the sustainability of small and medium-sized farms; (3) improving the quality of life and reducing poverty in rural areas; and (4) reducing the vulnerability of rural communities to natural disasters and chronic health problems.

Success of U.S. agriculture and rural communities is increasingly dependent on maintaining and expanding domestic and international markets. It is also dependent on the development of new products, production practices, and business and marketing tools and information that enhance efficiency, equity and the competitiveness of the producer. However, the new technology and increasing markets have not benefitted all producers or rural communities. Primarily because of technological changes and associated growth in corporate farming, the medium sized farms are disappearing, with US agriculture increasingly reflecting a bimodal structure. Small and medium-sized farms are challenged by limited economic opportunities and increasing concerns about environmental quality. Although farming, including forestry continues to be an important source of income, most of rural America is moving from agrarian to post-agrarian economies. Despite decades of intervention and billions of dollars in public investment, many rural residents have a lower quality of life than many urban residents and rural poverty continues to persist as one of the most stubborn social problems. Some communities are facing economic decline and rural exodus, while other regions, especially coastal and mountainous areas, have experienced increased economic growth and new resident influx. Economic growth and population changes have made some communities more vulnerable to natural disasters and chronic health problems, such as obesity.

The overall goals of the Agricultural Economics and Rural Communities cluster are to:

1) develop strategies for entering into and being competitive in domestic and overseas markets;
2) enhance farm efficiency and sustainability, including the viability and competitiveness of small and medium sized forestry, dairy, livestock, and crops in rural and peri-urban areas;
3) improve choices and increase applications of technology, including new decision tools for farm and market systems;
4) develop new hazard and risk assessment and mitigation measures and tools for applications in agriculture and rural communities; and
5) develop and disseminate new approaches to rural development, including rural entrepreneurship, small business development, rural workforce development and environmental protection and enhancement.

The AFRI cluster on Agricultural Economics and Rural Communities accepts applications to the following programs:

a. Agribusiness Markets and Trade
b. Agricultural Prosperity for Small and Medium-sized Farms
c. Rural Development

The Agricultural Economics and Rural Communities cluster primarily addresses CSREES' strategic goal to enhance the competitiveness and sustainability of rural and farm economies. It also supports CSREES' strategic goal of enhancing the international competitiveness of American agriculture.

The following cross-cutting AFRI programs also contribute to the goals of the Agricultural Economics and Rural Communities area:

Managed Ecosystems
Biobased Products and Bioenergy Production Research
Human Nutrition and Obesity
Water and Watersheds
Biology of Weedy and Invasive Species in Agroecosystems
Air Quality

Nanoscale Science and Engineering for Agriculture and Food Systems

a. Agribusiness Markets and Trade

Program Code - 96160
National Program Leader –
Dr. S. (Suresh) Sureshwaran (202-720-7536 or ssureshwaran@csrees.usda.gov)
Dr. Henry Bahn (202-720-8143 or hbahn@csrees.usda.gov)
Total Program Funds – anticipated funding at approximately $4.6 million
Proposed Budget Requests –

- Proposed research project budget requests must not exceed $400,000 for multi-institution for project period of 2-4 years (including indirect costs).
- Proposed research project budget requests must not exceed $325,000 for a single institution for project period of 2-4 years (including indirect costs).
- Requests exceeding the budgetary guidelines above will not be reviewed.

Letter of Intent – Not required for this program.
Anticipated Application Deadline – May 15, 2009 (5:00 P.M., ET); the firm deadline will be made available in the AFRI RFA.

Background
Success of the U.S. economy in general, and agribusiness and rural communities in particular, is increasingly dependent on maintaining and expanding domestic and international markets. It is also dependent on the development of new products, production practices, and business and marketing tools and information that enhance efficiency, equity, and the competitiveness of the producer. The Agribusiness Markets and Trade program is designed to maintain and expand domestic and international markets and to identify public policies and private strategies that may be employed to enhance efficiency, equity, and the competitiveness of the U.S. agribusiness sector.

Industrialization, increased concentration and the trend towards industrial clusters in agriculture, has caused concern about the long-run structure and viability of the agricultural sector. To maintain and enhance the efficiency and equity of the U.S. agribusiness sector, new science based information is continuously needed, especially on the structure, conduct, and performance of firms in different industries; effects of integration on producers, prices, etc; and the impacts of food chain clusters on independent producers, markets, etc. To maintain and expand international market opportunities for U.S. agribusiness, more research is needed on rapid changes in consumer demand for agricultural products, the impacts of expanding agricultural markets on domestic producers and consumers, the benefits and costs of regulation, and alternative market solutions; the influence of existing and new policy and technology, etc. The competitiveness of the U.S. agribusiness sector is determined by new product development and placement of these products in the value chain. Therefore, to enhance competitiveness, the agribusiness sector needs research based information on marketing new products, including packaging, labeling, etc; on product differentiation, including characteristics, production process, geographic origin, etc; impacts of changing demand patterns for differentiated products, etc.

The Agribusiness Markets and Trade program seeks to achieve three objectives during the next ten years: (1) provide knowledge to enhance economic efficiency and equity in U.S. agribusiness sector; (2) support research that builds international market opportunities; and (3) provide economic analysis to assist with new product development and insertion in the value chain for value-added plant, animal and bio-based products.

FY 2009 Priority for Research Projects

1. Enhance understanding of the changes in agribusiness structure and conduct, as well as its effectiveness in the development of markets at home and abroad.

2. Provide knowledge to increase market access and reduce trade impediments for major agricultural products.

3. Develop new models and theories to enhance understanding of changes in domestic and foreign consumer tastes and preferences.

Other Key Information

- **This is a non-integrated program. Please refer to Part III, A for eligibility criteria.**

- The program is Agribusiness Marketing and Trade. Agribusiness is an enterprise that derives a significant portion of its revenues from sales of agricultural products or sales to agricultural producers.

- Applications that do not address at least one of the stated research program priorities will not be reviewed.

- Applications addressing these priority areas are invited from any social or behavioral science discipline, business, management, or engineering, or interdisciplinary team. A wide range of theoretical and applied quantitative and qualitative methodological approaches is welcome, but applicants are strongly advised to specify their theory and methods on a level that a multidisciplinary review panel will understand.

- Applications with topics specific to small and mid-size farm viability or agricultural development should be directed to the Agricultural Prosperity for Small and Medium-Sized Farms Program. Applications related to risk, risk management issues, or risk management instruments and tools should be directed to the competitive programs of the USDA Risk Management Agency.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

b. Agricultural Prosperity for Small and Medium-sized Farms

Program Code - 96360
National Program Leaders –
Dr. Suresh Sureshwaran (202-720-7536 or ssureshwaran@csrees.usda.gov)
Dr. Diana Jerkins (202-401-6996 or djerkins@csrees.usda.gov)
Total Program Funds – approximately $4.8 million
Proposed Budget Requests –

- Proposed integrated project budget requests must not exceed $500,000 for multi-institution for project period of 2-4 years (including indirect costs).
- Proposed integrated project budget requests must not exceed $400,000 for a single institution for project period of 2-4 years (including indirect costs).
- Requests exceeding the budgetary guidelines above will not be reviewed.

Letter of Intent – Not required for this program.
Anticipated Application Deadline – June 5, 2009 (5:00 P.M. ET); the firm deadline will be made available in the AFRI RFA.

Background

Small and medium-sized farms are challenged by limited economic opportunities and increasing concerns about environmental quality, as indicated by their low value of agricultural products sold, decreasing share of the food dollar, and the perceived trade-off between agricultural sustainability and economic viability. In recent years, these challenges have been magnified by changes in market conditions caused by tremendous demographic shifts, new global markets and vertical integration, and the increasing competition for farm land for non-agricultural uses. Therefore, the purpose of this program is to foster interdisciplinary projects that enhance interactions between the economic and environmental components important to the long-term viability, competitiveness and efficiency of small and medium-sized farms (including social, biological and other components, if necessary). These include small and medium-sized dairy, livestock, forestry, crop and other commodity operations. While small and medium-sized farms with less than $500,000 in annual sales account for less than 25 percent of the value of all agricultural

products sold in the U.S., the long-term viability of these farms is critical to the prosperity of rural people and places as these farms account for approximately 92 percent of all farms in the U.S. Therefore, the program will also foster interdisciplinary studies to enhance income accruing to small and medium-sized farms through value-added activities and in turn, their contribution to rural prosperity.

To meet these identified needs of agriculture, the long-term (10 year) goals for this program are: increase the value of agricultural products sold per farm by small and medium-sized farms through the adoption of environmentally sustainable, economically viable best management practices; increase the share of the food dollar accruing to the small and medium-sized farms and to rural communities by creating on-farm value added activities based on enhanced knowledge of the interactions between changing consumer needs, environmental and economic viability; and adopt sustainable practices that will enhance the economic value of the land, operated by small and medium-sized farms, in agricultural use.

FY 2009 Priorities for Integrated Projects – Applicants must address at least one of the following priorities. Research and Education or Research and Extension:

1. Increasing the productivity and profitability of new and existing small and medium sized farms, including forestland and ranches, through education and extension programs based on new knowledge generated by research on factors that advance the economic and environmental integration of on-farm agricultural production and soil and water conservation practices.

2. Identification and dissemination of information to enhance the net economic, environmental and social benefits to small and medium-sized farms of on- and off-farm agricultural business activities, including impacts of innovative marketing and regional food systems, off-farm employment, development of new markets/applications for materials derived from thinning of forestlands, etc.

Research and Education:

3. Through innovative research-based education projects enhance the understanding of students and current and future policymakers, farmers and others on how land use change, farm entrepreneurship, farm transition and farm entry issues affect the prosperity of small and medium-sized farms.

Other Key Information

- **This is an integrated program. Please refer to Part III, A for eligibility criteria.**

- Project proposals must include at least two of the three components of the agricultural knowledge system (i.e., research, education, and extension). Each component should be represented by one or more objectives within the proposal. Projects must budget sufficient resources to carry out the proposed set of research, extension and/or education activities, with **no more than two-thirds** of a project's budget being allocated to a single knowledge area. Please see Part II.C.2 for a full listing of integrated project requirements, which should be followed closely to ensure success in the peer review process.

- Please see Part IV, A. for the criteria that will be used to evaluate integrated proposals. Applicants are also encouraged to see http://www.csrees.usda.gov/funding/integrated/integrated for an example of an integrated proposal and other grant-writing resources.

- Applications must include the elements of a logic model detailing the activities, outputs, and outcomes of the proposed project. This information may be provided as a narrative or formatted into a logic model chart. The logic model planning process is a tool that should be used to develop your project **before** writing your proposal. Two additional pages are allowed for this information. More information and resources related to the logic model planning process are provided at http://www.csrees.usda.gov/funding/integrated/integrated_logic_model.html.

- The AFRI encourages integrated projects that develop content suitable for delivery through eXtension. This content is for "end users" as opposed to staff development and must align with the eXtension Guiding Principles, Implementation Plan and other requirements as presented at

http://about.extension.org/university-researcher/. Funds may be used to contribute to an existing Community of Practice or to form a new Community of Practice as appropriate.

- The AFRI encourages integrated projects that lead to measurable, documented changes in learning, actions or conditions in Family and Consumer Sciences disciplines and/or projects suitable for 4-H audiences and stakeholder groups while meeting identified program priorities. 4-H projects should align with 4-H Mission mandates of Science, Engineering, Technology, Healthy Living or Citizenship. See guiding principles at http://www.national4-hheadquarters.gov/ <http://www.national4-hheadquarters.gov/ or contact your university Cooperative Extension headquarters or Family and Consumer Sciences State Leaders.

- The Agricultural Prosperity for Small and Medium-Sized Farms program encourages projects that enhance project staff, including graduate student, interactions with teachers in K-12 schools to share their research findings, improve communication and team building skills, enhance curriculum for and enrich learning and interest in agricultural science education among K-12 students (including social sciences), and help strengthen partnerships between institutions of higher education and local school districts

- Applications should be interdisciplinary and focused on the economic profitability and the environmental sustainability of small and medium-sized farms.

- Applications that focus on community development activities not directly related to agriculture should be directed to the Rural Development Program., which anticipates accepting applications in FY 2010. Applications not focused on the profitability and viability of small and medium-sized farms should not be directed to this program.

- Applications that do not address at least one of the stated integrated program priorities will not be reviewed.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

c. Rural Development

Program Code - 96260
National Program Leaders – Dr. Suresh Sureshwaran (202-720-7536 or ssureshwaran@csrees.usda.gov)
Total Program Funds – approximately $4.6 million
Proposed Budget Requests – **Not accepting applications for FY 2009**
Letter of Intent – Not required for this program.
Application Deadline – Rural Development program will not be offered in FY 2009. This program will be offered in alternate years and anticipates accepting applications for the first time in FY 2010.

Background
During the last 30 years, dramatic social, economic, and technological changes have occurred in many rural areas in the United States. Although farming, including forestry, continues to be an important source of income, most of rural America is moving from agrarian to post-agrarian economies. Some communities are facing economic decline and rural exodus, while other regions, especially coastal and mountainous areas, have experienced increased economic growth and new resident influx. However, these changes have not benefited all rural people.

Despite decades of intervention and billions of dollars in public investment, many rural residents have a lower quality of life than many urban residents. Economic development and employment have been hampered by the lack of trained workforce, entrepreneurship skills, public services, and sufficient market size for the provision of some goods and services. Rural poverty remains as one of the most difficult social problems facing legislators and other public policy makers. Some industrial development strategies have adversely affected the environment and the long term sustainability of viable economic development. In addition, population gain driven by migration has increased

diversity. The influx of migrant labor and senior citizens, as well as the exodus of educated youth may have exacerbated the decrease in economic vitality and increased poverty in some rural communities.

To meet these identified problems and opportunities of rural development, the long-term (10 year) goal for this program is to help develop sustainable rural communities through integrated projects focused on: 1) enhancing economic vitality of rural communities and, in turn, reduce rural poverty; 2) protecting and enhancing economic growth and the natural resource base of rural areas by developing strategies that reduce the competition between economic growth and the environment; and 3) building a diversified workforce to meet the needs of the present and for the future.

FY 2010 Priorities for Integrated Projects – Applicants must address at least one of the following priorities.

1. Enhance knowledge, evaluate policy options, and implement practical strategies to create employment opportunities and income growth, including appropriate entrepreneurship and small business development strategies (especially agribusinesses that enhance the sustainability of agriculture and forestry).

2. Estimate the costs, benefits, and societal impacts of protecting the environment, using market and non market techniques, and implement practical strategies to enhance ecosystem services while promoting economic development and employment growth.

3. Enhance understanding of and develop innovative strategies to build the rural workforce for the present and for the future, including projects to attract and retain rural youth.

Other Key Information

- **This is an integrated program. Please refer to Part III, A for eligibility criteria.**

- Project proposals must include a research component and either an extension or education component. It may also contain all three components of the agricultural knowledge system (i.e., research, education, and extension). Project proposals may not consist of a combination of only education and extension components. Each component should be represented by one or more objectives within the proposal. Projects must budget sufficient resources to carry out the proposed set of research and extension or education activities, with **no more than two-thirds** of a project's budget being allocated to a single knowledge area. Please see Part II.C.2 for a full listing of integrated project requirements, which should be followed closely to ensure success in the peer review process.

- Please see Part IV, A. for the criteria that will be used to evaluate integrated proposals. Applicants are also encouraged to see http://www.csrees.usda.gov/funding/integrated/integrated for an example of an integrated proposal and other grant-writing resources.

- Applications must include the elements of a logic model detailing the activities, outputs, and outcomes of the proposed project. This information may be provided as a narrative or formatted into a logic model chart. The logic model planning process is a tool that should be used to develop your project **before** writing your proposal. Two additional pages are allowed for this information. More information and resources related to the logic model planning process are provided at http://www.csrees.usda.gov/funding/integrated/integrated_logic_model.html.

- The AFRI encourages integrated projects that develop content suitable for delivery through eXtension. This content is for "end users" as opposed to staff development and must align with the eXtension Guiding Principles, Implementation Plan and other requirements as presented at http://about.extension.org/university-researcher/. Funds may be used to contribute to an existing Community of Practice or to form a new Community of Practice as appropriate.

- The AFRI encourages integrated projects that lead to measurable, documented changes in learning, actions or conditions in Family and Consumer Sciences disciplines and/or projects suitable for 4-H audiences and stakeholder groups while meeting identified program priorities. 4-H projects should align with 4-H Mission mandates of Science, Engineering, Technology, Healthy Living or Citizenship. See guiding

principles at http://www.national4-hheadquarters.gov/ <http://www.national4-hheadquarters.gov/ or contact your university Cooperative Extension headquarters or Family and Consumer Sciences State Leaders.

- Integrated projects that identify and recruit undergraduate students for pipelining into graduate programs in rural development or related disciplines are particularly encouraged. Such training and experiential learning component must go beyond the level of laboratory or other data collection and analysis projects. Examples of education projects include curriculum and/or degree program development in rural development, multi-college/university/department approaches to mentoring and experiential learning in rural development, faculty sharing, and joint degrees. The education component is expected to describe institutional resources and must clearly indicate how and why the proposed new curriculum or degree will complement, enhance, or replace any existing curriculum or programs at the institution and help promote rural development. Projects should also include plans for assessment and performance outcome measurement for continuation or expansion beyond the period of USDA support and potentially for tracking of participant accomplishments after course completion.

- Interdisciplinary applications focused on the creation of sustainable rural communities by protecting the environment, reducing poverty, and enhancing community economic vitality are strongly encouraged.

- Applications that focus on small and medium-sized farms and not directly related to the larger rural community should be directed to the Agricultural Prosperity for Small and Medium-Sized Farms program. Applications not focused on rural community development should not be directed to this program.

- Applications that do not address at least one of the stated integrated program priorities will not be reviewed.

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

E.7. Rapid Response Food and Agricultural Science for Emergency Issues

Program Code - 97100
National Program Leader – Dr. Mark Poth (202-401-5244 or mpoth@csrees.usda.gov)
Total Program Funds - $1,000,000
Proposed Budget Requests –

- Proposed integrated or research project budgets must not exceed $250,000 (including indirect costs) for a project period up to 2 years.
- Requests exceeding the budgetary guidelines will not be reviewed.

Letter of Intent Deadline – Immediately; see Part II, F for format and submission instructions.
Anticipated Application Deadline – Submit any time from the time of release of the Request for Applications to July 30, 2009 (5:00 P.M., ET); the firm deadline will be made available in the AFRI RFA. Applications will be reviewed and considered as they are submitted on an ongoing basis.

Background
Issues such as pathogens in packaged spinach or the loss of honey bees due to colony collapse disorder can cause immediate problems for agriculture. This program is a mechanism to rapidly provide the science necessary to more effectively respond to important emergency issues vital to agriculture, food science and related natural and human resources. The issues addressed by the program will be of an urgent and time sensitive nature and have a dramatic impact on agriculture, the food system or related resources. Considerable effort in working with stakeholders goes into structuring the programs and priorities for the Agriculture and Food Research Initiative (AFRI) Request for Applications (RFA) across the six emphasis areas. However, as time moves on there are emergency issues in agriculture and food science that are so critically important that a rapid response —before the next AFRI RFA release (i.e. FY2010) — is justified. This program is designed to meet that need.

FY 2009 Priorities

1. By design this program does not have specific priorities. Submissions must be related to critically important emerging issues that will be identified on our agency web site. Applications to this program should have the following characteristics: 1) The project described is currently NOT being supported by other programs in AFRI or other CSREES programs; and 2) There is clear justification for a rapid scientific response to fill knowledge gaps or provide tools and outreach to deal with the emergency issue quickly. When an emergency issue will be addressed by this program, an announcement soliciting letters of intent and describing that issue will be available on the CSREES web site at http://www.csrees.usda.gov/fo/rapidresponseafri.cfm.

Other Key Information

- A letter of intent is required for this program either in response to an emerging critical issue or to identify an unsolicited emerging critical issue. Letters of intent will be reviewed and considered as they are submitted on an ongoing basis. Communication with the National Program Leader is required before submission of the Letter of Intent. See Part II, F for format and submission instructions.

- Letters of intent will be reviewed by an adhoc panel and the proposed project(s) with the most merit will be requested to submit an application(s) that will be subject to merit and peer review. Please note that requests for letters of intent and applications may have relatively short deadlines (e.g., 15-30 days) to address that critical emerging issue in an expeditious manner.

- Letters of intent and applications will be accepted from the time of the initial posting of the FY 2009 AFRI RFA until July 30, 2009 (5:00 P.M., ET).

- If a project is funded, beginning in the first year of funding, the project director will be required to attend annual investigator meetings. Reasonable travel expenses should be included as part of the project budget.

Other Key Information (Integrated Applications Only)

- Project proposals must include at least two of the three components of the agricultural knowledge system (i.e., research, education, and extension). Each component should be represented by one or more objectives within the proposal. Projects must budget sufficient resources to carry out the proposed set of research, extension and/or education activities, with **no more than two-thirds** of a project's budget being allocated to a single knowledge area. Please see Part II.C.2 for a full listing of integrated project requirements, which should be followed closely to ensure success in the peer review process.

- Please see Part IV, A. for the criteria that will be used to evaluate integrated proposals. Applicants are also encouraged to see http://www.csrees.usda.gov/funding/integrated/integrated for an example of an integrated proposal and other grant-writing resources.

- Applications must include the elements of a logic model detailing the activities, outputs, and outcomes of the proposed project. This information may be provided as a narrative or formatted into a logic model chart. The logic model planning process is a tool that should be used to develop your project **before** writing your proposal. Two additional pages are allowed for this information. More information and resources related to the logic model planning process are provided at http://www.csrees.usda.gov/funding/integrated/integrated_logic_model.html.

- The AFRI encourages integrated projects that develop content suitable for delivery through eXtension. This content is for "end users" as opposed to staff development and must align with the eXtension Guiding Principles, Implementation Plan and other requirements as presented at http://about.extension.org/university-researcher/. Funds may be used to contribute to an existing Community of Practice or to form a new Community of Practice as appropriate.

- The AFRI encourages integrated projects that lead to measureable, documented changes in learning, actions or conditions suitable for 4-H audiences and stakeholder groups while meeting identified program priorities. Projects should align with 4-H Mission mandates of Science, Engineering, Technology, Healthy Living or Citizenship. See guiding principles at http://www.national4-hheadquarters.gov/ or contact your university Cooperative Extension headquarters.

F. Letter of Intent Instructions

Certain programs require a letter of intent. See the program description to determine whether the letter is required. A letter of intent must be submitted to the program by the designated deadline date, by 5:00 P.M., Eastern Time. A letter of intent must be formatting following the requirements below. **Failure to follow this format may result in the letter being returned and removed from consideration for potential submission of a complete application.**

- The Letter of Intent must be clear, readily legible, and conform to the following requirements:
  - Use one of the following typefaces identified below:
    - Arial, Courier New, or Palatino Linotype at a font size of 10 points or larger
    - Times New Roman at a font size of 11 points or larger
    - Computer Modern family of fonts at a font size of 11 points or larger
    - A font size of less than 10 points may be used for mathematical formulas or equations, figure, table or diagram captions and when using a Symbol font to insert Greek letters or special characters. Project Directors are cautioned, however, that the text must still be readable;

- No more than 6 lines of text within a vertical space of 1 inch; and

- Margins, in all directions, must be at least an inch.

- The letter of intent is limited to two pages for Standard project types. Coordinated Agricultural Projects may use three pages.
  - On Page 1 provide cover letter information including:
    - the name of the lead project director;
    - the names of collaborating investigators; and
    - the program and program priority(ies) addressed by the project.
  - On Page 2 (or Page 2 and 3 for Coordinated Agricultural Projects) include:
    - a descriptive title; and
    - a brief statement of approaches and objectives

- Attach the PDF letter of intent to an email addressed to the National Program Leader responsible for the program. In the email subject heading write '*Letter of Intent Program Code_PDs Last Name'*.
  - An acknowledgement receipt will be sent indicating the letter was received.
  - Letters of intent will be reviewed relative to suitability, scope, and needs of the program as delineated in the program description and priorities.
  - Submission of more than one letter of intent to a program is discouraged.
  - Within two weeks after the letter of intent deadline, Project Directors will receive a response from the National Program Leader inviting or rejecting a full application.
  - Only invited full applications will be reviewed by the panel.

G. Anticipated Project Narrative Instructions

For Standard Research, Education, Extension, or Integrated Applications – 18 page limit

a. *Introduction*.
The introduction should include a clear statement of the long-term goal(s) and supporting objectives of the proposed project. Summarize the body of knowledge or other past activities that substantiate the need for the proposed project. Describe ongoing or recently completed activities related to the proposed project including the work of key project personnel. Include preliminary data/information pertinent to the proposed work.

b. *Progress Report*.
If the application is for the expansion of a project that has been funded competitively by this agency in the past five years, include a clearly marked progress report describing results to date from the previous award. The progress report must be contained within the 18-page limit and should contain the following information:

1. A comparison of actual accomplishments with the objectives established for the previous award;
2. The reasons established objectives were not met, if applicable;
3. A listing of any publications, patents, new curricula, or other outputs, including those outputs identified in the project logic model resulting from the award; and
4. The CSREES program that funded the award.

c. *Rationale and Significance*.
1. Concisely present the rationale behind the proposed project;
2. Describe the specific relationship of the project's objectives to one or more of the particular program priorities; and
3. The potential long-range improvement in and sustainability of U.S. agriculture and food systems should be shown clearly. These purposes are described under Part I, B., Purpose and Priorities. Any novel ideas or contributions that the proposed project offers should also be discussed in this section.

d. *Approach.*
The activities proposed or problems being addressed must be clearly stated and the approaches being applied clearly described. Specifically, this section must include:
- A description of the activities proposed and the sequence in which the activities are to be performed;
- Methods to be used in carrying out the proposed project, including the feasibility of the methods;
- Expected outcomes;
- Means by which results will be analyzed, assessed, or interpreted;
- How results or products will be used;
- Pitfalls that may be encountered;
- Limitations to proposed procedures;
- A full explanation of any materials, procedures, situations, or activities related to the project that may be hazardous to personnel, along with an outline or precautions to be exercised to avoid or mitigate the effects of such hazards; and
- A brief timeline of the proposed project.

e. *Logic Model*
For Integrated Projects and Integrated CAP Projects: 2-Page Limit (not included in the 18-page limit)

f. *Management Plan*
For Integrated Projects and Integrated CAP Projects: 3-Page Limit (not included in the 18-page limit)
Because of the complexity of integrated projects, it is important to have a clearly articulated management plan. Include a timeline for completion of objectives and for production of deliverables, as well as a strategy to enhance coordination, collaboration, and communication, as well as data sharing and reporting among members of the project team and stakeholder groups.

PART III—ELIGIBILITY INFORMATION

A. Eligible Applicants

1. Non-Integrated Programs. Eligible applicants for the grant program implemented under this subpart include: (1) State agricultural experiment stations; (2) colleges and universities; (3) university research foundations; (4) other research institutions and organizations; (5) Federal agencies, (6) national laboratories; (7) private organizations or corporations; (8) individuals who are U.S. citizens or permanent residents; and (9) any group consisting of 2 or more entities identified in (1) through (8). Eligible institutions do not include foreign and international organizations, unless otherwise provided in the RFA.

2. Integrated Programs. Eligible applicants for the integrated research projects under this subpart include: (1) Colleges and universities (as defined in section 1404 of the National Agricultural Research, Extension, and Teaching Policy Act of 1977 (7 U.S.C. 3103)); (2) 1994 Institutions (as defined in section 532 of the Equity in Educational Land-Grant Status Act of 1994 (Public Law 103–382; 7 U.S.C. 301 note)); (3) Hispanic-serving agricultural colleges and universities (as defined in section 1404 of the National Agricultural Research, Extension, and Teaching Policy Act of 1977 (7 U.S.C. 3103), as amended).

3. Additional eligibility requirements.
Postdoctoral Fellowships. In accordance with Section 2(b)(3)(D) of the Act of August 4, 1965, as amended, individuals who recently have received or will soon receive their doctoral degree may submit proposals for postdoctoral fellowships. The following eligibility requirements apply:

(i) The doctoral degree of the applicant must be received not earlier than January 1 of the fiscal year three years prior to the submission of the proposal and not later than nine months after the proposal due date;

(ii) The individual must be a citizen or a national of the United States; and

(iii) The proposal must contain:

(A) documentation that arrangements have been made with an established investigator to serve as mentor;

(B) documentation that arrangements have been made for the necessary facilities, space, and materials for conduct of the research; and

(C) documentation from the host institution's authorized organizational representative indicating that the host institution concurs with these arrangements.

The Food and Agricultural Science Enhancement Grants (FASE) have additional eligibility requirements. See Part II, C, 3. for details.

When the RFA is released, applicants must respond to the program priorities and deadlines found in the FY 2009 PA and restated in the RFA. Applications from scientists at non-United States organizations will not be accepted. Grant recipients may subcontract to organizations not eligible to apply provided such organizations are necessary for the conduct of the project.

B. Request for Determination

If an applicant's institution can be considered a minority-serving institution and wishes to be considered for a strengthening grant (as described in Part II, C.3), but does not work with one or more of the minority groups specified in the Definitions section of this PA (see Part IV, D.), the applicant must submit to CSREES documentation supporting the request. This documentation must be submitted as part of the requestor's application package or letter of intent and must be received by CSREES by the applicable program deadline. The Secretary of Agriculture or designated individual will determine whether the group or groups identified are eligible under this program.

The Request for Determination must be attached with the final application. The following information must be provided in the order specified below:

(a) A description of each minority group that is being submitted for determination;

(b) Data or studies supporting this group's designation as a minority group; and

(c) Data indicating that enrollment of the minority group(s) exceeds 50 percent of the total enrollment at the academic institution, including graduate and undergraduate and full- and part-time students.

All institutions grouped under one main campus as listed in Table 1 are excluded from eligibility for equipment grants and, unless located in an EPSCoR state, all other strengthening funds. However, if any campus within a multi-campus listing can provide information demonstrating that it is administratively independent or has an independent accreditation, then the PD may petition for an exemption to this rule and request eligibility for strengthening funds. The PD must include a letter with the full application indicating how the institution is independent of the main campus, either through accreditation or administration. In addition, if the institution is in a non-EPSCoR state, the letter should stipulate that the institution is eligible due to enrollment and total federal funds received for science and engineering research. The letter must be signed by the AOR and included with the completed application.

C. Cost Sharing or Matching

For single-function projects, unless otherwise indicated, cost sharing or matching is not required for AFRI awards. See Part II, C, 3, (c), (ii) for matching requirements for equipment grants.

For applied research projects, if a grant is for applied research that is commodity-specific and not of national scope, the grant recipient is required to match the USDA funds awarded on a dollar-for-dollar basis from non-Federal sources with cash and/or in-kind contributions.

D. Hispanic-serving Agricultural Colleges and Universities

Section 7101 of the Food, Conservation, and Energy Act of 2008 added a new group of cooperating institutions, Hispanic-serving Agricultural Colleges and Universities (HSACUs). HSACUs means colleges and universities that qualify as Hispanic-serving Institutions (HSIs) and offer associate, bachelors, or other accredited degree programs in agriculture-related fields. HSACUs do not include 1862 land-grant institutions.

Please note that all 4-year HSIs would qualify for any AFRI non-integrated or integrated program. Although not all 2-year HSIs may qualify for the integrated programs; however, they would qualify if they meet the eligibility requirements of a HSACU. Institutions requesting a determination of eligibility may submit a one-page request certifying that they are a HSI and providing a justification that they do offer associate, bachelors, or other accredited degree programs in agriculture-related fields.

Additional questions on HSACU eligibility can be addressed to Dr. Irma Lawrence, HSI National Program Leader, Science and Education Resources Development (SERD), at ilawrence@csrees.usda.gov, (202) 720-2082, or via fax (202) 720-3398.

PART IV— OTHER

A. Evaluation Criteria

Projects supported under this program shall be designed, among other things, to accomplish one or more of the purposes of agriculture research, education, and extension, subject to the varying conditions and needs of States. Therefore, in carrying out its review, the peer review panel shall take into account the following factors.

For Research Project Applications:

1. Scientific Merit of the Application for Research

(a) Novelty, innovation, uniqueness, and originality;

(b) Where model systems are used, ability to transfer knowledge gained from these systems to organisms of importance to U.S. agriculture;

(c) Conceptual adequacy of the research, as applicable;

(d) Clarity and delineation of objectives;

(e) Adequacy of the description of the undertaking and suitability and feasibility of methodology;

(f) Demonstration of feasibility through preliminary data and/or, for postdoctoral fellowships, publication record of the mentor; and

(g) Probability of success of the project is appropriate given the level of scientific originality, and risk-reward balance.

2. Qualifications of Project Personnel, Adequacy of Facilities, and Project Management

(a) Qualifications of applicant (individual or team) to conduct the proposed project, including performance record and potential for future accomplishments (for Postdoctoral Fellowship applications, this applies to the mentor, as well as to the postdoctoral applicant);

(b) Demonstrated awareness of previous and alternative approaches to the problem identified in the application;

(c) Institutional experience and competence in subject area;

(d) Adequacy of available or obtainable support personnel, facilities, and instrumentation; and

(e) Planning and administration of the proposed project, including: time allocated for systematic attainment of objectives; and **planned** administration of the proposed project and its maintenance, partnerships, collaborative efforts, and the planned dissemination of information for multi-institutional projects over the duration of the project.

3. Project Relevance

(a) Documentation that the research is directed toward specific priority areas identified for the program in this RFA. These priorities are designed to yield improvements in and sustainability of U.S. agriculture, the environment, human health and well-being, and rural communities.

For Postdoctoral Fellowships and New Investigator Grants:

For Research focused projects see Research criteria.

For Integrated, Multifunctional projects see Integrated criteria.

Postdoctoral Fellowship applications will also be evaluated on the quality of the training environment, including:

(a) Documentation that arrangements have been made with an established investigator to serve as mentor;

(b) Documentation that arrangements have been made for the necessary facilities, space, and materials to conduct the proposed research; and

(c) Potential for the postdoctoral fellow to initiate an independent research program.

For Conference Applications:

1. Relevance of the Proposed Conference to Agriculture and Food Systems in the U.S. and Appropriateness of the Conference in Fostering Scientific Exchange;

2. Qualifications of the Organizing Committee and Appropriateness of Invited Speakers to Topic Areas Being Covered; and

3. Uniqueness, Timeliness of the Conference, and Appropriateness of Budget Requests.

For Sabbatical Grants, Equipment Grants, and Seed Grants Applications:

1. The Merit of the Proposed Activities or Equipment as a Means of Enhancing the Capabilities and Competitiveness of the Applicant and/or Institution;

2. The Applicant's Previous Experience and Background along with the Appropriateness of the Proposed Activities or Equipment for the Goals Proposed; and

3. Relevance of the Project to Long-Range Improvements in and Sustainability of U.S. Agriculture, the Environment, Human Health and Well-being, and Rural Communities.

Evaluation Criteria for Single Function Education Projects

These evaluation criteria should be used for the review of all single function education applications.

1. Merit of the Application for Science Education

(a) exhibit standards of high quality and educational excellence;

(b) include goals with measurable objectives and an evaluation component ;

(c) be replicable, consistent in quality and designed to be sustainable;

(d) address science education goals identified by USDA and national science education organizations, such as the National Academy of Sciences and the National Science; and

(e) increase the number of people who choose education to matriculate and have careers supporting the science-based food and agriculture mission of USDA. Include under-represented groups as appropriate.

2. Qualifications of Project Personnel, Adequacy of Facilities, and Project Management

(a) Roles of key personnel are clearly defined;

(b) Key personnel have sufficient expertise to complete the proposed project, and where appropriate, partnerships with other disciplines (e.g., social science or economics) and institutions are established;

(c) Evidence of institutional capacity and competence in the proposed area of work is provided;

(d) Support personnel, facilities, and instrumentation are sufficient;

(e) A clear plan is articulated for project management, including time allocated for attainment of objectives and delivery of products, maintenance of partnerships and collaborations, and a strategy to enhance communication, data sharing, and reporting among members of the project team; and

(f) The budget clearly allocates sufficient resources to carry out a set of education activities that will lead to desired outcomes, with no more than two-thirds of the budget focused on a single project component.

3. Project Relevance

(a) The project addresses a stated program priority.

(b) Project plan fully addresses the problem or issue identified;

(c) The proposed work addresses identified stakeholder needs;

(d) Stakeholder involvement in project development, implementation, and evaluation is demonstrated, where appropriate;

(e) Plan and methods for evaluating success of project activities and documenting potential impact against measurable short and mid-term outcomes are suitable and feasible;

(f) Science-based knowledge gained, curricula and related products will sustain education functions beyond the life of the project; and

(g) The resulting curricula or products share information and recommendations based on knowledge and conclusions from a broad range of research initiatives.

Evaluation Criteria for Single Function Extension Projects:

These evaluation criteria should be used for the review of all integrated research, education, and extension applications.

1. Merit of the Application for Science Extension

(a) Project objectives and outcomes are clearly described, adequate, and appropriate.

(b) Proposed approach, procedures, or methodologies are appropriate, clearly described, suitable, and feasible;

(c) Proposed extension leads to measurable, documented changes in learning, actions, or conditions in an identified audience or stakeholder group.

2. Qualifications of Project Personnel, Adequacy of Facilities, and Project Management

(a) Roles of key personnel are clearly defined;

(b) Key personnel have sufficient expertise to complete the proposed project, and where appropriate, partnerships with other disciplines (e.g., social science or economics) and institutions are established;

(c) Evidence of institutional capacity and competence in the proposed area of work is provided;

(d) Support personnel, facilities, and equipment/instrumentation are sufficient;

(e) A clear plan is articulated for project management, including time allocated for attainment of objectives and delivery of products, maintenance of partnerships with stakeholders and collaborations, and a strategy to enhance communication, data sharing concerning outcomes including changes in learning, actions or conditions, and reporting among members of the project team.

3. Project Relevance

(a) The project addresses a stated program priority.

(b) The proposed work addresses identified stakeholder needs;

(c) Stakeholder involvement in project development, implementation, and evaluation is demonstrated, where appropriate;

(d) Plan and methods for evaluating success of project activities and documenting potential impact against measurable short and mid-term outcomes are suitable and feasible;

(e) curricula and related products such as eXtension communities of practice will sustain informal education or extension functions beyond the life of the project; and

(f) Extension activities and the resulting curricula or products share information and recommendations based on knowledge and conclusions from a broad range of research initiatives.

B. Application Disposition

When each peer review panel has completed its deliberations, the responsible program staff of AFRI will recommend that the project: (a) be approved for support from currently available funds or (b) be declined due to insufficient funds or unfavorable review.

AFRI reserves the right to negotiate with the PD and/or with the submitting organization or institution regarding project revisions (e.g., reductions in the scope of work, funding level, period, or method of support) prior to recommending any project for funding.

An application may be withdrawn at any time before a final funding decision is made regarding the application; however, withdrawn applications normally will not be returned. One copy of each application that is not selected for funding, including those that are withdrawn, will be retained by AFRI for a period of three years.

C. Electronic Subscription to AFRI Announcements

If you would like to receive notifications of all new announcements pertaining to AFRI PA, you can register via Grants.gov at http://www.grants.gov/search/subscribeAdvanced.do.

- Enter the e-mail address at which you would like to receive the announcements
- Enter " "
- Select "Subscribe to Mailing List"

Other criteria may be selected; however, your e-mail address and the CFDA number are the only data required to receive AFRI announcements. You do not need to be a registered user of Grants.gov to use this service. You may modify your email subscriptions or unsubscribe at any time.

D. Definitions

For the purpose of this program, the following definitions are applicable:

1862 Land-Grant Institution means an institution eligible to receive funds under the Act of July 2, 1862, as amended (7 U.S.C. 301 et seq.). Unless otherwise stated for a specific program, this term includes a research foundation maintained by such an institution.

1890 Land-Grant Institution means one of those institutions eligible to receive funds under the Act of August 30, 1890, as amended (7 U.S.C. 321 et seq.), including Tuskegee University and West Virginia State University. Unless otherwise stated for a specific program, this term includes a research foundation maintained by such an institution.

1994 Land-Grant Institution means one of those institutions as defined in section 532 of the Equity in Educational Land-Grant Status Act of 1994, as amended (7 U.S.C. 301 note). These institutions are commonly referred to as Tribal Colleges or Universities.

Administrator means the Administrator of the Cooperative State Research, Education, and Extension Service (CSREES) and any other officer or employee of the CSREES to whom the authority involved is delegated.

Advisory Board means the National Agricultural Research, Extension, Education, and Economics Advisory Board (as established under section 1408 of the National Agricultural Research, Extension, and Teaching Policy Act of 1977 (7 U.S.C. 3123).

Agricultural research means research in the food and agricultural sciences.

Applied research means research that includes expansion of the findings of fundamental research to uncover practical ways in which new knowledge can be advanced to benefit individuals and society.

Authorized Departmental Officer or ADO means the Secretary or any employee of the Department with delegated authority to issue or modify grant instruments on behalf of the Secretary.

Authorized Representative or AR means the President or Chief Executive Officer of the applicant organization or the official, designated by the President or Chief Executive Officer of the applicant organization, who has the authority to commit the resources of the organization to the project.

Budget period means the interval of time (usually 12 months) into which the project period is divided for budgetary and reporting purposes.

Cash contributions means the recipient's cash outlay, including the outlay of money contributed to the recipient by non-Federal third parties.

Citizen or national of the United States means (1) A citizen or native resident of a State; or, (2) A person defined in the Immigration and Nationality Act, 8 U.S.C. 1101(a)(22), who, though not a citizen of the United States, owes permanent allegiance to the United States. When eligibility is claimed solely on the basis of permanent allegiance, documentary evidence from the Immigration and Naturalization Service as to such eligibility must be made available to CSREES upon request.

College or university means, unless defined in a separate subpart, an educational institution in any State which:
(1) Admits as regular students only persons having a certificate of graduation from a school providing secondary education, or the recognized equivalent of such a certificate;
(2) Is legally authorized within such State to provide a program of education beyond secondary education;
(3) Provides an educational program for which a bachelor's degree or any other higher degree is awarded;
(4) Is a public or other nonprofit institution; and

(5) Is accredited by a nationally recognized accrediting agency or association. Unless otherwise stated for a specific program, this term includes a research foundation maintained by such an institution.

Department means the United States Department of Agriculture.

Education activity or teaching activity means formal classroom instruction, laboratory instruction, and practicum experience in the food and agricultural sciences and other related matters such as faculty development, student recruitment and services, curriculum development, instructional materials and equipment, and innovative teaching methodologies.

Established and demonstrated capacity means that an organization has met the following criteria:
(1) Conducts any systematic study directed toward new or fuller knowledge and understanding of the subject studied; or,
(2) Systematically relates or applies the findings of research or scientific experimentation to the application of new approaches to problem solving, technologies, or management practices; and
(3) Has facilities, qualified personnel, independent funding, and prior projects and accomplishments in research or technology transfer.

Extension means informal education program conducted in the States in cooperation with the Unites States Department of Agriculture.

Extension activity means an act or process that delivers science-based knowledge and informal educational programs to people, enabling them to make practical decisions.

Food and Agricultural Science Enhancement (FASE) awards means funding awarded to eligible applicants to strengthen science capabilities of Project Directors, to help institutions develop competitive scientific programs, and to attract new scientists into careers in high-priority areas of National need in agriculture, food, and environmental sciences. FASE grants include Postdoctoral Fellowships, New Investigator grants, and Strengthening grants including but not limited to Seed grants, Sabbatical grants, and Equipment grants. Eligibility for the FASE Strengthening grants are limited to degree-granting institutions in USDA EPSCoR States and to small, mid-sized, and minority-serving degree-granting institutions that have had limited institutional success as defined in the RFA.

Food and agricultural sciences The term "food and agricultural sciences" means basic, applied, and developmental research, extension, and teaching activities in food and fiber, agricultural, renewable natural resources, forestry, and physical and social sciences, including activities relating to the following:
(1) Animal health, production, and well-being.
(2) Plant health and production.
(3) Animal and plant germ plasm collection and preservation.
(4) Aquaculture.
(5) Food safety.
(6) Soil and water conservation and improvement.
(7) Forestry, horticulture, and range management.
(8) Nutritional sciences and promotion.
(9) Farm enhancement, including financial management, input efficiency, and profitability.
(10) Home economics.
(11) Rural human ecology.
(12) Youth development and agricultural education, including 4-H clubs.
(13) Expansion of domestic and international markets for agricultural commodities and products, including agricultural trade barrier identification and analysis.
(14) Information management and technology transfer related to agriculture.
(15) Biotechnology related to agriculture.
(16) The processing, distributing, marketing, and utilization of food and agricultural products.

Fundamental research means research that (1) increases knowledge or understanding of the fundamental aspects of phenomena and has the potential for broad application, and (2) has an effect on agriculture, food, nutrition, or the environment.

Graduate degree means a Master's or doctoral degree.

Grant means the award by the Authorized Departmental Officer of funds to an eligible grantee to assist in meeting the costs of conducting for the benefit of the public, an identified project which is intended and designed to accomplish the purpose of the program as identified in the program solicitation or RFA.

Grantee means the organization designated in the grant award document as the responsible legal entity to which a grant is awarded.

Insular area means the Commonwealth of Puerto Rico, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, the Federated States of Micronesia, the Republic of the Marshall Islands, the Republic of Palau, and the Virgin Islands of the United States.

Integrated means a project that brings together at least two of the three components of the agricultural knowledge system (i.e., research, education, and extension) around a problem or issue. In general, integrated projects will be stakeholder driven, problem focused, and outcome oriented.

Land-grant Institutions means the 1862 Land-Grant Institutions, 1890 Land-Grant Institutions, and 1994 Land-Grant Institutions.

Matching or cost sharing means that portion of allowable project or program costs not borne by the Federal Government, including the value of in-kind contributions.

Merit review means an evaluation of a proposed project or elements of a proposed program whereby the technical quality and relevance to regional or national goals are assessed.

Merit reviewers means peers and other individuals with expertise appropriate to conduct merit review of a proposed project.

Methodology means the project approach to be followed.

Minority-serving institution means an academic institution whose enrollment of a single minority or a combination of minorities exceeds fifty percent of the total enrollment, including graduate and undergraduate and full- and part-time students. An institution in this instance is an organization that possesses a significant degree of autonomy. Significant degree of autonomy is defined by being independently accredited as determined by reference to the current version of the Higher Education Directory, published by Higher Education Publications, Inc., 6400 Arlington Boulevard, Suite 648, Falls Church, Virginia 22042.

Minority means Alaskan Native, American Indian, Asian-American, African-American, Hispanic American, Native Hawaiian, or Pacific Islander. The Secretary will determine on a case-by-case basis whether additional groups qualify under this definition, either at the Secretary’s initiative, or in response to a written request with supporting explanation.

Mission-linked research means research on specifically identified agricultural problems which, through a continuum of efforts, provides information and technology that may be transferred to users and may relate to a product, practice, or process.

Multidisciplinary project means a project on which investigators from two or more disciplines collaborate to address a common problem. These collaborations, where appropriate, may integrate the biological, physical, chemical, or social sciences.

National laboratories include Federal laboratories that are government-owned contractor-operated or government-owned government-operated.

Peer reviewers means experts or consultants qualified by training and experience to give expert advice on the scientific and technical merit of grant applications or the relevance of those applications to one or more of the application evaluation criteria. Peer reviewers may be adhoc or convened as a panel.

Prior approval means written approval by an Authorized Departmental Officer evidencing prior consent.

Private research organization means any non-governmental corporation, partnership, proprietorship, trust, or other organization.

Private sector means all non-public entities, including for-profit and nonprofit commercial and non-commercial entities, and including private or independent educational associations.

Program Officer means a CSREES individual who is responsible for the technical oversight of the award on behalf of USDA.

Project means the particular activity within the scope of the program supported by a grant award.

Project Director or PD means the single individual designated by the grantee in the grant application and approved by the Authorized Departmental Officer who is responsible for the direction and management of the project, also known as a Principal Investigator (PI) for research activities.

Project period means the total length of time, as stated in the award document and modifications thereto, if any, during which Federal sponsorship begins and ends.

Research means any systematic study directed toward new or fuller knowledge and understanding of the subject studied.

Scientific peer review is an evaluation of the technical quality of a proposed project and its relevance to regional or national goals, performed by experts with the scientific knowledge and technical skills to conduct the proposed research work.

Secretary means the Secretary of Agriculture and any other officer or employee of the Department to whom the authority involved is delegated.

Small and mid-sized institutions are academic institutions with a current total enrollment of 17,500 or less including graduate and undergraduate and full- and part-time students. Applicants applying under this category should indicate the current total enrollment of the institution in a cover letter. An institution, in this instance, is an organization that possesses a significant degree of autonomy. Significant degree of autonomy is defined by being independently accredited as determined by reference to the current version of the *Higher Education Directory*, published by Higher Education Publications, Inc., 6400 Arlington Boulevard, Suite 648, Falls Church, Virginia 22042 (703-532-2300).

State means any one of the fifty States, the District of Columbia, and the insular areas.

Third party in-kind contributions means the value of non-cash contributions of property or services provided by non-Federal third parties, including real property, equipment, supplies and other expendable property, directly benefiting and specifically identifiable to a funded project or program.

Under Secretary means the Under Secretary for Research, Education, and Economics.

United States means the several States, the District of Columbia, and the insular areas.

Units of State government means all State institutions, including the formal divisions of State government (i.e., the official state agencies such as departments of transportation and education), local government agencies (e.g., a county human services office), and including state educational institutions (e.g., public colleges and universities).

USDA-EPSCoR States (Experimental Program for Stimulating Competitive Research) means States which have been less successful in receiving funding from AFRI, having a funding level no higher than the 38th percentile of all States based on a 3 year rolling average of AFRI funding levels, excluding FASE Strengthening funds granted to EPSCoR States, small, mid-sized, and minority-serving degree-granting institutions.

APPENDIX

TABLE 1. Most Successful Universities and Colleges Receiving Federal Funds

Use to Determine Eligibility for Strengthening Research Awards[4] - The following institutions are NOT eligible for equipment grants:

Arizona State University main campus	Oregon State University	University Kansas (all campuses)
Baylor College of Medicine	Pennsylvania State University (all campuses)	University Kentucky (all campuses)
Boston University	Princeton University	University Massachusetts Worcester
Brown University	Purdue University (all campuses)	University Maryland Baltimore
California Institute of Technology	Rockefeller University	University Maryland College Park
Carnegie Mellon University	Rutgers State University NJ (all campuses)	University Michigan (all campuses)
Case Western Reserve University	Scripps Research Institute,	University Miami
Colorado State University	Stanford University	University Minnesota (all campuses)
Columbia University in the City of New York	SUNY Stony Brook (all campuses)	University Missouri-Columbia
Cornell University (all campuses)	The Johns Hopkins University	University North Carolina Chapel Hill
Dartmouth College	The University AL Birmingham	University New Mexico (all campuses)
Duke University	Thomas Jefferson University	University of Medicine and Dentistry New Jersey
Emory University	University Arizona	University Oklahoma (all campuses)
Georgia Institute of Technology (all campuses)	University California, Berkeley	University Pennsylvania
George Washington University	University California, Davis	University Pittsburgh (all campuses)
Georgetown University	University California, Irvine	University Rochester
Harvard University	University California, Los Angeles	University Southern California
Iowa State University	University California, San Diego	University Texas - Austin
Indiana University (all campuses)	University California, San Francisco	University Texas Health Science Center Houston
Louisiana State University (all campuses)	University California, Santa Barbara	University Texas Health Science Center San Antonio
Massachusetts Institute of Technology	University Chicago	University Texas M. D. Anderson Cancer Center
Medical College Wisconsin	University Cincinnati (all campuses)	University Texas Medical Branch
Medical University South Carolina	University Colorado (all campuses)	University Texas Southwestern Medical Center Dallas
Michigan State University	University Corp. for Atmospheric Research	University Utah
Mississippi State University	University Connecticut (all campuses)	University Virginia (all campuses)
Mt. Sinai School of Medicine	University Florida	University Vermont
North Carolina State University	University Georgia	University Washington
New Mexico State University (all campuses)	University Hawaii Manoa	University Wisconsin Madison
Northwestern University	University Hawaii system office	Virginia Commonwealth University
New York University	University Iowa	Virginia Polytechnic Institute and State University
Ohio State University (all campuses)	University Illinois Chicago	Vanderbilt University
Oregon Health & Science University	University Illinois Urbana-Champaign	Wake Forest University

[4] Data obtained from the table of Federal obligations for science and engineering research and development to the 100 universities and colleges receiving the largest amounts, ranked by total amount received in FY 2005 of Federal Science and

Engineering Support to Universities, Colleges, and Nonprofit Institutions (National Science Foundation). Campuses that are part of a larger university system as listed in Table 1 may petition for an exemption to this rule. Please see more details on this exemption policy under Strengthening Awards, Part II, C, 3(c)(3).

TABLE 2. Lowest One Third of Universities and Colleges Receiving Federal Funds

Use to Determine Eligibility for Possible Waiver of Matching Funds Requirement for Equipment Grants – Lowest One Third of Universities and Colleges Receiving Federal Funds for Science and Engineering Research and Development in FY 2005[5]

A.T. Still University of Health Sciences	Carl Albert State College
Adams State College	Carlow University
Agnes Scott College	Carroll College (Helena, MT)
Albany College of Pharmacy	Carroll College (Waukesha, WI)
Albion College	Carteret Community College
Allegheny College	Central College
Alma College	Central Connecticut State University
American University PR	Central Maine Community College
Angelo State University	Central Missouri State University
Anne Arundel Community College	Central Virginia Community College
Arkansas Tech University	Central Wyoming College
Arcadia University	Century Community and Technical College
Armstrong Atlantic State University	Cerritos College
Asnuntuck Community College	Chaminade University Honolulu
Augustana College (Rock Island, IL)	Chapman University
Augustana College (Sioux Falls, SD)	Charleston Southern University
Avila University	Chatham College
Azusa Pacific University	Chemeketa Community College
Babson College	Chesapeake College
Bard College	Cheyenne River Community College
Bellarmine University	Christian Brothers University
Bellin College of Nursing	Cincinnati State Technical and Community College
Belmont University	Citadel Military College SC
Beloit College	City Colleges Chicago (all campuses)
Berea College	Clarke College
Berry College	Clarkson College
Bethel College (Mishawaka, IN)	Clatsop Community College
Bethel College (North Newton, KS)	Colorado College
Bethel College and Seminary (all campuses)	Colorado State University Pueblo
Blackhawk Technical College	Coastal Bend College
Bloomsburg University PA	Coastline Community College
Brenau University	Cochise College
Brescia University	Colby College
Bridgewater State College	Colby Community College
Bristol Community College	College DuPage
Brookdale Community College	College Eastern UT
California Institute of the Arts	College Misericordia
California State University Stanislaus	College New Rochelle
Calhoun Community College	College NJ, The

Canisius College	College of Notre Dame MD
Capital University	College of Our Lady of the Elms
Caribbean University	College of St. Catherine
College of the Atlantic	Gettysburg College
College of the Canyons	Gonzaga University
Community College Aurora	Goucher College
Community College Philadelphia	Graceland University
Concordia College (Moorhead, Minnesota)	Green River Community College
Concordia University (Mequon, WI)	Guam Community College
Cornell College	Gustavus Adolphus College
Crown College (Bible College, Minnesota)	Gwynedd-Mercy College
CUNY John Jay College of Criminal Justice	Hampshire College
CUNY Medgar Evers College	Hartwick College
CUNY Queensborough Community College	Haywood Community College
Cuyahoga Community College (all campuses)	Henderson State University
Dakota Wesleyan University	Hendrix College
Danville Community College	Heritage College (Las Vegas, NV)
Delta State University	Heritage University (Toppenish, WA)
Denison University	Hawaii Pacific University
DePauw University	Hinds Community College (Raymond, MS)
Des Moines Area Community College	Hollins University
Dickinson State University	Holy Family University
Dominican College Blauvelt	Hood College
Dowling College	Howard Community College
D-Q University	Husson College
Drury University	Iowa Valley Community College District
D'Youville College	Illinois Valley Community College
Eastern Iowa Community College District	Illinois Wesleyan University
Eastern Oregon University	Immaculata University
El Camino College	Indian River Community College
Elmhurst College	Indiana University Pennsylvania (all campuses)
Emerson College	Iona College
Emporia State University	John Carroll University
Evergreen Valley College	Juniata College
Fairfield University	Kalamazoo College
Fairleigh Dickinson University (all campuses)	Kean University
Felician College	Kettering University
Ferris State University	LaGuardia Community College CUNY
Finlandia University	Lake Forest College
Florida Gulf Coast University	Lake Michigan College
Florida Memorial University	Laramie County Community College
Franklin W. Olin College of Engineering	Le Moyne-Owen College
Ft. Hays State University	Le Tourneau University
Fuller Theological Seminary California	Lebanon Valley College
Fulton-Montgomery Community College	Lee University
Georgia College and State University	Lewis and Clark College
Georgia Southwestern State University	Lewis University
Gallaudet University	Lewis-Clark State College

Gannon University	Little Priest Tribal College
George College Wallace Community College Dothan	Los Angeles Valley College
Georgetown College	Loyola College
Lurleen B. Wallace Community College	Okaloosa Walton College
Massachusetts College of Liberal Arts	Oklahoma City Community College
Macomb Community College	Otterbein College
Malone College	Ouachita Baptist University
Manhattan College	Pacific Graduate School of Psychology
Marian College Fond du Lac	Pacific Lutheran University
Marist College	Pacific University
Mary Baldwin College	Paine College
Marymount University	Paul Smith's College of Arts and Sciences
Marywood University	Peninsula College
Mayo Graduate School	Pepperdine University
Mayville State University	Philadelphia College of Osteopathic Medicine
Mercy College	Philadelphia University
Meredith College	Philander Smith College
Mesa State College	Pikeville College
Metropolitan State College Denver	Pima County Community College District
Metropolitan State University	Pine Technical College
Miami Dade College	Pitzer College
Middle Tennessee School of Anesthesia	Plymouth State University
Midwestern State University	Point Loma Nazarene College
Moberly Area Community College	Portland Community College
Mohave Community College	Prescott College
Molloy College	Queens University Charlotte
Monterey Peninsula College	Quinnipiac University
Moore College of Art and Design	Radford University
Moravian College	Randolph-Macon College
Morris Brown College	Regis College
Mountain Empire Community College	Regis University
Mountain State University	Rhodes College
Loyola University New Orleans	Rivier College
NAES College Chicago	Rockhurst University
Nashville State Technical Community College	Rollins College
National College of Naturopathic Medicine	Roosevelt University
Nazareth College Rochester	Russell Sage College (all campuses)
North Dakota State College of Science	Rust College
Nebraska Indian Community College	Sacred Heart University
New York City College of Technology/CUNY	Saginaw Valley State University
Newman University	Salisbury University
Nicholls State University	Salt Lake Community College
North Park University	Sam Houston State University
Northeast State Technical Community College	Stanford University
Northland College	Samuel Merritt College
Northwest Nazarene University	San Jacinto College
Northwestern Health Sciences University	Santa Fe Community College (Gainesville, FL)
Norwich University (all campuses)	Science and Engineering Alliance, Inc.

New York Law School	Shelton State Community College
Ohio Northern University	Shenandoah University
Ohio Wesleyan University	Shippensburg University PA
Sierra College	Trinity College (Hartford, CT)
Skidmore College	Troy University main campus
Slippery Rock University PA	Tusculum College
Sojourner-Douglas College	Texas A&M University Commerce
Southeastern University	Union University
Southern Arkansas University (all campuses)	Universidad del Turabo
Southern California College of Optometry	University Central OK
Southern Connecticut State University	University Hawaii West Oahu
Southern Nazarene University	University Houston-Clear Lake
Southern Polytechnic State University	University Indianapolis
Southern Vermont College	University North Alabama
Southwest Florida College	University of St. Francis (Ft. Wayne, IN)
Southwest Texas Jr. College	University of St. Francis (Joliet, IL)
Southwestern Oregon Community College	University of the Incarnate Word
Spalding University	University of the South
Spartanburg Technical College	University Phoenix
St. Catharine College	University Puerto Rico La Montana Regional College
St. Cloud State University	University Puget Sound
St. Francis University (Loretto, PA)	University Sioux Falls
St. John Fisher College	University Tampa
St. Joseph College (West Hartford, CT)	University Tennessee Space Institute
St. Joseph's College New York (all campuses)	University West GA
St. Lawrence University	University Wisconsin Parkside
St. Mary's University (San Antonio, TX)	University S. Naval Academy
St. Mary's University Minnesota	Ursuline College
St. Norbert College	Utah Valley State College
St. Paul's College (Lawrenceville, VA)	Virginia College (Lynchburg, VA)
St. Vincent College	Virginia Wesleyan College
St. Xavier University	Valdosta State University
State Center Community College District	Viterbo University
Stetson University	Wabash College
Strayer University	Wagner College
Suffolk University	Wake Technical Community College
SUNY College Cortland	Waldorf College
SUNY College Geneseo	Walsh College of Accountancy and Business Administration
SUNY College of Technology Alfred	Washington and Lee University
SUNY College Potsdam	Washington College
SUNY Farmingdale	Wenatchee Valley College
SUNY New Paltz	Wesley College (Dover, DE)
Susquehanna University	West Chester University PA
Sweet Briar College	West Los Angeles College
Tacoma Community College	West Virginia University Institute of Technology
Taylor University	Western New England College
Technical College of the Low Country	Western Oklahoma State College
The Fielding Institute	Westminster College (Salt Lake City, UT)

Thomas Edison State College	Westmont College
Three Rivers Community College	Wheaton College (Norton, MA)
Touro College	White Earth Tribal and Community College
Whitman College	William Rainey Harper College
Wilkes Community College	Wilmington College (New Castle, DE)
Wilkes University	WyoTech
Willamette University	Xavier University
William Paterson University NJ	York College PA
	Youngstown State University

Data obtained from the table of Federal obligations for science and engineering research and development to universities and colleges, ranked by total amount received, by agency from the FY 2005 Survey of Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions (National Science Foundation).

[5] University-administered foundations must contact CSREES' Competitive Programs Unit to determine their eligibility (see contact information on Table 4).

TABLE 3. AFRI Personnel Contact Information

Deputy Administrator	Dr. Deborah Sheely	dsheely@csrees.usda.gov	(202) 401-5024
Research Director	Dr. Mark Poth	mpoth@csrees.usda.gov	(202) 401-5244
Integrated Programs Director	Vacant		
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Agribusiness Markets and Trade	Dr. Siva Sureshwaran Dr. Henry Bahn	ssureshwaran@csrees.usda.gov hbahn@csrees.usda.gov	(202) 720-7536 (202) 720-8143
Agricultural Prosperity for Small and Medium-Sized Farms	Dr. Siva Sureshwaran Dr. Diana Jerkins	ssureshwaran@csrees.usda.gov djerkins@csrees.usda.gov	(202) 720-7536 (202) 401-6996
Air Quality	Dr. Ray Knighton	rknighton@csrees.usda.gov	(202) 401-6417
Animal Genome, Genetics, and Breeding	Dr. Peter Burfening Dr. Muquarrab Qureshi	pburfening@csrees.usda.gov mqureshi@csrees.usda.gov	(202) 401-5823 (202) 401-4895
Animal Growth and Nutrient Utilization	Dr. Mark Mirando	mmirando@csrees.usda.gov	(202) 401-4336
Animal Health and Well-being	Dr. Peter Johnson	pjohnson@csrees.usda.gov	(202) 401-1896
Animal Protection and Biosecurity	Dr. Peter Johnson	pjohnson@csrees.usda.gov	(202) 401-1896
Animal Reproduction	Dr. Mark Mirando	mmirando@csrees.usda.gov	(202) 401-4336
Applied Plant Genomics CAP	Dr. Ed Kaleikau	ekaleikau@csrees.usda.gov	(202) 401-1931
Arthropod and Nematode Biology and Management	Dr. Mary Purcell-Miramontes	mpurcell@csrees.usda.gov	(202) 205-0440
Bioactive Food Components for Optimal Health	Dr. Etta Saltos	esaltos@csrees.usda.gov	(202) 401-5178
Biobased Products and Bioenergy Production Research	Dr. Chavonda Jacobs-Young	cjacobs@csrees.usda.gov	(202) 401-6188
Biology of Weedy and Invasive Species in Agroecosystems	Dr. Michael Bowers	mbowers@csrees.usda.gov	(202) 401-4510
Enhancing Ecosystem Services from Agricultural Lands: Management, Quantification, and Developing Decision Support Tools	Dr. Diana Jerkins Dr. Anne Sergeant	djerkins@csrees.usda.gov sergeant.anne@epa.gov	(202)401-6996 (202)343-9661
Food Safety and Epidemiology	Dr. Nancy Cavallaro	ncavallaro@csrees.usda.gov	(202) 401-4082
Global and Climate Change	Dr. Nancy Cavallaro Dr. Louie Tupas	ncavallaro@csrees.usda.gov ltupas@csrees.usda.gov	(202) 401-4082 (202)-401-4926
Human Nutrition and Obesity	Dr. Etta Saltos Dr. Susan Welsh	esaltos@csrees.usda.gov swelsh@csrees.usda.gov	(202) 401-5178 (202) 720-5544
Integrated Solutions for Animal Agriculture	Dr. Peter Johnson Dr. Mark Mirando	pjohnson@csrees.usda.gov mmirando@csrees.usda.gov	(202) 401-1896 (202) 401-4336
Improving Food Quality and Value	Dr. Ram Rao Dr. Hongda Chen Dr. Dionne Toombs	rrao@csrees.usda.gov hchen@csrees.usda.gov dtoombs@csrees.usda.gov	(202) 401-6010 (202) 401-6497 (202)401-2138

Managed Ecosystems	Dr. Diana Jerkins	djerkins@csrees.usda.gov	(202) 401-6996
Microbial Biology	Dr. Ann Lichens-Park	apark@csrees.usda.gov	(202) 401-6460
Microbial Genomics	Dr. Ann Lichens-Park Dr. Daniel Jones	apark@csrees.usda.gov djones@csrees.usda.gov	(202) 401-6460 (202) 401-6854
Nanoscale Science and Engineering for Agriculture and Food Systems	Dr. Hongda Chen	hchen@csrees.usda.gov	(202) 401-6497
Plant Biology	Dr. Liang-Shiou Lin Dr. Diana Jerkins Dr. Ed Kaleikau	llin@csrees.usda.gov djerkins@csrees.usda.gov ekaleikau@csrees.usda.gov	(202) 401-5042 202-401-6996 (202) 401-1931
Plant Breeding and Education	Dr. Liang-Shiou Lin	llin@csrees.usda.gov	(202) 401-5042
Plant Biosecurity	Dr. Liang-Shiou Lin	llin@csrees.usda.gov	(202) 401-5042
Plant Genome	Dr. Ed Kaleikau	ekaleikau@csrees.usda.gov	(202) 401-1931
Protection of Managed Bees Coordinated Agricultural Project (CAP)	Dr. Mary Purcell-Miramontes	mpurcell@csrees.usda.gov	(202)205-0440
Rapid Response Food and Agricultural Science for Emergency Issues	Dr. Mark Poth	mpoth@csrees.usda.gov	(202) 401-5244
Rural Development	Dr. Siva Sureshwaran	ssureshwaran@csrees.usda.gov	(202) 720-7536
Soil Processes	Dr. Nancy Cavallaro	ncavallaro@csrees.usda.gov	(202) 401-4082
Sustainable Agroecosystems Science and Long-Term Agroecosystem Program	Dr. Michael Bowers	mbowers@csrees.usda.gov	(202) 401-4510
Water and Watersheds	James P Dobrowolski Mary Ann Rozum	jdobrowolski@csrees.usda.gov mrozum@csrees.usda.gov	(202) 401-5016 (202) 401 - 4533

AFRI DEADLINE DATES FOR FY 2009

The following dates have been established for FY 2009 application submission deadlines within AFRI Program, CSREES, United States Department of Agriculture. In FY 2009 several programs require a letter of intent prior to submission of the full application. Select projects will be invited to submit a complete application by the program's deadline. Applications submitted to programs requiring a letter of intent without the proper invitation will not be reviewed.

Programs offered in any fiscal year depend on availability of funds and deadlines may be delayed due to unforeseen circumstances. Consult AFRI home page (www.csrees.usda.gov/funding/application_info.html) for up-to-date information.

TABLE 4. AFRI Program Anticipated Deadline Date

Program	Program Code	National Program Leader	Integrated	Letter of Intent Deadline	Application Deadline
Agribusiness Markets and Trade	96160	Dr. Siva Sureshwaran Dr. Henry Bahn	No	No	5/15/2009
Agricultural Prosperity for Small and Medium-sized Farms	96360	Dr. Siva Sureshwaran Dr. Diana Jerkins	Yes	N/A	6/5/2009
Air Quality	94140	Dr. Ray Knighton	Yes	3/5/2009	6/5/2009
Animal Biosecurity CAP	92420	Dr. Peter Johnson	Yes	N/A	N/A
Animal Genome, Genetics, and Breeding	92120	Dr. Peter J. Burfening Dr. Muquarrab Qureshi	No	3/5/2009 Priorities 1-4 Only	5/14/2009 Priorities 1-4 Only 4/17/2009 Priority 5
Animal Growth and Nutrient Utilization	92220	Dr. Mark Mirando	No	No	7/8/2009
Animal Health and Well-Being: Animal Health	92521	Dr. Peter Johnson	No	1/16/2009	3/13/2009
Animal Health and Well-Being: Animal Well-Being	92522	Dr. Peter Johnson	No	1/16/2009	3/13/2009
Animal Health and Well-Being: Tools and Resources	92523	Dr. Peter Johnson	No	6/1/2009	8/14/2009
Animal Reproduction	92320	Dr. Mark Mirando	No	No	3/3/2009
Applied Plant Genomics Coordinated Agricultural Project (CAP)	91710	Dr. Ed Kaleikau	Yes	1/16/2009	3/11/2009
Arthropod and Nematode Biology and Management: Organismal and Population Biology	91111	Dr. Mary Purcell-Miramontes	No	No	3/9/2009
Arthropod and Nematode Biology and Management: Suborganismal Biology	91112	Dr. Mary Purcell-Miramontes	No	4/1/2009	6/24/2009
Arthropod and Nematode Biology and Management: Tools, Resources, and Genomics	91113	Dr. Mary Purcell-Miramontes	No	4/1/2009	6/24/2009
Bioactive Food Components for Optimal Health	93130	Dr. Etta Saltos	No	1/22/2009	4/7/2009
Biobased Products and Bioenergy Production Research	95150	Dr. Chavonda Jacobs-Young	No	2/11/2009	4/2/2009
Biology of Weedy and Invasive Species in Agroecosystems	94240	Dr. Michael Bowers	Yes	4/20/2009	6/19/2009

Program	Program Code	National Program Leader	Integrated	Letter of Intent Deadline	Application Deadline
Enhancing Ecosystem Services from Agricultural Lands	94340	Dr. Diana Jerkins Dr. Anne Sergeant	No	N/A	See EPA Web site
Food Safety and Epidemiology: Biological Approaches for Food Safety	93231	Dr. Nancy Cavallaro	No	3/4/2009	5/6/2009
Food Safety and Epidemiology: Epidemiological Approaches for Food Safety	93232	Dr. Nancy Cavallaro	Yes	3/4/2009	5/6/2009
Food Safety and Epidemiology: Practical Approaches for Food Protection	93233	Dr. Nancy Cavallaro	No	3/4/2009	5/6/2009
Global and Climate Change	94640	Dr. Nancy Cavallaro Dr. Louie Tupas	No	N/A	See EPA
Improving Food Quality and Value	93430	Dr. Ram Rao Dr. Dionne Toombs Dr. Hongda Chen	No	1/21/2009	**3/31/2009**
Integrated Solutions for Animal Agriculture	92620	Dr. Peter Johnson Dr. Mark Mirando	Yes	3/16/2009	6/30/2009
Human Nutrition and Obesity	93330	Dr. Etta Saltos Dr. Susan Welsh	Yes	N/A	6/15/2009
Managed Ecosystems	94340	Dr. Diana Jerkins	Yes	3/3/2009	6/2/2009
Microbial Biology: Microbial Associations with Plants	91210	Dr. Ann Lichens-Park	No	2/16/2009	4/30/2009
Microbial Genomics: Genome Sequencing	91311	Dr. Ann Lichens-Park Dr. Daniel Jones	No	No	See Microbial Genome Sequencing Program Announcement
Microbial Genomics: Functional Genomics of Microorganisms	91312	Dr. Ann Lichens-Park	No	2/5/2009	4/16/2009
Nanoscale Science and Engineering for Agriculture and Food Systems	95250	Dr. Hongda Chen	No	No	N/A
Plant Biology: Environmental Stress	91412	Dr. Diana Jerkins	No	1/30/2009	3/27/2009
Plant Biology: Biochemistry	91413	Dr. Ed Kaleikau	No	2/20/2009	4/27/2009
Plant Biology: Growth and Development	91414	Dr. Liang-Shiou Lin	No	3/2/2009	5/19/2009
Plant Breeding and Education	91810	Dr. Liang-Shiou Lin	Yes	3/16/2009	6/15/2009
Plant Biosecurity	91510	Dr. Liang-Shiou Lin	Yes	4/13/2009	6/26/2009
Plant Genome, Genetics, and Breeding	91610	Dr. Ed Kaleikau	No	1/16/2009	3/11/2009
Protection of Managed Bees CAP	91910	Dr. Mary Purcell-Miramontes	Yes	3/2/2009	**5/1/2009**
Rapid Response Food and Agricultural Science for Emergency Issues	97100	Dr. Mark Poth	Yes	Immediately	7/30/2009
Rural Development	96260	Dr. Siva Sureshwaran	Yes	N/A	N/A
Soil Processes	94440	Dr. Nancy Cavallaro	No	1/16/2009	3/17/2009
Sustainable Agroecosystems Science and Long-Term Agroecosystem	94740	Dr. Michael Bowers	No	N/A	3/2/2009
Water and Watersheds	94540	Dr. James Dobrowolski Ms. Mary Ann Rozum	No	No	4/15/2009

FIGURE 1. Flow Chart for Strengthening Grant Eligibility