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 non-integrated program. 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. Whole Genome Enabled Animal Selection 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.