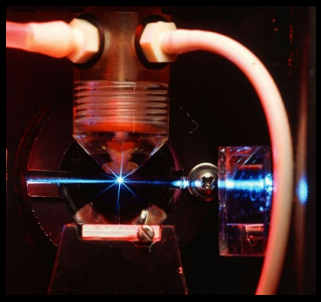
United States
Department of
Agriculture

**Agricultural
Research
Service**

Strategic Plan
FY 2012-2017



2016 Revision

Abstract

U.S. Department of Agriculture, Agricultural Research Service. 2012. ARS Strategic Plan for FY 2012 - 2017. Washington, D.C., Revised 2016

This publication is the Agricultural Research Service's strategic plan for 2012 through 2017; the Plan describes the ARS national programs and lays out the agency's strategies and activities under four strategic goal areas that encompass specific objectives and also several management initiatives. This 2016 mid-term revision includes minor updates to the program sections of the Plan (Strategic Goals 1-4) and creates new Program Management; Administrative Management; and Civil Rights and Diversity Goals from the previous Strategic Goal 5 for Equal Opportunity Employment; Management Goals; Administrative and Financial Management (AFM) Initiatives; and Office of the Chief Information Officer (OCIO) Management Initiatives.

Additional copies of this Strategic Plan can be downloaded from www.ars.usda.gov.

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Message from the Administrator

I am pleased to present the Agricultural Research Service (ARS) Strategic Plan for 2012-2017. In this Plan, we have outlined our vision for accomplishing USDA's research-related mission: supporting the national food and agricultural systems while protecting human health and the environment. Though organized within the framework of our existing National Program structure, this Plan emphasizes key priorities currently identified by USDA's Research, Education, and Economics mission area: sustainable intensification of agricultural production, responding to climate and energy needs, sustainable use of natural resources, nutrition and childhood obesity, and food safety.

In articulating this Plan to support the broad USDA goals for agriculture, ARS has sought to maintain continuity with the strengths of prior planning processes, while making several changes to help achieve key cultural transformation and relevance goals aimed to dramatically increase the impact of our work. The ARS Strategic Plan is a living document that adjusts to the evolving needs, objectives, and focus of an organization. This 2016 mid-term revision includes minor updates to the program sections of the Plan (Strategic Goals 1-4) and creates new Program Management; Administrative Management; and Civil Rights and Diversity Goals from the previous Strategic Goal 5 for Equal Opportunity Employment; Management Goals; Administrative and Financial Management (AFM) Initiatives; and Office of the Chief Information Officer (OCIO) Management Initiatives.

This Plan specifies performance measures that will indicate progress toward identified goals and objectives, while outlining the specific research activities needed to address each performance measure. The Plan also accommodates current accountability mechanisms designed to evaluate the effectiveness of Federal programs.

The ARS Strategic Plan builds on existing, rigorous national program planning processes. ARS scientists and national program leaders identify strategic and responsive, relevant goals for each research area through intense customer and stakeholder interaction and internal discussion and collect the strategies through the national program management process, described on page ix. The Plan then documents, at broad and specific levels, the research needed to achieve national priorities. This approach succeeds in achieving a direct link from each research project plan in ARS to the ARS, REE, and USDA Strategic Plans, through the National Program Action Plan.

As research goals are achieved and new problems and priorities emerge, ARS will continue to update this Strategic Plan to reflect necessary changes in emphasis. It is our hope that this Plan will not only help USDA meet the food and agriculture needs of the American people effectively, but will also provide an available model for other agencies looking to streamline and improve upon their planning processes.

Chavonda Jacobs-Young
Administrator

Introduction

Mission Statement

ARS conducts research to develop and transfer solutions to agricultural problems of high national priority and provide information access and dissemination to:

- Ensure high-quality, safe food, and other agricultural products;
- Assess the nutritional needs of Americans;
- Sustain a competitive agricultural economy;
- Enhance the natural resource base and the environment;
- Provide economic opportunities for rural citizens, communities, and society as a whole; and
- Provide the infrastructure necessary to create and maintain a diversified workplace.

Vision Statement

The ARS vision is to lead America towards a better future though agricultural research and information.

Core Values

Our success depends on:

- **Inclusion** — Providing opportunities for ARS constituents to shape and improve those services provided by the Agency.
- **Collaboration** — Working cooperatively at all governmental levels domestically and internationally on policy matters affecting a broad audience.
- **Accountability** — Ensuring that the performance of all employees is measured against the achievement of the Agency's strategic goals.
- **Customer Focus** — Serving ARS' constituents by delivering programs that address their diverse needs.
- **Professionalism** — Building and maintaining a highly skilled, diverse, and compassionate workforce.
- **Results Orientation** — Measuring performance and making management decisions to direct resources to where they are used most effectively.

Strategic Plan Framework

Formed in 1953 as USDA's chief scientific research agency, ARS is one of the four component agencies of the Research, Education, and Economics (REE) mission area. The Agency's mission centers around conducting the basic and applied research needed to solve problems of national importance for American agricultural producers, Government action agencies, and the general public and, increasingly, for producers and consumers worldwide. This work covers a wide range of needs, ranging from animal and crop protection and production to human nutrition, food safety, and natural resources conservation. Today, with a staff of over 8,000 employees, ARS carries out research at over 90 laboratories throughout the Nation and in several foreign countries. These laboratories are led by Research Leaders – scientists that are critical to the research mission and operation of the agency.

Outlining the major needs and corresponding goals for the 5 years ending in 2017, this Strategic Plan will help guide the Agency's scientific activities and the accompanying transfer of ARS research products to producers, consumers, action and regulatory agencies, the private sector, and other customers and stakeholders. This 2016 mid-term revision includes minor updates to the program sections of the Plan (Strategic Goals 1-4) and creates new Program Management; Administrative Management; and Civil Rights and Diversity Goals from the previous Strategic Goal 5 for Equal Opportunity Employment; Management Goals; Administrative and Financial Management (AFM) Initiatives; and Office of the Chief Information Officer (OCIO) Management Initiatives.

Goal Areas

Echoing ARS' National Program structure, the Plan is organized into four main Goal Areas: Nutrition, Food Safety, and Quality; Natural Resources and Sustainable Agricultural Systems; Crop Production and Protection; and Animal Production and Protection. These Goal Areas—and the goals, performance measures, and actionable strategies identified within them—align with the components of the REE Action Plan and the USDA Strategic Plan Goals as follows:

ARS Goal Area	ARS Strategic Goal	REE Action Plan Goal	USDA Strategic Goal Objective (s)
1: Nutrition, Food Safety and Quality	1.1 Human Nutrition	4	4.2
	1.2 Food Safety	5	4.3
	1.3 Quality and Utilization of Agricultural Products	2B, 7	1.3
2: Natural Resources and Sustainable Ag Systems	2.1 Water Availability and Watershed Management	3A	2.2 & 2.3
	2.2 Climate Change, Soils, and Emissions Research	2A, 3B	2.1, 2.2 & 2.3
	2.3 Biorefining	2B	1.1
	2.4 Agricultural and Industrial Byproducts	3B	1.3, 2.1 & 4.3
	2.5 Rangeland, Pasture and Forages	3B	2.1
	2.6 Agricultural Competitiveness and Sustainability	2A, 2B, 3B	1.3, 2.1, 2.2 & 2.3
3: Crop Production and Protection	3.1 Plant Genetic Resources, Genomics, Genetic Improvement, and Crop Production	1A, 1C	1.3, 3.1 & 4.4
	3.2 Plant Diseases, Crop Protection and Quarantine, and Methyl Bromide Alternatives	1B, 1C	3.1 & 4.4
4: Animal Production and Protection	4.1 Animal Production	1A, 1B, 1C	1.3 & 3.1
	4.2 Prevention and Control of Pests and Animal Disease that Threaten Agriculture	1B, 1C	3.1 & 4.4

Goals

Each Goal Area includes specific goals that are aligned groupings of ARS' 17 National Programs, derived from the Agency's specific mission, as outlined in each 5-year National Program Action Plan. In developing their individual Project Plans, each ARS scientist will, in turn, align his or her research objectives with the overarching goals identified in this portion of the ARS Strategic Plan, thereby ensuring continuity with the USDA, REE, and ARS vision for agricultural research.

Performance Measures – Explaining the Numbering System

The performance measures describe specific measurable achievements, which indicate progress toward reaching the broader objectives and goals. The first digit of the performance measure ties it to the primary USDA Strategic Goal that is being addressed, the next digit represents the ARS goal area, while the 3rd digit together with the ARS goal area, represents the specific ARS goal.

Performance Targets

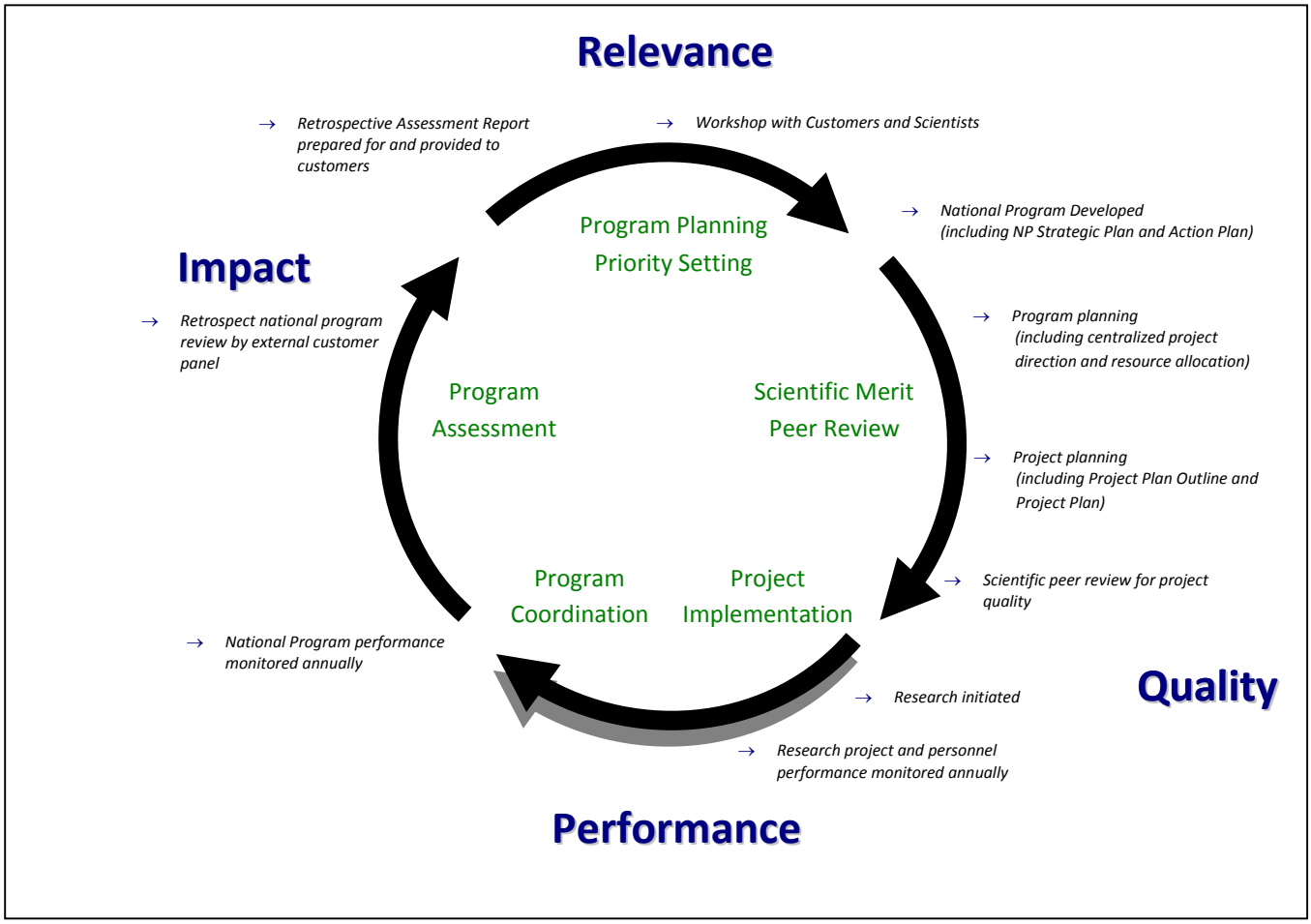
There are a number of performance targets that will be used to achieve each performance measure. These are research components broken down to more clearly align research products and accomplishments with the appropriate performance measure, with a baseline and target to be reached by 2017.

Strategies and Means

These include some of the specific research activities that ARS anticipates conducting during the next 5 years to address each Performance Measure.

National Research Program Management in ARS

Approximately 750 research projects from around the Country are aligned into 17 National Programs that encompass all the research of the Agency. The National Programs are grouped into four program areas: Animal Production and Protection; Crop Production and Protection; Natural Resources and Sustainable Agricultural Systems; and Nutrition, Food Safety, and Quality. Each of the four program areas is managed by a Deputy Administrator, and each program is led by a team of National Program Leaders (NPLs). Some 25 NPLs are responsible for planning and developing research strategies to address critical issues affecting American agriculture. Nearly 200 Research Leaders work with five geographically-based Area Directors to implement the coordinated research objectives issued by the National Program Leaders.



Implementation of the 5-Year National Program Cycle

The overarching objectives of the National Programs are ***relevance, quality,*** and ***impact*** of ARS research, all important elements of improved accountability. Research must be ***relevant*** to the highest priority problems, the goals and outcomes of the research should significantly ***impact*** the problems, and the science must meet the highest standards of ***quality.*** To ensure that these objectives could be achieved, ARS implemented the National Program Cycle, a cycle of phases embodying a series of recurring activities.

The 5-year program management cycle illustrates the activities by which ARS conducts its research: program planning and priority setting, peer review, project implementation, program coordination, and assessment. The cycle ties these activities together in a recurring 5-year sequence to ensure effective and efficient program and project management within ARS.

Ongoing monitoring of project quality and performance takes place throughout the program cycle, and adjustments are made when necessary to improve performance or meet emerging challenges. At the end of the program's 5-year cycle, a rigorous National Program Retrospective Review is convened. The purpose is two-fold: to ensure, based on feedback from an outside group of experts (made up of academics, stakeholders, and government) that the research is being conducted as indicated in the Action Plan; and to gain advice and insight from these same experts as to the future direction of the research.

Relevance, Quality (Prospective and Retrospective), and Performance—these objectives are what a research organization must promote to be successful. Program Planning and Priority Setting, Scientific Merit Peer Review, Project Implementation and Coordination, and Program Assessment—prescribe the actions that the Agency undertakes carefully, thoroughly, and with outside review to demonstrate that our research is of the highest quality.

Increasing Communication within and outside ARS

By definition, the planning and implementation of National Program research is designed to be a participatory process requiring significant input from the broad sources of expertise and experience within and outside the Agency. Through coordinated efforts that emphasize communication with valued partners and scientists, ARS can ensure that public resources are expended in a targeted and synchronized fashion on scientifically and programmatically relevant problems.

Further, by gathering input from outside users of ARS research, the Agency meets the ever-increasing demand for public accountability. ARS solicits input from the Administration, regulatory and action agencies, producers and producer groups, university communities, and non-governmental organizations, often through face-to-face exchanges. By accounting for the needs and priority issues of these customers, stakeholders, and partners, ARS develops responsive research that emphasizes meeting short-term emergencies or requirements as well as long-term sustained research to address problems of regional, national, and international scope and importance.

Emphasis on communication and coordination ultimately ensures that the physical, financial, and human resources of ARS are deployed appropriately to address high-priority agricultural, food, and environmental research needs of the Nation.

Because agricultural research is not the exclusive domain of any public or private entity, the very specific and the wide variety of needs that farmers, producers, ranchers, and industry stakeholders have must be met in a broad collaborative and cooperative effort. ARS has developed and continues to utilize an extensive network of research relationships among researchers with universities, industry, and other Federal government agencies to meet the research needs of U.S. agriculture. First among those Federal relationships is the USDA National Institute for Food and Agriculture (NIFA), USDA's extramural research agency. ARS and NIFA national program leaders work closely together to ensure that research funded by each agency is complimentary, and not duplicative. For example, ARS and NIFA national program leaders have collaborated on utilizing intramural and extramural research to develop joint action strategies for research on plant diseases and pests (i.e., citrus greening), animal diseases, and water and soil conservation.

National Programs

ARS organizes its research activities under 17 National Programs under four broad categories:
Nutrition, Food Safety and Quality; Natural Resources and Sustainable Agricultural Systems; Crop Production and Protection; and Animal Production and Protection. To best address issues of agricultural importance, ARS makes regular adjustments to this program structure. The structure appears below.

Nutrition, Food Safety, and Quality

- Human Nutrition
- Food Safety (Animal and Plant Products)
- Quality and Utilization of Agricultural Products

Natural Resources and Sustainable Agricultural Systems

- Water Availability and Watershed Management
- Climate Change, Soils, and Emissions
- Biorefining
- Agricultural and Industrial Byproducts
- Pasture, Forage, and Rangeland Systems
- Agricultural System Competitiveness and Sustainability

Crop Production and Protection

- Plant Genetic Resources, Genomics and Genetic Improvement
- Plant Diseases
- Crop Protection and Quarantine
- Crop Production

Animal Production and Protection

- Food Animal Production
- Animal Health
- Veterinary, Medical , and Urban Entomology
- Aquaculture

Strategic Goal Area 1:
Nutrition, Food Safety, and Quality

The Nutrition, Food Safety and Quality research and information area exists to lead and coordinate ARS research and information dissemination to define the role of food and its components in optimizing health for all Americans; develop tests and processes that keep the food supply safe; reduce and control pathogens and toxins in agricultural products; and improve the economic viability and competitiveness of American agriculture by enhancing the quality and utilization of agricultural products for the benefit of producers and consumers.

GOAL 1.1 – ENABLE AMERICANS TO MAKE HEALTH-PROMOTING, SCIENCE-BASED DIETARY CHOICES

NATIONAL PROGRAM 107 - HUMAN NUTRITION

To improve the nutrition and health of the American people, ARS conducts research on the quality of the American diet and on related health behaviors. Distinctive aspects of this research include an emphasis on a food-based approach to improving health; the core capability to sustain long-term research in areas deemed of high priority for the Nation's health; the availability of state-of-the-science equipment and facilities for human research across the lifecycle; and the conduct of multidisciplinary research to improve the nutritional value of the American diet and food supply. The mission of the Human Nutrition Program is to define the role of food and its components in optimizing health throughout the life cycle for all Americans by conducting high national priority research. This research emphasizes study of essential nutrients and nonessential, health-promoting components in foods; evaluating the nutritional value of diets eaten by people in America; determining how consumption of specific foods or food components can enhance health; and developing strategies to improve food choices and lifestyle factors. Increasingly, research focuses on addressing over-consumption and caloric imbalance with incorporation of cutting-edge genomic and metabolomic technologies to carry out research. Research addresses four overarching components: nutrition monitoring, the scientific basis for dietary recommendations, obesity prevention, and life stage nutrition and metabolism. Information dissemination programs operated by the National Agricultural Library address general and specific human nutrition issues and audiences and include general Web portals, such as www.nutrition.gov, as well as the targeted Web sites of the Food and Nutrition Information Center.

Performance Measure

4.1.1 Monitor nutrient composition of food supply and consumption by Americans while conducting research on life stage nutrition and metabolism. Strengthen the scientific basis for dietary guidance for health promotion and disease prevention and develop strategies for prevention of obesity and related diseases.

Performance Targets

1.1.A Link Agricultural Practices and Beneficial Health Outcomes.

Baseline 2012	Target 2017
Two discoveries documented and published in peer-reviewed journals that demonstrate how agronomic practices may benefit public health by improving important nutritional components of the food supply.	Cumulatively, six discoveries communicated to ARS stakeholders through peer-reviewed scientific papers.

1.1.B Monitor Nutrient Composition of the Food Supply and Consumption by Americans.

Baseline 2012	Target 2017
Three datasets on food composition and dietary intake were released by ARS and used by customers to establish Federal dietary policy guidelines, food assistance and feeding programs, and food labeling to safeguard the health of the American people.	Cumulatively, 15 datasets developed and released to ARS customers.

1.1.C Strengthen the Scientific Basis for Dietary Guidance for Health Promotion and Disease Prevention.

Baseline 2012	Target 2017
Four research studies on health effects of foods or nutrients published in peer-reviewed scientific journals that contribute evidence used in Dietary Reference Intake reports or the Dietary Guidelines for Americans.	Cumulatively, 20 studies published and released to ARS customers.

1.1.D Develop Strategies for Prevention of Obesity and Related Diseases.

Baseline 2012	Target 2017
Five papers in peer-reviewed scientific journals that test innovative approaches to preventing obesity or related conditions.	Cumulatively, 25 papers documenting these discoveries added to the scientific literature on this topic.

1.1.E Conduct Research on Life Stage Nutrition and Metabolism.

Baseline 2012	Target 2017
Five studies published in peer-reviewed journals that increase knowledge of nutrient requirements in the youngest and oldest Americans, how nutritional status relates to health, and how genes and epigenetic mechanisms contribute to this interplay.	Cumulatively, 25 scientific discoveries will be documented in scientific publications.

Strategies and Means

- Discover how agricultural production, post-harvest practices and environmental conditions affect the nutrient content of the U.S food supply.
- Determine food consumption and dietary patterns of Americans.
- Update, enhance and expand U.S. food composition data.
- Identify roles of food, nutrients, food components, and physical activity in promoting health and preventing disease.
- Improve the science base for updating national dietary standards and guidelines.
- Identify causes and consequences of obesity and related disorders.
- Develop and evaluate strategies to prevent obesity and related diseases.
- Evaluate the role of the Dietary Guidelines for Americans in preventing obesity and improving health.
- Understand mechanisms by which nutrition promotes healthy development and function from conception to old age.
- Define the basis for, and consequences of, nutritional programming.

GOAL 1.2 – PROTECT FOOD FROM PATHOGENS, TOXINS, AND CHEMICAL CONTAMINATION DURING PRODUCTION, PROCESSING, AND PREPARATION

NATIONAL PROGRAM 108 - FOOD SAFETY

The safety of the food supply continues to be a highly visible public health issue and a national priority for the Federal government. The continued priority is partly due to the diverse and complex system of production, processing, and distribution of food in the United States and the increasing global distribution. Outbreaks of foodborne illness are seen as a major cause of morbidity and mortality, and economic costs, both nationally and internationally. The full extent of the disease burden is still unknown, even with recent CDC estimates. Foodborne illnesses can be caused by microbial pathogens, parasites, viruses and an array of foodborne contaminants such as chemicals or toxins. The cause of every outbreak is still unknown, but persistent outbreaks of major commodity-specific foods that may directly affect public health, regulations, industry, and trade, require our immediate attention.

ARS has developed an integrated approach to food safety, that is, food production is seen as a continuous process from production, through harvesting and processing, to retail and the consumer. Pre- and post-harvest are not separated but considered an integrated production system of safe and quality food. Interventions and controls that are applied to one phase will ultimately affect the other segments of food production and processing. Food safety research has also changed during the past decade, having moved past simple, surveillance/prevalence studies to asking more complex questions. Consequently, researchers are required to think creatively to solve problems, which means considering alternate perspectives, exploiting new opportunities and technologies, and crossing conventional boundaries. Multidisciplinary collaborations, especially between Centers/Institutes, nationally and internationally are an absolute necessity.

ARS provides the intramural infrastructure and expertise to address short and long-term needs in food safety. Because of the infrastructure, ARS is uniquely poised to respond quickly to emerging and critical food safety issues. ARS also collaborates closely with Federal regulatory agencies as well as industry, professional, and international stakeholders to assist in addressing their specific food safety needs.

Performance Measure

4.1.2 <u>Develop new technologies that assist ARS customers in detecting, identifying and controlling foodborne diseases associated with the consumption of animal products that affect human health.</u>

Performance Targets

1.2.A Develop detection methodologies for food-borne pathogens and technologies for the rapid and sensitive detection of toxins, chemicals, and biologics that can be implemented for improved food safety and food defense.

Baseline 2012	Target 2017
Develop and transfer one new technology to ARS customers to detect, identify, and control foodborne pathogens and contaminants along the food production continuum.	Cumulatively, five new technologies will be developed and transferred.

1.2.B Conduct and evaluate research that will lead to effective control and intervention strategies for the reduction of microbial, chemical, and other contaminants of the food supply, as well as elucidation of the molecular and physiological mechanisms that allow for persistence, survival, and transmission of foodborne pathogens in the populations and environment.

Baseline 2012	Target 2017
Identify and evaluate potential control and intervention strategies for the reduction and control of foodborne pathogens and contaminants along the food production continuum.	Identify and evaluate potential control and intervention strategies for the reduction and control of foodborne pathogens and contaminants along the food production continuum.

Strategies and Means

- Identify and characterize the movement, structure, and dynamics of populations throughout food production and processing.
- Apply concepts of systems biology, taking advantage of genomics, proteomics, transcriptomics, metabolomics, and bioinformatics to the study of pathogenicity and virulence.
- Develop and evaluate technologies for the detection and characterization of microbial contaminants.
- Develop new intervention and control strategies for the reduction and control of foodborne pathogens and foodborne contaminants along the entire food production.
- Develop and evaluate predictive microbiology and data acquisition studies to understand microorganisms and their immediate environment and that can be used in risk assessments.
- Develop and evaluate detection methods and toxicology (including toxins) for the regulation, reduction, and control of veterinary drugs, chemical residues, heavy metals, persistent organic pollutants, and biological toxins derived from bacteria, fungi, and plants.
- Expand and improve the services of the National Agricultural Library food safety research information office.

GOAL 1.3 – ENHANCE THE ECONOMIC VIABILITY AND COMPETITIVENESS OF U.S. AGRICULTURE BY MAINTAINING THE QUALITY OF HARVESTED AGRICULTURAL COMMODITIES OR OTHERWISE ENHANCING THEIR MARKETABILITY, MEETING CONSUMER NEEDS, DEVELOPING ENVIRONMENTALLY FRIENDLY AND EFFICIENT PROCESSING CONCEPTS, AND EXPANDING DOMESTIC AND GLOBAL MARKET OPPORTUNITIES THROUGH THE DEVELOPMENT OF VALUE-ADDED FOOD AND NONFOOD TECHNOLOGIES AND PRODUCTS, EXCEPT ENERGY AND FUELS

NATIONAL PROGRAM 306 - QUALITY AND UTILIZATION OF AGRICULTURAL PRODUCTS

This research will increase our knowledge and develop technologies to better measure or enhance the quality of crop and animal products after harvest. Similarly, the marketability and value of commodities can be increased by ensuring that value-added food products (such as fresh-cut or minimally processed produce) retain sensory quality, nutritional value, and are free from food safety hazards. The research in this National Program will also generate new information on health promoting components of foods and assess their effects on important human diseases and obesity, in cooperation with the Human Nutrition National Program (NP 107) and other partners. In addition to food quality and safety, consumers have expressed concern over rising food prices which can be attributed to multiple factors. A significant factor in the cost of food production can be attributed to food waste or rot. Estimates indicate that approximately 27 percent of food produced in the United States is lost as waste among retailers, food service businesses, and consumers. Additional losses occur during food harvesting, storage, and distribution. The magnitude of the loss is even greater when resources spent on growing food such as fuel, water, fertilizer, chemicals, land-use, and human resources are considered. NP 306 research will develop technologies that improve quality, extend product shelf life, reduce waste, and decrease costs.

ARS conducts research on the development of nonfood, nonfuel biobased products from agricultural commodities and byproducts. Interest in biobased products has increased as consumers and governments have sought more environmentally friendly products that provide alternatives to petroleum and which do not contribute to greenhouse gases. Thus, biobased products can reduce our dependency on petroleum and provide a more sustainable technology for the future. Biobased products that were once too expensive to commercialize may now be affordable. There is some public concern that biobased products could contribute to the rising cost of food in the United States. This program seeks opportunities to develop biobased products from agricultural feedstocks that do not compete with food, in cooperation with other ARS national programs and partners. ARS also supports quality and processing research on crop fiber, such as cotton, and from animal hides, such as leather and wool. Stakeholders who produce fibers and hides constitute an important segment of our rural economy. These industries are severely impacted by energy and production costs and have lost market share to foreign competition. Technologies that improve fiber quality, reduce the energy consumption of processing equipment, and develop new products are needed to help the fiber industry to compete in a global market.

Performance Measure

1.1.3 <u>Develop methods and technologies to better define, measure, preserve or enhance quality and improve utilization of food crops, animals and agricultural fibers, as well as non-food, non-fuel biobased products and sustainable technologies/processes.</u>

Performance Targets

1.3.A Develop Methods and Technologies to Better Define, Measure, Preserve, or Enhance Quality and Improve Utilization of Food Crops and Animals.

1.3.B Develop Methods and Technologies to Better Define, Measure, Preserve, or Enhance Quality and Improve Utilization of Agricultural Fibers.

1.3.C Develop Non-Food, Non-Fuel Biobased Products and Sustainable Technologies/Processes.

The following baseline and target applies to all three performance targets listed above.

Baseline 2012	Target 2017
Four new biobased or fiber products and food items with improved quality, nutritional or functional characteristics were developed by ARS and used by customers, both domestic and foreign.	Cumulatively, 20 new technologies developed by ARS and adopted for uses that provide food crops and products with higher quality and extended shelf life; convenient and acceptable healthy foods; non-food, non-fuel biobased products with cost and performance features comparable or superior to petroleum-based products; high quality agricultural fibers; and valuable co-products from agricultural residues and processing wastes.

Non-food, non-fuel biobased products derived from renewable agricultural resources represent a small fraction of the market for petroleum-based industrial products and some are not yet economically competitive. Also, many agricultural products are marketed as low-value commodities, with postharvest spoilage decreasing return to producers. Healthy foods are often not convenient or readily accepted by significant numbers of consumers. Quality of agricultural fibers needs to be assured in an increasingly competitive global market.

Strategies and Means

- Define, measure, preserve, or enhance quality of foods and agricultural fibers.
- Identify and characterize new bioactive ingredients and develop functional foods.
- Develop new or improved technologies, processes, or products for foods and agricultural fibers.
- Identify and characterize agricultural feedstocks and byproducts for biobased products.
- Develop sustainable technologies/ processes which facilitate development of biobased products.

Strategic Goal Area 2: Natural Resources and Sustainable Agricultural Systems

ARS conducts research that *explains* the nature and function of agricultural systems and their physical, chemical, and biological components. With that explanatory power, ARS develops abilities to *predict* how agricultural systems may respond to different environments or management scenarios. Once ARS can make predictions with confidence, our scientists turn that knowledge into *decision support* tools and methods for:

- Improving the efficiency and effectiveness of management practices for agricultural systems and working lands to enhance ecosystem goods and services, including the sustainable production of agricultural commodities;
- Managing soil, water, air, and biological resources for society's benefits, including reductions in environmental impact, under different climatic regimes and environmental conditions;
- Providing agricultural products and co-products as renewable, bio-based alternatives to petroleum as inputs to manufacturing and generating energy; and
- Developing new, valuable, environmentally sound uses for agricultural and industrial byproducts.

Major priorities for ARS research on interactions among land, water, atmosphere, and diverse biological communities include remediation and use of degraded water for production of a wide range of crops; protection and enhancement of ecosystem goods and services arising from our natural resources; adaptation of agricultural production systems to climate change and mitigation of agricultural greenhouse gas emissions; development of diverse energy crops and agronomic practices for efficient and sustainable production, optimized for different geographic regions and climatic conditions throughout the U.S.; identification of safe uses of agricultural wastes and byproducts in generating energy/fuel and value-added biochemical products and fertilizers; creation and evaluation of conservation practices and land management decision-support tools arising from ARS' long-term agricultural research conducted in the agency's unique, critical infrastructure of instrumented watersheds and rangelands; development of widely accessible databases to support analyses of agriculture, land management, and the environment; and creation of a broad-based data and information access portal at the National Agricultural Library to enable life-cycle analyses and development/validation of sustainability indices for agricultural production and delivery systems.

Goal 2.1 – Integrated, Effective, and Safe Water Resource Management

National Program 211 - Water Availability and Watershed Management

Fresh water is essential to maintaining both agricultural and industrial production, ecosystem integrity, and human health. As the nation was established and expanded, it flourished in part because of its abundant and readily available water and other natural resources. As the 21st century unfolds, agriculture faces new and intensifying water challenges—increasing demands for water from our cities, farms, and aquatic ecosystems; increasing reliance on irrigated agriculture for stable crop and animal production and farm income; and changing water supplies due to groundwater depletion in some areas, climate variability and change, and the need to tap alternative water sources. These challenges are not insurmountable, and agricultural lands can play an important role in meeting them. Advances in agricultural water management can provide important and unique contributions to the complex problem of water management at regional and national scales. As new and

emerging technologies widen the range of options for future water management, science can develop and provide the tools needed by managers and planners to accurately predict the outcomes of proposed water management decisions at farm to national scales. The factual basis for decision-making includes an understanding of these new technologies, their effectiveness as well as potential unintended consequences, and a strategy for getting water users and agencies to adopt the technologies determined to be most effective. Thus, the Nation has the opportunity to apply and use science and technology to protect, sustain, enhance, and manage our water resources, improving human and ecological health, while continuing to build a strong and growing economy.

Performance Measure

2.2.1 Develop technology and practices to promote improvement of integrated, effective and safe water resource management.

Performance Targets

2.1.A Develop Tools and Technologies to Improve the Effectiveness of Agricultural Water Management.

Baseline 2010	Target 2017
ARS released new FAO water quality guidelines for irrigation with marginal waters and treated wastewaters.	Cumulatively, 17 models, tools, databases, sets of guidelines, or design criteria developed and released to ARS customers.

2.1.B Improve the Scientific Understanding of Erosion, Sedimentation, and Contaminant Transport Processes from Agricultural Fields and Landscapes to Facilitate the Development of Tools and Technologies to Better Protect the Agricultural Water Quality.

Baseline 2010	Target 2017
ARS released version 2010.1 of the Water Erosion Prediction Project (WEPP) model, to users in the US and throughout the world. Customers include land managers and conservationists charged with predicting runoff, soil loss, and sediment yield from hill slopes and small watersheds. The new version gives improved performance especially in areas experiencing substantial erosion from snowmelt on thawing soils.	Cumulatively, 16 technologies, databases, tools, models, or sensor-based monitoring systems developed and released to ARS customers.

2.1.C Develop Strategies to Improve the Effectiveness of Agricultural Conservation Efforts by Developing New or Improved Conservation Practices, Improving Practice Placement to Maximize Effectiveness and Minimize Cost, and Developing a Better Understanding of the Effects of Agricultural Conservation at the Landscape Scale.

Baseline 2010	Target 2017
Three tools to enhance conservation effectiveness released by ARS and used by customers to improve conservation management.	Cumulatively, 10 tools, technologies, models, databases, or improved conservation practices developed and released to ARS customers

2.1.D Conduct Research to Improve Watershed Management and Ecosystem Services in Agricultural Landscapes.

Baseline 2010	Target 2017
Two tools to enhance watershed management and ecosystem services in agricultural landscapes released by ARS and used by customers to improve flash flood forecasting and set design standards for flood and transport infrastructure, erosion estimates, storm characteristics, and other watershed processes.	Cumulatively, 10 tools, models, databases, or technologies developed and released to ARS customers

Strategies and Means

- Develop and/or improve irrigation scheduling technologies to sustain or enhance agricultural production.
- Improve water productivity and reduce water requirements at multiple scales.
- Develop and/or improve irrigation application methods.
- Improve dryland/rainfed water management.
- Improve drainage water management and control.
- Develop and/or expand alternative water sources for irrigation.
- Improve management of field scale processes controlling soil erosion, and the transport and fate of sediment and contaminants.
- Quantify and predict in-stream physical and biological processes controlling contaminant fate, transport, and effects.
- Improve our understanding of the processes influencing relationships between contaminants and aquatic ecosystems.
- Develop and test cost-effective measures to control transport and fate of contaminants in agricultural, urban, and turf systems.
- Develop new and innovative modeling and assessment tools to quantify sediment and contaminant transport on the landscape.
- Improve our understanding of how to select, place, and combine conservation practices to achieve improvements in water quantity and quality in watersheds.
- Improve conservation technologies by developing and testing new designs, equipment, and materials, to better protect water resources.
- Ensure conservation and agricultural management practices can increase agricultural profitability and resilience under changing climate and land use.
- Link conservation practice performance to multiple ecosystem responses and services across agricultural landscapes and aquatic systems.
- Improve watershed management and ecosystem services through large area, long-term field research, site characterization, and data dissemination in agricultural watersheds and landscapes.
- Develop tools and methods to improve water resources management.
- Measure and predict water-driven agroecosystem productivity and other ecosystem services.
- Improve our understanding of the impacts of climate and land-use change on water use and availability.

GOAL 2.2 – IMPROVE QUALITY OF ATMOSPHERE AND SOIL RESOURCES, UNDERSTAND EFFECTS OF CLIMATE CHANGE

NATIONAL PROGRAM 212 - CLIMATE CHANGE, SOILS, AND EMISSIONS RESEARCH

Agricultural systems function within the soil-atmosphere continuum. Mass and energy exchange processes occur within this continuum and agriculture can significantly affect the processes. Emissions from agriculture to the atmosphere affect air quality and increase atmospheric greenhouse gas (GHG) concentrations. While GHG emissions are largely a result of the natural cycling of carbon (C) and nitrogen (N), these emissions also contribute to climate change.

A changing climate impacts agriculture, range and pasture systems, and soils through alterations of precipitation and temperature patterns. Increased atmospheric carbon dioxide (CO_2) concentration has an enhanced fertilization effect on plants, particularly weeds. Combining these impacts of changing climate can alter habitats, thus changing the distribution of pathogens, weeds, and invasive species, resulting in increased threats to agricultural production and increasing the cost of production. The impacts of climate change clearly create challenges to agriculture and soil, water and air resources, and yet may also offer new opportunities for agricultural production and enhancement of soil quality.

Soils are a crucial boundary resource between agriculture and the atmosphere. Soils in agricultural systems must be managed to meet rising global demands for food, feed, fiber, fuel, and ecosystem services while maintaining soil productivity and limiting undesirable interactions between soils and the atmosphere. Enhancement of soil productivity is a focus of ARS research and together with crop improvement research offers promise for meeting future global agricultural demands.

The variability of the atmosphere, soils, and plants, and the complexity of interactions among these systems require collaborations by ARS scientists conducting NP 212 research. Formal and informal Cross Location Research (CLR) projects including the Greenhouse gas Reduction through Agricultural Carbon Enhancement network (GRACEnet), the Resilient Economical Agricultural Practices project (REAP; formerly called the Renewable Energy Assessment Project), the Long-Term Agroecosystem Research (LTAR) Network, and field campaigns focused on air quality are successful examples. Synthesis and integration of information, including sources outside NP 212 research projects, increases the utility and impact of ARS research for producers, land managers, and policy-makers. Efficient assimilation of data from NP 212 projects into existing and future collaborative data bases enhances synthesis and integration analyses and expands research opportunities.

Performance Measure

2.2.2 <u>Improve quality of atmosphere and soil resources; understand effects of climate change through development of knowledge and technologies.</u>

Performance Targets

2.2.A Enable Improvements of Air Quality via Management and Mitigation of Emissions from Agricultural Operations.

Baseline 2010	Target 2017
Integrated Farm Systems Model (IFSM) and Dairy Greenhouse Gas Emissions Model (DairyGEM) developed with focus on NE US agricultural systems, as a prototype for on-farm decision support technology.	Protocols implemented for standardized air quality research data collection and storage with transport parameters and emission rates for emission and transport model improvement, evaluation, and validation. IFSM and DairyGEM calibrated and tested for other regions of US.

2.2.B Develop Knowledge and Technologies for Reducing Atmospheric Greenhouse Gas Concentrations Through Management of Agricultural Emissions and Carbon Sequestration.

Baseline 2010	Target 2017
Cumulative GRACEnet project production of 208 scientific publications on GHG emissions and carbon sequestration in U.S. croplands and rangelands.	Agriculture product/production system-specific decision support tools and management strategies for balancing production goals, environmental stewardship objectives, GHG emission reductions, and C sequestration.

2.2.C Enable Agriculture to Adapt to Climate Change.

Baseline 2010	Target 2017
Data revealing anticipated impacts of climate change on crop production, weeds, pathogens, food, and forage quality.	Prototype decision support tools that enable sustainable agriculture under conditions of changing climate

2.2.D Develop Technologies for Maintaining and Enhancing Soil Resources.

Baseline 2010	Target 2017
Data on effects of biochar amendments and crop rotations on soil biomass, carbon cycling and enzymes.	Develop guidelines and practices to lower production costs, improve soil quality and health, and reduce use of energy and petroleum-based products.

Strategies and Means

- Understand, predict, and manage emissions from cropping systems.
- Understand, predict, and manage emissions from animal operations.
- Understand, predict, and manage emissions from post-harvest processing systems.
- Understand and measure emissions of greenhouse gases from agricultural sources.
- Develop process understanding of GHG emissions.
- Develop improved technologies and agricultural systems to manage greenhouse gas emissions.

- Understand the responses of crops, rangelands and pasture systems to anticipated climate change.
- Understand the impact of anticipated climate change on endemic pests, weeds and diseases.
- Evaluate germplasm and identify genetic variation that will respond positively to climate change.
- Evaluate and adapt agronomic management to climate change.
- Identify and develop scalable methodologies for assessing potential impacts and adaptation of agriculture to climate change.
- Develop strategies for controlling soil erosion.
- Improve soil management and water use efficiency.
- Improve nutrient cycling and use.

GOAL 2.3 – ENABLE NEW BIOREFINING TECHNOLOGIES TO SUPPORT AN ECONOMICALLY ROBUST BIOREFINING INDUSTRY

NATIONAL PROGRAM 213 - BIOREFINING

The ARS bioenergy program develops technologies to enable sustainable commercial production of biofuels by the agricultural sector in ways that enhance our natural resources without disrupting existing food, feed, and fiber markets. Research will optimize both the production of plant feedstocks and the biorefining of agricultural materials to bioenergy and value-added coproducts. This research will strengthen rural economies, provide supplies of renewable transportation fuel, enhance energy security, and improve the U.S. balance of trade, while diversifying rural economies and employment with new biobased technologies and commercial coproducts.

The growth and long-term viability of bioenergy production in the Nation is impeded by a number of technical and commercial barriers. ARS leverages its unique strengths and capabilities to pursue technical barriers that can be overcome by ARS resources.

In addition to tackling specific technical barriers and leveraging ARS core competencies, ARS bioenergy research is consistent with relevant non-technical considerations associated with public policy, general resource constraints, and overall practices/trends within the bioenergy industry.

Performance Measure

1.2.3 <u>Enable new commercially-viable technologies to (1) convert agricultural materials and byproducts into fuels and other marketable products, and (2) reduce risks and increase profitability in existing industrial biorefineries.</u>

Performance Targets

2.3.A Enable New Technologies that Benefit Biorefiners which Utilize Biochemical Processes to Convert Carbohydrate-Based Feedstocks.

Baseline 2012	Target 2017
ARS characterized two important feedstock traits, make progress on one enhanced germplasm pool, and establish one significant public-private partnership for advancing feedstock variety improvement.	By 2017, ARS will characterize 10 important feedstock traits, create three enhanced germplasm pools, and establish five significant public-private partnerships for advancing feedstock variety improvement.

2.3.B Enable New Technologies that Benefit Biorefiners which Convert Lipid-Based Feedstocks.

Baseline 2012	Target 2017
ARS incorporated at least one new technology that enables production of biomass and will contribute to the introduction of a new region-based system.	By 2017, ARS will incorporate six new technologies and introduce three new region-based systems that enable the production of biomass feedstocks to help achieve U.S. goals for meeting legislated mandates for blending biofuels. ARS will provide 10 science-based practices suitable for developing NRCS conservation plans.

2.3.C Enable New Technologies that Benefit Biorefiners which Utilize Pyrolysis to Convert Feedstocks.

Baseline 2012	Target 2017
ARS commercialized one biorefining and/or co-products technology which was enabled by ARS research.	By 2017, industry will commercialize five biorefining and/or co-products technologies which were enabled by ARS research.

Strategies and Means

- Enable conversion technologies (catalytic, enzymatic, microorganisms, esterification, and saccharification) that are used by industry for the production of advanced biofuels, biobased products, and/or co-products.
- Enable new technologies that are used by existing biorefiners to reduce their business risks and increase profitability.
- Enable new technologies that are used by industrial buyers of co-products from existing biorefiners.
- Enable new technologies that are deployed by industry to significantly improve cold-flow performance of biodiesel fuels.
- Enable commercially viable technologies that are employed by industrial users, for manufacturing new products or co-products at biodiesel facilities.
- Enable pyrolysis-based technologies that are used by industrial biorefineries for producing marketable advanced biofuels and/or fuel intermediates.
- Identify desirable feedstock traits and feedstock handling/preprocessing/blending practices that are adopted by biorefiners, feedstock producers, or plant breeders to enhance pyrolysis or torrefaction processing performance.
- Create capital and operating cost models for biorefining technologies to assess the commercial viability of new technologies and to identify ARS research that will result in the greatest impact.

Goal 2.4 – Effectively and Safely Manage and Use Manure and Other Agricultural and Industrial Byproducts in Ways that Maximize their Potential Benefits while Protecting the Environment and Human and Animal Health

National Program 214 - Agricultural and Industrial Byproducts

Improvements are needed in animal feeding and management regimens in order to increase the proportion of dietary nutrients retained in the animal or animal products while decreasing the quantity of dietary nutrients excreted and lost to the environment. Basic research is needed to evaluate the fate and transport of manure

nutrients in the major soil-crop systems common to animal agriculture. This is the foundation for developing Best Management Practices (BMP). Application methods are needed that can improve nutrient use efficiency and incorporate manure to conserve N while maintaining adequate crop residue to protect the soil from erosion and runoff. These practices, and their associated nutrient management plans, must be based on sound understanding of the fate and transport of specific nutrients for major soils, hydrologic conditions, and cropping systems.

Information is needed on pathogen inactivation and die-off as well as their potential for regrowth as functions of environmental conditions (e.g., temperature, moisture, etc.) during all stages of waste management. Technologically sound methods are needed for utilizing byproducts that will be characterized as beneficial and can result in products that are commercially sustainable. This includes blending, composting, and amending byproducts as well as developing land application and management techniques that will improve soil, water, and air quality in addition to improved plant growth. In addition, improved formulations of agriculture byproducts feed stock for use in industrial as well as agricultural applications are needed.

Performance Measure

2.2.4 Effectively and safely manage and use manure and other agricultural and industrial byproducts in ways that maximize their potential benefits while protecting the environment and human and animal health.

Performance Targets

2.4.A Increase Utilization of Manure Nutrients and Resources.

Baseline 2012	Target 2017
Data of the effectiveness of current practices.	Develop manure treatment/handling systems and management strategies for maximizing effective nutrient utilization and environmental stewardship objectives.

2.4.B Reduce Manure Pathogens and Pharmaceutically Active Compounds (PACs).

Baseline 2012	Target 2017
Data on environmental fate and transport of pathogens and PACs.	Develop animal production strategies for reducing excretion of pathogens and PACS. Develop manure treatment/utilization systems minimizing introduction of pathogens and PACs into the environment.

2.4.C Reduce Atmospheric Emissions from Animal Production Facilities.

Baseline 2012	Target 2017
Initial datasets of emissions from animal production operations and facilities.	Develop manure treatment/handling systems and animal production/management strategies for minimizing emissions.

2.4.D Develop Beneficial Uses of Agricultural, Industrial, and Municipal Byproducts.

Baseline 2012	Target 2017
Reuse of some materials and disposal of the majority.	Ten new economical and environmentally beneficial products created from materials previously considered to be wastes. Examples include new fuels, structural materials, and soil amendments.

Strategies and Means

- Improve the usability of manure nutrients through more effective animal nutrition and management.
- Maximize the value of manure through improved collection, storage, and treatment options.
- Utilize manure in integrated farming systems to improve profitability and protect soil, water, and air quality.
- Use manure and other agricultural byproducts as a renewable energy resource.
- Identify factors that control the fate and transport of pathogens from animal agriculture.
- Minimize the release of veterinary pharmaceuticals and hormones.
- Reduce antibiotic resistant bacteria in agricultural manures and wastes.
- Minimize risk with best management practices and treatment technologies.
- Quantify the extent of agricultural emissions of air pollutants.
- Characterize the physical, chemical, and biological processes essential for the development and evaluation of emissions models.
- Develop and test technologies and improved management practices to reduce emissions.
- Enhance the value of agricultural, industrial, and municipal byproducts by developing beneficial uses.
- Quantify the risks and benefits of using byproducts in agriculture and horticulture.

Goal 2.5 - Develop and Transfer Economically Viable and Environmentally Sustainable Production and Conservation Practices, Technologies, Plant Materials and Integrated Management Strategies, Based on Fundamental Knowledge of Ecological Processes, that Conserve and Enhance the Nation's Diverse Natural Resources Found on Its Range, Pasture, Hay and Turf Lands

National Program 215 - Rangeland, Pasture and Forages

This program develops and integrates improved management practices, germplasm, and land-use strategies to optimize productivity, economic viability and environmental enhancement in managing vegetation, livestock, and natural resources on private and public grass and forage lands. Research activities include: enhancing conservation and restoration of ecosystems and agro ecosystems through improvements based on the application of ecological principles; improving management of fire, invasive weeds, grazing, climate change, and other agents of change; developing grazing-based livestock systems that reduce risk and increase profitability in existing and emerging markets; developing improved grass and forage legume germplasm for livestock, conservation, turf, and bioenergy and bioproduct systems; improving the sustainability of turf management; and improving decision-support systems including improving inventory, monitoring, and assessment tools.

Performance Measure

2.2.5 Develop and transfer economically viable and environmentally sustainable production and conservation practices, technologies, plant materials and integrated management strategies, based on fundamental knowledge of ecological processes, that conserve and enhance the Nation's diverse natural resources found on its range, pasture, hay and turf lands.

Performance Targets

2.5.A Develop Practices and Technologies to Improve Rangeland Productivity and Ecological Services.

Baseline 2012	Target 2017
Three practices and technologies that improve livestock production and the effectiveness of conservation and restoration including reducing the risk of wildfires, invasive weeds and climatic uncertainty to improve profitability and enhance ecological services	Cumulatively, 15 rangeland practices and technologies developed and released to ARS customers

2.5.B Develop Practices and Technologies to Improve Pasture Productivity and Ecological Services.

Baseline 2012	Target 2017
Two practices and technologies that improve livestock production and the effectiveness of conservation on pasture lands including reducing the risk of climatic uncertainty and enhancing water resources and other ecosystems services	Cumulatively, 10 pasture practices and technologies developed and released to ARS customers

2.5.C Developed Sustainable Harvested Forage Systems for Livestock, Bioenergy and Bioproducts.

Baseline 2012	Target 2017
Two practices and technologies that improve harvested forage production for livestock and bioenergy while reducing the risk of climatic uncertainty and enhancing water resources and other ecosystems services	Cumulatively, 10 forage practices and technologies developed and released to ARS customers

2.5.D Develop Improved Germplasm and Management Practices for Sustainable Turf Systems.

Baseline 2012	Target 2017
One improved germplasm that enhances turf management including improving the environment and reducing the risk of climatic uncertainty	Cumulatively, five improved germplasm releases or improved management practices developed and released to ARS customers

Strategies and Means

- Develop rangeland livestock grazing systems that can meet producer, land manager, and global food security objectives, while being adaptable to changing environmental and climatic conditions.
- Develop management strategies and practices that enhance and conserve rangeland ecosystems to provide multiple ecosystem services under changing environmental and climatic conditions.
- Develop science-based understanding of how soils, plants, animals, climate, and human activities interact to affect rangeland ecosystem structure and function at multiple scales over time to improve the effectiveness of land management under changing conditions.
- Develop pasture-based livestock production systems that can meet producer, environmental, and global food security objectives while being adaptable to changing environmental and climatic conditions.
- Develop management strategies and practices that enhance and conserve pasture agroecosystems to provide multiple ecosystem services under changing environmental and climatic conditions.
- Develop science-based understanding of how soils, plants, animals, climate, and human activities interact to affect pasture agroecosystem structure and function at multiple scales over time to improve the effectiveness of land management under changing conditions.
- Develop improved plant materials for harvested forage and biomass production systems that will increase the efficiency of livestock and bioenergy production systems while enhancing the environment.
- Develop improved harvested forage and biomass production systems that increase economic and energy efficiency while enhancing the environment to meet national energy and food security goals.
- Develop improved turf germplasm and management practices that meet the objectives of turf producers and users under changing climatic and environmental conditions**.**

GOAL 2.6 – DEVELOP INTEGRATED SOLUTIONS TO SOLVE CHALLENGES RELATED TO AGRICULTURAL SYSTEM PRODUCTIVITY, PROFITABILITY, ENERGY EFFICIENCY, AND NATURAL RESOURCE STEWARDSHIP

NATIONAL PROGRAM 216 - AGRICULTURAL COMPETITIVENESS AND SUSTAINABILITY

Profitable farms are the basis of vibrant rural economies. Consumers benefit from agricultural production that provides abundant choices of products at relatively low costs. Even though commodity prices are now high, many farms still have difficulty responding to changing market conditions, and the high costs of fuel and other purchased inputs. In addition, there is increasing competition from overseas markets where production costs are comparatively low. At the same time, continued advancement of conservation goals is needed to enhance the natural resource base upon which the nation not only depends for food, feed, fiber, and renewable energy, but also for supplies of fresh water, clean air, and healthy ecosystems. The challenges producers face regarding productivity, profitability, and natural resource stewardship are complex, so the solutions to these challenges will not be simple.

Producers and natural resource managers need holistic solutions to the complex problems they face. Not only do they need to decide what the best production methods, improved varieties, and advanced technologies to use, they want to know how these innovations can be best incorporated into their operations and whether their investment will increase their ability to compete in the market. Though many of the problems producers face are the same across the country, it is accepted that each region and every farm is different, so there are no "one-size-fits-all" solutions.

These challenges are not unique to the United States. The United Nations Food and Agriculture Organization (GAO) addressed similar issues in their Strategic Framework 2010-2019. Strategic Objective A – Sustainable Intensification of Crop Production – seeks to increase production per unit land area to meet world food needs and "requires the integration and harmonization of all appropriate crop production policies and practices aimed

at increasing crop productivity in a sustainable manner, thereby meeting key millennium development goals aimed at reducing hunger and preserving the natural resources and environment for future use."

Interdisciplinary systems research provides an approach to understand how different kinds of farm enterprises function, and how changing or introducing new technology will affect their productivity, profitability, energy efficiency, and natural resource stewardship. Finding the best combinations of practices will help producers achieve their production goals, while enhancing the environmental goods and services derived from agricultural lands. Diverse and dynamic agricultural systems are needed that can adjust to changing environmental and market conditions to increase the long-term financial viability and competitiveness of farms, enhance natural resource quality, contribute to the vibrancy of rural communities, and increase the food, fiber, and energy security for the Nation and the world. This research will contribute to making sustainable intensification of agriculture a reality.

Performance Measure

1.2.6 Develop integrated solutions to solve challenges related to agricultural system productivity, profitability, energy efficiency, and natural resource stewardship.

Performance Targets

2.6.A Develop new strategies and technologies to reduce production costs and risks of economic losses for agronomic and bioenergy crop production systems.

Baseline 2012	Target 2017
Description of baseline systems for regional agronomic crop production systems.	Identify five new region-specific agronomic crop production system configurations that utilize on-farm resources and natural ecosystem processes to reduce the need for purchased inputs and reduce whole-system costs and risks.

2.6.B Develop new specialty crop management strategies to reduce production costs but have neutral or positive impacts on yield, product quality, and risk of economic loss.

Baseline 2012	Target 2017
Description of baseline condition for region-specific specialty crop production systems.	Identify four new region-specific production system configurations for new crops that utilize on-farm resources and natural ecosystem processes to reduce the need for purchased inputs and reduce whole-system costs and risks.

2.6.C Develop new strategies that integrate crop and livestock production elements to reduce risks of economic loss, diversify income, and enhance environmental benefits.

Baseline 2012	Target 2017
Description of baseline conditions for integrated crop-livestock production systems.	Identify two enhanced region-specific system configurations that take advantage of the complimentary benefits of combining crop and livestock production enterprises to reduce the need for purchased inputs and reduce whole-system costs and risks.

2.6.D Develop and integrate technology and decision support tools to increase production system efficiency.

Baseline 2012	Target 2017
Single natural resource and plant growth assessment models calibrated for local conditions.	Natural resource assessment and plant growth models applied to regional crop production systems and integration of economic factors.

Strategies and Means

- Develop economic risk averting management strategies that improve soil productivity, enhance soil and water conservation and nutrient cycling, and reduce fuel and pesticide use while enhancing the natural resource base.
- Identify optimal regional strategies to incorporate bio-based energy production without disrupting agricultural diversity and compromising natural resource quality.
- Develop on-farm production systems to replace purchased fuel and energy.
- Develop ecological-based pest management strategies that enhance yields and market quality, while reducing the need for pesticides.
- Develop production systems that meet new market opportunities and improve producer profitability and competitiveness.
- Identify the most appropriate methods for delivering new information and technologies to promote adoption by customers and stakeholders.
- Develop a set of management principles that are common to agricultural systems across production regions that reduce risks, improve competitiveness, and promote environmental stewardship.
- Improve production efficiencies through precision management, automation, and decision support technologies that reduce agricultural chemical and irrigation water use.
- Develop an approach to assess the economic and environmental impacts of agriculture across broad landscapes.
- Through a perspective of the interaction of genetics by environment by management (GxExM) focus research that leads to a closing of the yield gap between potential yields offered by genetics and farmer yields that rarely reach potential yields.

Strategic Goal Area 3:
Crop Production and Protection

Research conducted by ARS' Crop Production and Protection Program (CPP) National Programs will deliver science-based information and technologies to meet:

- Producers' needs for increased crop productivity and quality, protection from diseases and pests, and economically and environmentally sustainable methods of crop production;
- Consumers' demands for a ready supply of high quality, safe, affordable, and nutritious food;
- Workers' needs for a safe working environment;
- The public's desire to protect the environment; and
- The global community's needs for food security.

To meet these needs, ARS will conduct research that addresses the national priorities of genetic resource conservation, genomics, and genetic improvement; prevention and treatment of plant diseases; identification and management of arthropod and weed pests, including quarantine pests; improved crop management strategies; and the development of methyl bromide alternatives. The research of the Crop Production and Protection National Programs is well integrated with other ARS research in Animal Protection and Production; Natural Resources and Sustainable Agricultural Systems; and Nutrition, Food Safety and Quality. Through the National Invasive Species Information Center and Alternative Farming Systems Center of the National Agricultural Library, key information will be disseminated to agricultural producers, the research and education community, and the general public.

Goal 3.1 – Protect, Expand, and Enhance the United States' Crop Genetic Resource Base, Increase Scientific Knowledge of Crop Genes, Genomes, Biological Processes and Systems, and Deliver Economically and Environmentally Sound Technologies that Improve the Production Efficiency, Quality, Health and Value of the Nation's Crops.

National Program 301 - Plant Genetic Resources, Genomics, and Genetic Improvement
National Program 305 - Crop Production

U.S. crop production depends on new and improved varieties of crops—developed faster and for less cost—that are competitive in the market, increasingly tailored to meet the complex demands for food, feed, fiber, ornamentals, and energy; and adapted to an increasingly challenging global climate. To do so, ARS research will harness the inherent genetic potential of plants. This research will develop, and effectively apply, new knowledge of crop genes, genomes, and the control and expression of genes, to accelerate productivity and improve the quality of crops; realized via traditional and novel plant breeding methods.

Genetic resources are the foundation of our agricultural future. ARS crop gene banks contain the sources of resistance to biotic and abiotic stresses and new genes to improve the quantity and quality of food, feed, energy, fiber, and ornamental crops. To ensure that these genes are available for research and breeding, ARS will continue to acquire and conserve crop genetic resources, develop more effective screening methods for identifying superior traits, characterize the genetic profiles of gene bank holdings, ensure that genetic resources

are distributed where and when they are needed, and safeguard these collections and their associated information for future generations.

New ARS genetic technologies will address the specific needs for higher crop yields; more durable and effective tolerance to abiotic stresses including drought, heat, cold, freezing, and flooding; more efficient crop use of key inputs such as water and nutrients; more durable and effective pest and disease resistance; control of flowering time; enhanced product composition and nutritional quality; value-added traits; and conversion efficiency to biofuels. ARS research will elucidate how crop traits are controlled by underlying genetic systems, how these traits are affected by environmental factors during crop production, and how to enhance traits by incorporating novel sources of genetic variation from underexploited genetic resources or by genetically-engineering such traits. ARS will devise new crop genetic improvement methods that incorporate advances in genome sequencing and analysis, molecular genetics, computational biology, and metabolic engineering. New crop breeding theories and strategies will be developed to more effectively capture the intrinsic genetic potential of germplasm—especially to improve key agronomic and horticultural traits—resulting in crops tailored for consumer and producer needs.

ARS will continue to lead the development of crop genetic and genomic information management and database systems that broadly support and enhance crop research, from germplasm improvement and breeding to genetic and genomic analyses. New tools will be generated to efficiently incorporate valuable new data into databases, extract key information from the massive quantity of data safeguarded in those databases, identify the important properties of genes, apply that knowledge to crop improvement, and build on genetic advances in one crop so as to accelerate genetic gains in others.

The Nation's economic vitality depends on the ability of U.S. crop producers to grow and market food, fiber, ornamentals, industrial products, feed, and fuels profitably; while enhancing the natural resource base on which crop production depends. Future economic success for U.S. producers depends on increased productivity, access to new markets for specialized products, new technologies that generate new opportunities for U.S. farmers, and new tools and information to mitigate risks and enable rapid adjustments to changing market conditions. The agricultural sector is challenged by a wide variety of resource, climatic, economic, and social factors that require an equally diverse array of strategies and solutions for successfully meeting those challenges.

Contemporary U.S. crop enterprises for annual, perennial, and greenhouse crop production are complex and depend on access to and successful integration of highly diverse components, such as a steady stream of superior crop varieties, new strategies for mitigation of crop losses from biotic and abiotic stresses, and mechanization and automation of undesirable or labor intensive activities. The development of successful new production systems to sustain or increase crop yield and quality requires focusing on 1) productive and profitable crop management strategies for new and traditional crops that conserve natural resources; 2) efficient and effective integrated management strategies for multiple pests; 3) mechanization of management activities to address labor constraints; and 4) improved crop management models and decision aids.

Pollination is a critical element in agriculture as well, because honey bees pollinate more than 130 crops in the United States and add $15 billion in crop value annually. Declining honeybee populations and honey production due to Colony Collapse Disorder (CCD) require special attention. CCD has now increased honey bee mortality to more than 30 percent. Also, as new crops are introduced and stresses on honeybees increase, pollinators will be continuously required for specific crops or protected environments.

Improved production systems must address the needs of small, intermediate, and large field-, greenhouse-, orchard-, and vineyard-based farming enterprises for more efficient conventional, organic, and controlled-environment production methods and strategies. New crop production technologies must increase production efficiency, conserve energy and natural resources, and provide resilience in the face of abiotic and biotic stresses; while maintaining or enhancing productivity and product quality.

Key outcomes of this research will be new technologies (such as superior crop varieties; enhanced breeding stock; more effective crop and pest management strategies; improved sensors, robotics, and spray application equipment; improved decision support systems; more efficient production systems) and information that sustain U. S. crop production and enable producers to compete more effectively in the global market place. The U. S. national capacity to exploit the genetic potential of crops efficiently and effectively is maintained, and U.S. crop productivity and efficiency are enhanced.

Performance Measure

1.3.1 Develop knowledge, strategies, systems and technologies that maximize the production efficiency of our annual, perennial, greenhouse and nursery cropping systems. Develop new technologies and tools contributing to improving these systems to meet current and future food crop production needs of diverse consumers, while ensuring economic and environmental sustainability and production efficiency, health, and value of our nation's crops.

Performance Targets

3.1.A Develop and Maintain Superior Crop Genetic Resources and Associated Information, Genetic, Genomic, Bioinformatic, and Breeding Tools, Techniques, and Analytical Approaches, Crop Production Systems, and Technologies to Harness Crops' Genetic Potential and Optimize Productivity and Profitability of U.S. Crop Production. The Preceding Will Underpin a Safe, Affordable and Sustainable Supply of Nutritious Foods and Superior Crop Products for the U.S. and Other Nations, Protect the Environment, and Contribute Strongly to Global Market Competitiveness of U.S. Agriculture.

Baseline 2012	Target 2017
Ten new technologies are developed by ARS and used by ARS customers, leading to increased production efficiency and enhanced economic value and quality of U.S. crop production, while reducing any negative environmental impact.	Fifty new technologies are developed by ARS and used by ARS customers, leading to increased production efficiency and enhanced economic value and quality of U.S. crop production, while reducing any negative environmental impact.

Strategies and Means

- Higher yielding plants.
- Plants with resistance or tolerance to diseases and pests.
- Plants tolerant to environmental changes or extremes.
- Plants with superior product quality.
- Plants with enhanced water and input-use efficiencies.
- Plants optimized for production efficiency.
- Plants for bioenergy and bio-based products.
- New uses for current crops.
- Genetically and phenotypically characterized germplasm designed for elucidating gene function and/or developing superior cultivars.
- High-throughput genotyping methods and mapped genetic markers for priority traits in diverse crops.
- High-resolution genetic maps and sequences for priority crops.
- New phenotyping approaches for quantitative trait analysis.
- Dissection of the genetic structure of complex traits and functional characterization of their constituent genes.

- Methods of genomic selection and prediction.
- Genomic-assisted breeding approaches for dealing with complex traits, and identifying and introgressing exotic alleles into adapted backgrounds.
- Improved plant breeding techniques that apply knowledge from model plants.
- Actively curated, long-term, interconnected information resources that support crop breeding, genetic, genomic, and biological research.
- Bioinformatic tools for data analysis or data mining that can extend from a single crop to related species.
- New tools to manage high-throughput phenotypic and genotypic data.
- Expanded outreach to instruct users on database access and the diversity of available data.
- Database improvements resulting from user surveys and database working group recommendations.
- Expanded domestic and international research community utilization of bioinformatic tools and data.
- Priority genetic resources and associated knowledge safeguarded in state-of-the art gene banks and databases.
- Genetic gaps in collections identified and priority genetic resources acquired.
- Genetic resources characterized systematically.
- Genetic resources evaluated for priority agricultural traits.
- More efficient and effective genetic resource management methods developed.
- High quality genetic resources and associated information delivered to requestors.
- International partnerships for genetic resources research and exchange expanded.
- Genetic resource management plans and Crop Germplasm Committees strengthened.
- Enhanced knowledge of how plants interact with the environment at the molecular, whole genome, and systems level, which is needed for developing resilient, well-adapted crops.
- Determining how plant growth and development are controlled at the genetic and epigenetic levels, so that more productive crops can be bred.
- Understanding the control of plant metabolism and biochemical pathways to enable higher yielding crops and new crop products to be developed.
- Improved biotechnology risk assessment methods for the analysis of potential unintended consequences in crop plants, on crop production, and on the environment.
- Improved public domain tools for producing transgenic crops.
- Genetic engineering technologies that can serve as adjuvants to improve the efficiency of conventional crop breeding.
- Improve understanding of the effects of management practices on crop productivity and quality.
- Develop integrated strategies for managing pests, soil, water, nutrient, and environmental factors for optimal yield, quality, and economic returns.
- Develop sensors, mechanization, and automation technologies that increase production efficiency.
- Develop technologies and information that enable agricultural input applicators to appropriately apply and deliver pesticides to target pests and pathogens and comply with safety and regulatory requirements.
- Integrate crop cultivars, management strategies for abiotic and biotic stresses, and mechanization technologies into improved, productive, profitable, and environmentally acceptable crop production systems.
- Develop decision support systems to optimize the efficiency of crop production systems.
- Improve bee health, which will in turn increase honey production and effectiveness of crop pollination.
- Protect pollinator biodiversity needed for conserving and restoring U.S. landscapes.

GOAL 3.2 – PROTECT OUR NATION'S CROPS

NATIONAL PROGRAM 303 - PLANT DISEASES
NATIONAL PROGRAM 303 AND CROP PROTECTION AND QUARANTINE

Economic losses of agricultural crops and natural ecosystems due to arthropods, plant pathogens, nematodes and weeds are considerable, with estimates in the tens of billions of dollars each year to agriculture, landscapes, and forests in the United States. Losses are due to reduced yields, lower product quality or shelf-life, decreased aesthetic or nutritional value, and food and feed contaminated with toxic compounds. Pest management strategies include cultural, biological, physical, and chemical methods. Non-chemical methods based on biological knowledge continue to expand, but the United States continues to depend heavily on chemical control to produce agricultural commodities. For instance, in 2007 more than 850 million pounds of pesticides (including herbicides, insecticides, fungicides, and nematicides) were applied to agricultural crops in the United States to protect these commodities from pests and pathogens (Pesticides and Industry Sales and Usage; 2007 and 2007 Market Estimates, EPA).

Maintenance of our arsenal of valuable management strategies is a constant challenge, as inherent disease and pest resistance in crops declines while pests become resistant to chemical controls, new pest problems emerge, new regulatory requirements are enacted, and production costs increase with rising energy costs. Further, the problem of losses due to pests and plant diseases does not end in the field or with the harvest. Insects and diseases reduce the quality of stored grain and other stored products, and it is estimated that post-harvest losses to corn and wheat alone amount to as much as $2.5 billion annually. Pests and diseases can also impede foreign trade. Imported commodities as well as those destined for export must be protected from endemic and exotic pests. Exotic insect, disease, and weed pests that threaten our food, fiber, and natural ecosystems are another mounting concern, as world trade and travel continues to expand. Invasive species such as the brown marmorated stinkbug and the Asian soybean rust directly threaten U.S. agricultural crops, while other invasive insects transmit devastating viral and bacterial diseases, such as citrus greening, that threaten entire agricultural industries. Still other invasive insects, such as the Asian longhorned beetle, and the sudden oak death pathogen decimate our forests and urban landscapes, while invasive weeds reduce biodiversity, displace native species, and cost billions of dollars annually to control. Management of arthropod pests, plant diseases, and weeds is essential for providing an adequate supply of food, feed, fiber, and ornamental crops, but effective control depends on understanding the biology and ecology of these deleterious organisms as well as beneficial ones.

Numerous, diverse approaches are needed to protect U.S. crops from arthropods, plant pathogens, nematodes, and weeds. To manage plant pathogens and nematodes, ARS will: 1) develop and improve rapid and reliable methods for detection and identification of plant pathogens and nematodes; 2) enhance knowledge of the etiology of plant diseases and systematics of their pathogens; 3) provide in-depth knowledge of the biology, ecology, and epidemiology of plant pathogens and their interactions with hosts and vectors to identify targets for new disease management strategies; 4) develop and deploy host resistance against plant diseases and nematodes, and 5) develop biologically based and integrated disease management strategies.

To reduce the impact of weeds on the nation's agricultural and natural systems, ARS will 1) develop novel weed management solutions to control the reproduction and spread of invasive and weedy plants—based on new knowledge derived from plant genomics, biochemistry, and physiology; 2) expand integrated weed management programs by incorporating newly identified natural products or natural enemies, such as fungi, bacteria, viruses, nematodes, and insects; 3) determine the mechanisms of herbicide resistance in weeds and enhance knowledge of the biology, physiology, and ecology of weeds, so as to develop cropping system methods that mitigate herbicide resistance development and spread; 4) develop spatial models to monitor and control invasive plants in complex landscapes; 5) develop recommendations for restoring natural systems in ways that prevent weed

invasions following effective biological control; and 6) identify effective weed management solutions for reduced tillage, low herbicide input, and organic production systems.

To ensure the cost effective management and control of native and invasive arthropod plant pests, ARS will 1) develop new bioinformatic tools that enhance insect species identification; 2) identify genetic, biological, and ecological determinants of plant insect pests that can be manipulated to improve their control; 3) determine critical factors involved in disease transmission by insects; 4) improve insect monitoring and capturing methodologies by identifying, synthesizing, and field-testing semiochemicals; 5) develop new biological, chemical, and cultural methodologies to control plant insect pests; 6) improve or develop sterile insect technique technologies to eradicate insect pests; and 7) develop systems for rearing natural enemies that have been demonstrated to be effective and safe biological control agents.

The key outcomes of this research will be the knowledge and improved capacity needed to protect plants in agricultural and natural systems—including the safe production and trade of food, feed, fiber, ornamentals, industrial products, and biofuels. This research and the transfer of resulting technologies will provide globally competitive and sustainable agricultural systems, safe and nutritious food, and healthy landscapes.

Performance Measure

4.3.2 Provide scientific information to increase our knowledge of plant genes, genomes and biological and molecular processes to protect crops and cropping systems from the negative effects of pests and infectious diseases. Develop sustainable control strategies for crop pests and pathogens based on fundamental and applied research that are effective and affordable, while maintaining food safety and environmental quality.

Performance Target

3.2.A Develop sustainable control strategies for crop pests and pathogens based on fundamental and applied research that are effective and affordable, while maintaining food safety and environmental quality.

Baseline 2012	Target 2017
Technologies produced by ARS were transferred to growers and producers, action agencies, the research community, and exporters and importers of agronomic products to exclude, eradicate and/or better manage disease and pest outbreaks as they occur in the United States or prior to their arrival on our shores.	At least 30 new or improved technologies produced by ARS will be transferred to growers and producers, action agencies, the research community, and exporters and importers of agronomic products to exclude, eradicate and/or better manage disease and pest outbreaks as they occur in the United States or prior to their arrival on our shores.

Strategies and Means

- Develop and improve diagnostics and systematics for plant pathogens and nematodes, and systematics of arthropods, and weeds.
- Expand knowledge of fundamental biology and ecology of arthropods, plant pathogens, nematodes and weeds; and pathogenesis of plant diseases.
- Develop and deploy plant resistance to effectively manage pests and diseases.
- Develop and implement biologically based and integrated management strategies of pests and diseases.
- Develop pest management systems to optimize efficacy of pesticides and reduce harmful emissions.
- Identify and mitigate emerging pest problems.

- Increase understanding of disease and pest etiologies to effectively interrupt critical points in life cycle.
- Develop and deploy trapping methods for new and endemic pests and pathogens.
- Identify and develop new molecular targets related to host preference, virulent and pest mitigation.
- Develop natural products and strategies to reduce pesticide use for sustainable cropping, horticultural and organic systems.
- Improve monitoring and restoration management approaches in natural ecosystems.
- Develop methods that allow economical replacement of methyl bromide fumigation for the purpose of controlling quarantine pests, pests on fresh and preserved commodities, and pests of stored products.
- Perform research to understand the risk from invasive species that affect agriculture, to develop methods to prevent entry of invasive pests, and to develop biological control to mitigate the damage from invasive species.

Strategic Goal Area 4:
Animal Production and Protection

The ARS Animal Production and Protection (APP) national programs provides the scientific information and tools to help support the U.S. food animal industries to continue to compete successfully in worldwide trade, provide the supply of nutritional animal products required by the Nation, and contribute toward global food security. APP will accomplish this mission by maximizing production efficiency and animal health through scientific innovation and the discovery and development of new technologies focused on national priorities. Strategic public-private partnerships will be established to achieve our mission, including support of government action and regulatory agencies responsible for trade, biodefense, and global food security. Emphasis will be given to genetic improvements of traits related to production and production efficiencies and germplasm conservation; understanding the mechanisms of disease resistance and the development of tools to prevent, control, or eradicate diseases that threaten the U.S. food supply and public health; and identifying and developing sustainable systems for production of high quality meat, fish, milk, and eggs that also ensure animal health and well-being. The portion of the program that produces new solutions to the many veterinary problems created by arthropod pests and vectors will be leveraged to solve related problems affecting human health and the well-being of American citizens.

Goal 4.1 – Provide Scientific Information and Biotechnologies to Enhance Management Practices that will Ensure an Abundant Supply of Competitively Priced Animal and Aquaculture Products

National Program 101 - Animal Production
National Program 106 - Aquaculture

U.S. production systems for food animals and aquaculture face formidable challenges. One of the most exacting challenges is successful adaptation to the accelerating demands of society that impact animal productivity and product quality, including increased production, improved production efficiencies, economic and environmental sustainability, ensuring animal well-being and improved product quality and healthfulness for consumers.

The demands placed on the national system of food animal production by a rapidly changing world can only be met by technologies that optimally harness the inherent genetic potential of animal germplasm in concert with industry stakeholders. Production systems that successfully harness that genetic potential will maximize profits, secure supply, increase market competitiveness, sustain small and mid-sized producers, maintain genetic diversity and increase consumer confidence. These optimized production systems will also ensure the economic and environmental sustainability of animal agriculture while enabling production of animal products adequate to meet the dramatically increased demand for animal products worldwide.

Consequently, the overall mission of ARS animal production and aquaculture systems is to 1) safeguard and utilize animal and microbial genetic resources, associated genetic and genomic databases, and develop robust bioinformatics tools; 2) develop a basic understanding of the physiology of livestock, poultry, and aquaculture; 3) develop improved understanding of nutritional requirements for animals, particularly in aquaculture and improve the efficiency of nutrient utilization for animals; and 4) develop information, tools, and technologies that can be used to improve animal production systems, all to ensure an abundant, safe, and inexpensive supply of animal products produced in a healthy, competitive, and sustainable animal agriculture sector of the U.S. economy.

Performance Measure

1.4.1 Provide scientific information to maximize the production efficiency of our food animal production systems. Develop new technologies and tools contributing to improve those systems to meet current and future food animal production needs of diversified consumers, while ensuring economic and environmental sustainability and animal well-being.

Performance Targets

4.1.A Provide scientific information to maximize the production efficiency of our food animal production systems.

Baseline 2012	Target 2017
Seven research studies on production efficiency published in peer-reviewed scientific journals that contribute evidence to improve food animal production systems.	Cumulatively, 35 new scientific papers will be published in this area of research.

4.1.B Develop new technologies and tools contributing to improved precision animal production systems to meet current and future food animal production needs of diversified consumers, while ensuring economic and environmental sustainability and animal well-being.

Baseline 2012	Target 2017
One new technologies developed and used by ARS customers to increase production efficiency and enhance the economic value and well-being of U.S. food animal production while decreasing the environmental footprint of production systems.	Cumulatively, five new technologies developed and used by ARS customers

Strategies and Means

- Develop genome analysis tools and reagents to enable better utilization of agricultural animal and microbial genomes and enhance genetic improvement programs.
- Develop understanding of metagenomes and how to exploit metagenomes for improved animal production and protection.
- Identify economically important genetic traits, their interactions, and correlations for application in genetic evaluation programs.
- Translate animal genomics into animal improvement programs and accelerate genetic gain.
- Determine biological processes that improve animal productivity and quality.
- Compare and analyze animal genes and genomes.
- Preserve and curate agricultural animal genetic resources.
- Identify criteria needed to ensure animal well-being and reduce stress in agricultural animal production systems.
- Improve efficiency of nutrient utilization and conversion of feeds and forages to animal products.
- Understand the relationship between nutrition and animal health/immunity.
- Enhance reproductive performance and reduce reproductive losses in agricultural animals.
- Improve the quality and healthfulness of food animal products.

- Develop systems for measuring and reducing variation in product quality and yield.
- Characterize safety and quality of products from non-conventional production systems.
- Improve aquaculture production systems, recirculation technologies, flow-through, and pond production systems.
- Develop shellfish systems to maximize productivity and environmental benefits of filter feeders.
- Determine nutrient requirements for various aquaculture species.
- Evaluate the nutritional value, and develop alternative ingredients as sources of protein and lipid for aquatic animal diets.

GOAL 4.2 - PREVENT AND CONTROL PESTS AND ANIMAL DISEASES THAT POSE A THREAT TO AGRICULTURE, PUBLIC HEALTH, AND THE WELL-BEING OF AMERICAN CITIZENS

NATIONAL PROGRAM 103 - ANIMAL HEALTH
NATIONAL PROGRAM 104 - VETERINARY, MEDICAL AND URBAN ENTOMOLOGY
NATIONAL PROGRAM 106 - AQUACULTURE

Investments in animal protection research are critical to the growth and resilience of the supply of food for tomorrow and Feed the Future initiatives. Enhancing the health of animals in agricultural production systems will directly impact food quality and ensure a sufficient supply of macro and micro-nutrients to meet people's basic needs worldwide. When combined with other investments in agricultural development, research-based innovations will address some of the fundamental constraints that give rise to food insecurity by reducing production risks associated with pests and diseases.

Achieving results in animal protection research in the 21st century will demand a systems biology approach in which knowledge obtained from animal genomes, functional genomics, clinical trials, and epidemiology are integrated in the discovery and development of countermeasures for preventing and controlling disease outbreaks.

Entomological research will concentrate on priority problems affecting animal production, human health, and the well-being of American animals and citizens. The research aims to dedicate 30 percent of resources to basic research that provides relevant information about target pests and 70 percent to applied research and product development. The program seeks to attain a balance of skills among its scientists so that it can take full advantage of the latest developments in biology, while at the same time applying its efforts to solution of practical problems.

Accordingly, the goal of the ARS animal protection research programs is to protect and ensure the safety of the Nation's agriculture and food supply through improved disease detection, prevention, control, and treatment. Basic and applied research approaches will be applied to solve animal health problems of high national priority. Emphasis will be given to methods and procedures to control animal diseases through the discovery and development of:

- Diagnostics and tools for identification of pests/vectors;
- Vaccines;
- Biotherapeutics;
- Pesticides, repellents, attractants, traps, and other innovative products for pest/vector control;
- Animal, pest, and vector genomics applications;
- Disease management systems and integrated pest/vector management systems;

- Animal disease models;
- Farm biosecurity measures;
- Applications of global information systems; and
- Chemical ecology of pests and vectors.

Animal protection national programs have eight strategic objectives:

1. Develop an integrated animal, arthropod, and microbial genomics research program.
2. Launch research programs to provide alternatives to antibiotics in food animal production.
3. Build a technology-driven vaccine and diagnostic discovery research program.
4. Develop core competencies in field epidemiology and predictive biology.
5. Develop expert collaborative research laboratories recognized by the World Organization for Animal Health (OIE) and the United Nation's Food and Agriculture Organization (FAO).
6. Develop a model technology transfer program to achieve the full impact of our research discoveries.
7. Perform the full spectrum of research for improvement of veterinary, public, and military entomology.
8. Develop safe and effective methods for prevention of damage caused by arthropods to homes and households.

Performance Measure

4.4.2 Provide scientific information to protect animals, humans, and property from the negative effects of pests and infectious diseases. Develop and transfer tools to the agricultural community, commercial partners, and government agencies to control or eradicate domestic and exotic diseases and pests that affect animal and human health.

Performance Targets

4.2.A Provide scientific information to protect animals, humans, and property from the negative effects of pests and infectious diseases.

Baseline 2012	Target 2017
Seven research studies that had significant impact on the scientific community and/or will lead to new technologies for protection of humans, property, and livestock from harm due to pests or diseases.	Cumulatively, 35 new scientific papers will be published in this area of research.

4.2.B Develop and transfer tools to the agricultural community, commercial partners, and government agencies to control or eradicate domestic and exotic diseases and pests that affect animal and human health.

Baseline 2012	Target 2017
One technology used by the commercial and/or government sectors relevant to the protection of humans, property, and domestic animals.	Cumulatively, transfer five technologies to the commercial and/or government sectors.

Strategies and Means

- Increase our capability to understand and predict emerging disease threats.
- Discover the genetic and epigenetic drivers of disease susceptibility.
- Improve our understanding of microbial pathogenesis, transmission, host-range specificity, and immune responses to enable the development of countermeasures to prevent, control, and eradicate animal diseases.
- Understand the role of poly-microbial infections in our domestic animal production systems.
- Improve our understanding of prions and other misfolding protein diseases.
- Apply a systems biology approach to the discovery of highly effective vaccines to prevent diseases of livestock, poultry, and aquaculture species.
- Create new tools to control highly infectious diseases of livestock, poultry, and aquatic species.
- Develop diagnostics and vaccines specifically designed for disease control programs.
- Discover, develop, and evaluate alternative strategies to mitigate the threat of antimicrobial resistance in animal agriculture.
- Identify effective disinfectants and validate their use to decontaminate containment areas and equipment.
- Improve the ability to perform assessment of risk from mosquitoes, flies, invasive ticks, stable flies, house flies, horn flies, biting midges, fire ants, and other invasive ants.
- Develop better surveillance methods for mosquitoes, sand flies, ticks, bed bugs, invasive ticks, screwworm fly, fire ants, and other invasive ants.
- Create better control techniques against mosquitoes, flies, sand flies, ticks, bed bugs, invasive ticks, stable flies, house flies, horn flies, screwworm fly, biting midges, fire ants, and other invasive ants.
- Achieve better sustainability of integrated pest management against mosquitoes, invasive ticks, house flies, screwworm flies, and fire ants.

Program Management Goal 1:

Ensuring the Quality, Relevance, and Performance of ARS Research

The Office of Management and Budget (OMB) has established Government-wide R&D Investment Criteria that are designed to assess the relevance, quality, and performance of Federally funded research, and ARS adopted the R&D Investment Criteria as a tool to measure its research. To establish the relevancy of the Agency's research programs, ARS relies on organized interactions with customers, stakeholders, and partners. Peer reviews conducted by the Office of Scientific Quality Review (OSQR) and the Research Position Evaluation System (RPES) ensure the quality of the Agency's research and scientific workforce. All research projects are assessed annually to determine the number of currently approved milestones that were met/not met during the preceding fiscal year. Near the end of the 5-year program cycle, National Programs are subject to retrospective reviews, which verify the scientific impact and programmatic relevance of the work conducted under each National Program Action Plan.

PM Goal 1.1 - Relevance: ARS' Basic, Applied, and Developmental Research Programs are Well- Conceived, have Specific Programmatic Goals, Address High Priority National Needs, and have Direct Relevancy in Achieving ARS' Long-Term Goals.

To ensure the relevance of ARS' research, ARS obtains stakeholder input, evaluates it along with input from the Administration and Congress, and carefully considers this input as it designs its research programs and projects.

Strategies and Means

- Gather external input on the agricultural research needs and scientific challenges relevant to the National Program through stakeholder, technical, and commodity-specific workshops.
- Evaluate input obtained from the workshops along with input from Congress, the White House, the Department, and other Federal agencies in the design of every National Program 5-year Action Plan.
- Consider all input in the design of the individual research projects supporting the National Program Action Plan.

PM Goal 1.2 - Quality: ARS' Research Projects are Reviewed for Quality by National Program Using Independent External Peer Review Panels Prior to the Beginning of the 5-Year National Program Cycle.

The Office of Scientific Quality Review (OSQR) manages the ARS peer review system for research projects, which gives researchers the opportunity to obtain constructive feedback from their external peers. These reviews are conducted by panels made up almost entirely of non-ARS scientific professionals, including an external chairperson with expert knowledge pertinent to the research being reviewed. In their evaluations, panels assess each Project Plan's research methodology, probability of success, and scientific merit. The peer review panel provides comments and scores each project as needing "No Revision", "Minor Revision", "Moderate Revision", and "Major Revision", or as "Not Feasible". Low scoring plans are given a single opportunity to revise and if they do not improve, are not be initiated.

Strategies and Means

- Provide training and guidance to ARS scientists so that they prepare high quality project plans.
- Peer review all ARS project plans prior to their execution for quality.

PM Goal 1.3 - Performance: ARS Research Projects are Annually Reviewed and ARS National Programs are Reviewed at the End of the 5-Year National Program Cycle for Performance and Impact

All research projects are assessed annually to determine the number of currently approved milestones that were met/not met during the preceding fiscal year. Information as to why a milestone was not met (including mitigating circumstances) is collected and will be used for making program management decisions. Each National Program is assessed by individuals from outside ARS at the end of its 5-year National Program cycle. This assessment results in a written report on the quality of accomplishments and the impact of the research. Twenty percent of National Programs are reviewed annually.

Strategies and Means

- Conduct an annual assessment of projects to determine if they have maintained direct relevance in achieving ARS' long term goals and the priority needs of U.S. agriculture. Those projects considered of lower relevance will be redirected into higher priority research areas/objectives. *(Relevance)*
- Receive summary information from OSQR, using a statistical rolling average, of the results achieved during the initial panel review. *(Quality)*
- Receive a summary each year of peer reviews that RPES conducts on ARS scientists. *(Quality)*
- Assess each project's progress against each approved milestone, indicating whether it was fully met, substantially met, or not met with an explanation for the latter two ratings. Line management will review and concur in these assessments. Each year, ONP will review these assessments to validate their conclusions. *(Performance)*
- Assess National Programs to gauge the level of past performance and establish the research priorities and direction of the program for the next 5-year cycle. This process, covering approximately 20 percent of the Agency's research program each year, provides valuable input to the writing teams that are drafting Action Plans for the next 5-year program cycle. *(Performance)*

Program Management Goal 2:

International Engagement and Partnerships

PM Goal 2.1 – International Engagement and Partnerships

In recognition that agriculture, and agricultural research, is now a global enterprise, ARS' international office enhances the productivity, effectiveness, and impact of ARS National Programs through mutually beneficial international research activities. The United States directly benefits from international collaboration in agricultural research through access to new ideas and technologies, global germplasm collections, crucial international foreign research sites, enhancement to domestic research, and increased trade. The increasingly transboundary nature of many agricultural problems, such as emerging and re-emerging plant and animal diseases, control of invasive species through discovery and importation of biological control agents, scientific collections including genetic resources preservation, and the need to increase productivity to ensure adequate supplies of agricultural products, provides a strong incentive for greater international cooperation. International agricultural research cooperation addresses global food security by providing solutions to current and future agricultural productivity and sustainability challenges. By sharing knowledge and technology through close collaboration with national and international research institutions in other countries and in the United States to increase institutional research capacity and speed technology development, ARS collaborations enhances international relationships and provides a benign face to U.S. trade and diplomacy.

Crop Production and Protection (CPP): International cooperation plays a critical role in germplasm conservation because USDA does not have the capacity to maintain collections for the entire world's vital crop germplasm. In addition, USDA must continue to cooperate with several foreign and international research institutions to fully realize the promise of genomics and genetics research. To also address the concern of food security, additional long term cooperation is needed in research to continue increasing productivity, availability, and utilization of food. International cooperation is also critical for the United States to address the control of invasive species (diseases, weeds, and insect pests) detrimental to crops, forests, and other natural areas.

Animal Production and Protection (APP): International cooperation enhances the goals of this area by increasing access to different livestock species which enables research to understand the mechanisms of disease resistance. International cooperation helps to develop and test tools to prevent, control, or eradicate diseases that threaten our food supply or public heath, and identifying and developing sustainable systems for production of high quality meat, milk, and eggs. International cooperation is particularly important in the area of animal diseases and their vectors since the approaches to controlling exotic diseases are not as well tested outside of areas where they occur endemically. It plays a key role in animal and aquaculture genomics and should continue to focus on development of tools and resources to meet productivity, efficiency, and sustainability needs. International cooperation also provides access to management systems and animal species that have been developed or evolved in tropical and semi-tropical climates and manifest much greater stress and disease tolerance.

Natural Resources and Sustainable Agricultural Systems (NRSAS): International collaborations benefit ARS in this area with additional data which helps scientists improve techniques and models over time and prove their application in different environments. Scientists from around the world are drawn to work with ARS in this arena given its current capacities and successes in developing and applying natural resources management strategies and models. In addition, sharing these applications helps extend the impact of these technologies in a world facing critical challenges to manage natural resources, particularly water. This also extends to addressing Climate

Change and how to manage its impact on U.S. agricultural production, as well as how it is impacted by agricultural practices. Finally, to try and meet U.S. bioenergy targets through research on biomass production, ARS continues to engage our international partners to address biomass use, productivity, management, and sustainability.

Nutrition, Food Safety and Quality (NFSQ): International cooperation can help provide a scientific foundation, both for research and to address regulatory, trade, and consumer issues because this area addresses many issues of concern to consumers, given the global nature of agriculture. International collaborations can leverage and greatly enhance U.S. nutrition research because of the diversity of the American population and food consumption patterns.

Strategies and Means

- Catalyze and implement international programs and projects that help the Agency to address critical threats to U.S. agriculture, including foreign animal and plant diseases and pests and invasive species.

Program Management Goal 3:

Ensure Provision and Permanent Access of Quality Information

PM Goal 3.1 – Ensure Provision and Permanent Access of Quality Information

The National Agricultural Library manages the world's largest agricultural information collections, designated as a USDA heritage asset, which include more than 50 million physical items, as well as extensive digital information products including databases, digital full-text journals, and digital full-text books and maps. AGRICOLA (AGRICultural OnLine Access), NAL's online catalog and index to the agricultural literature, serves as the finding tool for these collections and is made available free of charge by NAL at http://agricola.nal.usda.gov and by a number of commercial companies. In addition to extensive reference, research, information center, and document delivery services delivered to a global clientele, NAL provides 24/7 access for USDA staff worldwide to a large and growing array of digital information products via DigiTop (NAL's Digital DeskTop Library for USDA). NAL has initiated development of a digital collection system to preserve for perpetuity USDA publications and other essential agricultural information assets.

The National Agricultural Library (NAL) has statutory mandates to identify, collect, preserve in perpetuity, and provide access to quality information relevant to agriculture; serve as one of four national libraries; serve as USDA's library; provide leadership in developing and operating a comprehensive agricultural library and information network; and provide specialized information services through such NAL information centers and programs as AGRICOLA, the LCA Digital Commons, the Animal Welfare Information Center (AWIC), Alternative Farming Systems Information Center (AFSIC), Food and Nutrition Information Center (FNIC), Food Safety Research Information Office, National Invasive Species Information Center, Rural Information Center (RIC), and Water Quality Information Center (WIC). The world's largest agricultural library and a member of the Association of Research Libraries, NAL serves a large and broad customer base, including policymakers, researchers, agricultural specialists, farmers, members of the library, educational, and agribusiness sectors, food stamp recipients, and the general public. NAL and NAL customers benefit from participation in a number of partnerships and alliances, including the Agriculture Network Information Center (AgNIC), Nutrition.gov, and CENDI.

Strategies and Means

- Understand the information needs of NAL beneficiaries, customers, stakeholders, and partners by conducting large-scale as well as targeted surveys, focus groups, and other assessment instruments in order to meet and anticipate needs.
- Deliver unified, easy to use, convenient 24/7 digital services designed to meet customer needs and preferences.
- Deliver rapid information and services concerning "hot topics" and emerging issues of critical national importance.
- Improve information delivery to underserved customer audiences.
- Develop NAL brands to raise visibility.
- Market NAL services to specific audiences.
- Increase advocacy and outreach initiatives.
- Deliver training to optimize use of NAL programs and services.

- Optimize NAL structure, information technologies, and workflows to reflect increased movement to digital programs and services.
- Recruit and retain a service-oriented, technologically adept workforce.
- Foster a culture of innovation and creativity within NAL.
- Partner with important technology concerns to expose NAL content and to develop shared technical standards in conformance with national policies.
- Extend partnerships with USDA and other Federal agencies to develop targeted information services.
- Continue to participate in and lead national and international alliances and partnerships.
- Conserve the rare and at-risk items in the NAL physical collection to secure the Nation's agricultural heritage.
- Broaden and deepen the NAL physical and digital information collections.
- Extend and enrich AGRICOLA, including through links to online full-text publications and the continued enhancement of the NAL Thesaurus.
- Expand the audience and content for the NAL Digital Collections.
- Advance NAL preservation and digitization programs.

Program Management Goal 4:

Support Modern ARS Science

PM Goal 4.1 – Support Modern ARS Science

The nature of the science supporting ARS' mission is changing rapidly. In the past, scientific methods were often labor-intensive and consumed considerable time and effort to adequately address a single scientific question. Scientists are now generating vast amounts of high-quality data rapidly and relatively inexpensively. This fundamental change in the nature of science is presenting new challenges and demanding new approaches to maximize the value extracted from these large and complex datasets. This dramatic growth in data volume, variety, and velocity has come to be known as Big Data.

As a result of these changes, a new paradigm is emerging in science that is characterized by its data intensity. Previous methods for data collection, storage, and analysis are inadequate for handling the scale and complexity of this avalanche of new data. Therefore, ARS has a new goal to support scientific computing that efficiently combines disparate information for scientific discovery and enables the transfer of that knowledge quickly and efficiently to other scientists and to the public.

Strategies and Means

- Implement ARS Big Data initiative:
    - Create a scientific network for research data transfers (SciNet).
    - Establish hybrid high-performance computing and storage.
    - Develop a virtual research support group.

Administrative Management Goal 1:

Engaging Employees

AM Goal 1.1 – Engaging Employees

ARS values employee engagement as an engine for change, a source for solutions, and ultimately a way to make ARS a better place to work. The ARS Engagement Council will provide coordination, guidance, and leadership for employee engagement activities across ARS. Membership includes representatives from the areas, locations, headquarters program management units, Office of Outreach, Human Resources; Office of the Administrator, Research Leader Advisory Council, and National Advisory Council of Office Professionals.

Strategies and Means

- Establish network throughout ARS where employee activities and any corresponding data is easily communicated and readily available between Engagement Council representatives and Headquarters.
- Coordinate feedback of information on engagement activities from Areas or Headquarters to the Cultural Transformation Coordinator for use in multiple reports and activities designed to share best practices and ideas throughout the Agency.
- Create a more informed and engaged environment to aid in raising Federal Employee Viewpoint Survey participation and scores.

Administrative Management Goal 2:

High Performing, Efficient, and Adaptable Administrative Systems

ARS' Administrative and Financial Management (AFM) priorities and management goals are in alignment with the USDA's Strategic Goal to Create a USDA for the 21st century, that is High-Performing, Efficient, and Adaptable. AFM expects to achieve through its strategic priority:

- Improved agility;
- Increased productivity; and
- Improved quality.

AM Goal 2.1 - Improve Human Capital Management

AFM governs the agency's human resources programs. Services include program administration; policy and guidance development; human resources information systems development and maintenance; and training. The aforementioned goal is to ensure efficient and effective delivery of these functions.

Strategies and Means

- Ensure data-driven human resource management and policy decision making.
- Identify current and future skill gaps through an effective workforce planning process.
- Deliver human resources services through the implementation of e-HR tools, such as EOD online, etc.
- Improve individual and organizational performance through the development of position descriptions, standard performance plans, and training and knowledge management.
- Expand the use of the agency's learning management system (AgLearn) by increasing employees' access to online training resources.

AM Goal 2.2 - Improve Financial Management and Agreements

AFM manages the agency's financial management and agreement programs. Services include program administration; policy and guidance development; financial and agreement system development and maintenance; and training. The aforementioned goal is to ensure efficient and effective delivery of these functions.

Strategies and Means

- Ensure that ARS meets all appropriation level accounting and reporting requirements, that all reports continue to indicate an accurate financial reflection, and that reporting difficulties are mitigated expeditiously.
- Continue to improve financial systems business processes and financial reporting capabilities.
- Provide quality support to ARS travelers through the maximization of web-based travel system.
- Ensure extramural agreements are awarded in an efficient and timely manner, and that they are legally and fiscally sound and in full compliance with established policies and procedures.

- Ensure management and employees are continually kept abreast of financial policies and procedures.
- Aggressively seek every opportunity to eliminate and prevent improper payments.

AM Goal 2.3 - Optimize the Agency's Asset Management Programs

AFM administers the agency's facilities, safety, real property, and space management programs. Services are not limited to conducting the requirements of these programs, but also providing service delivery and program oversight for compliance. The aforementioned goal is to ensure efficient and effective delivery of these functions.

Strategies and Means

- Update the agency's capital investment strategy to adequately address facility needs as well as program needs.
- Expand research and data-driven asset management and policy decision making.
- Provide management information to determine the appropriate levels of investment.
- Use appropriate public and commercial benchmarking and best practices to improve asset management.
- Provide a safe, secure, and healthy workplace through the administration of a robust safety and health program.

AM Goal 2.4 - Ensure Effective Acquisition and Personal Property Management

AFM is required to administer and carryout many facets of the agency's acquisition and personal property program. Services are not limited to conducting acquisition requirements, but also providing acquisition and personal property related services and oversight. The aforementioned goal is to ensure efficient and effective delivery of these functions.

Strategies and Means

- Deliver contracting solutions to generate customer savings through effective strategic sourcing efforts.
- Promote the use of standard solutions and pricing with qualified suppliers to make it easier for the agency to meet their acquisition needs with minimal administrative demands.
- Track and monitor purchases to ensure regulatory requirements are followed.
- Continue to develop and refine the agency's personal property process and oversee the implementation of an automated inventory and tracking system known.

Administrative Management Goal 3:

High Performing, Efficient, and Adaptable Information Systems

AM Goal 3.1 - Provide Modern IT Tools and Infrastructure

Enable consistent, reliable access by all ARS employees to desktop and network-based resources necessary to perform their routine job functions.

Strategies and Means

- Upgrade location bandwidth, networks, and phone systems.
- Upgrade ARS website content management system.
- Integrate the ARS Active Directory with USDA.
- Ensure effective coordination of IT operations among OCIO, BSC, and Location IT staff

AM Goal 3.2 - Protect IT Operational Infrastructure and Digital Data

Use modern cybersecurity tools and capabilities agency wide to ensure appropriate confidentiality, integrity, and access of ARS information and assets and meet mandated cybersecurity requirements.

Strategies and Means

- Provide clear and consistent information policies and standards.
- Ensure compliance with Federal cybersecurity requirements.
- Actively monitor systems and networks.
- Take proactive measures to reduce security risk.
- Maintain effective response capability to resolve cybersecurity incidents.

AM Goal 3.3 - Invest in ARS IT Professionals

Ensure that ARS IT professionals have the necessary skills and training to enable effective support of ARS IT services.

Strategies and Means

- Provide training and development for ARS IT professionals to enable effective support of changing, modern information technologies.
- Provide ongoing cybersecurity training for ARS IT professionals to prevent, detect, and respond to evolving security threats.

AM Goal 3.4 - Provide Excellence in IT Customer Service

Provide the highest possible quality of technical support for ARS customers.

Strategies and Means

- Document Help Desk processes to streamline headquarters customer service.
- Documents common support solutions and share knowledge with agency-wide IT community.

Civil Rights and Diversity Goal 1:
Embracing Diversity

CRD Goal 1.1 – Embracing Diversity

The ARS recognizes and, more importantly, embraces the need for diversity in the work force for agricultural research in general and for its workforce in particular. ARS embraces diversity through the following.

Strategies and Means

- Expand outreach activities in areas such as K-12 schools, universities/colleges, and minority serving institutions, providing education about scientific research to increase awareness of career opportunities in ARS for underrepresented groups, thereby increasing outreach to underrepresented communities to address employment deficiencies identified through comparative analysis measured against the civilian labor force and reported in the MD-715. In like manner, scientific education and outreach efforts will be expanded towards organizations that promote and cater to persons with disabilities to increase awareness of ARS career opportunities for the disabled. ARS' goal is to increase the annual percentage of new hires of the following groups compared to the new hire FY 2014 data: White females; Hispanic males; Hispanic females; African American/Black males; African American/Black females; American Indian males; American Indian female; two or more races males; two or more races female; and persons with targeted disabilities.
- Utilize Schedule A hiring authority for persons with disabilities and Veteran Hiring Authorities as part of strategy to recruit and retain a diverse workforce. ARS' goal is to consistently increase the annual percentage of veteran new hires.

Civil Rights and Diversity Goal 2:

Equal Employment Opportunity (EEO)

CRD Goal 2.1 – Equal Employment Opportunity (EEO)

Develop a model Equal Employment Opportunity (EEO) program that will provide infrastructure necessary to create and maintain a diversified workplace free from discrimination, harassment, or retaliation and characterized by an atmosphere of inclusion and career development opportunities.

Strategies and Means

- Review annual policy statements and require 100 percent of ARS employees' to complete AgLearn training regarding EEO/civil rights, anti-harassment, and sexual harassment to promote an environment free from discrimination, sexual or non-sexual harassment, and retaliation.
- Develop and submit annual EEO Program Status reports to the Equal Employment Opportunity Commission and the Department aimed at eliminating barriers to hire women, groups that fall below the civilian labor force), and persons with disabilities.
- Provide EEO/civil rights information and counseling and advice to 100 percent of the employees requesting the information through a variety of sources to reduce EEO complaints.
- Ensure that 100 percent of all employees complete mandatory and recommended EEO training.
- Conduct civil rights impact analyses as required.
- Offer the Alternative Dispute Resolution (ADR) process to all employees in all stages of the EEO complaint process. ARS' goal is to increase the annual usage of ADR by 50% (six agreements utilizing ADR).

Appendix A:
Strategic Consultations & Inter-Agency Working Groups

ARS regularly consults with external groups—from customers to policy experts, to industry and consumer groups—about the effectiveness of its programs and the need for improvement. While many of these consultations are not conducted expressly for the purpose of the strategic plan, they influence strategic goals, objectives, strategies, and targets. ARS Associate Administrators, Deputy Administrators, and National Program Leaders serve on many committees, taskforces and inter-agency working groups where they lend their expertise to solving agricultural problems on both a domestic and global scale.

ARS Inter-Agency Working Group Participation		
Group name	**Sponsoring Organization**	**Brief purpose**
Academy of Finland	USDA/Finland	Collaborate on food safety research; share food safety information
ADODR on Confidentiality Agreements	Food Companies	To discuss mutual interests related to functional foods
Agricultural Air Quality Task Force	Chief of NRCS, Office of the Secretary	FACA dealing with air quality, climate change and sometimes bioenergy research and policy
Agricultural Trilateral Working Group Pakistan, Afghanistan (NEW)	FSA	To promote food security for Pakistan and Afghanistan in partnership with USDA
Air Quality Research Subcommittee	CENR	Federal agency information sharing
Alternative Feeds for Aquaculture Initiative	USDA/NOAA	Spur progress in development of aquaculture feedstuffs not reliant on marine pelagic fisheries
American Bakers Association	ABA	To exchange information and assess industry research needs and priorities.
American College of Veterinary Preventative Medicine	AVMA	Board certification association for veterinary preventive medicine
American Leather Chemists Association	ALCA	To share information and assess priority needs of the hides and leather industries
American Meat Science Association	Meat and Livestock Industry and Universities	Coordinate public research in meat quality, and safety
American Society of Microbiology	ASM	Share microbiologic information
American Veterinary Medical Association	AVMA	Sharing of information on veterinary medicine
AMI Scientific Steering Committee	American Meat Institute (AMI)	Set research priorities and review grants
AMI, NCBA, AMI, Pork Board, UFFV,	Commodity	Exchange information on priorities
APHIS Plant Protection and Quarantine Board of Advisors	USDA, APHIS, PPQ	Coordination and Customer Needs for APHIS PPQ
APHIS Research Priorities Steering Committee	APHIS, ARS, NIFA	Interagency Coordination
APHIS Technical Advisory Group for Biological Control Agents for Weeds	APHIS	Provide Technical guidance to APHIS on risks associated with biological control agent releases
Aquatic Nuisance Species Task Force	Federal Interagency	Provide Technical Guidance to Federal Invasive Species Response (Aquatic Nuisance Species)
Armed Forces Pest Management Board	DoD	Consultant

ARS Inter-Agency Working Group Participation		
Group name	**Sponsoring Organization**	**Brief purpose**
ARS Liaison to FSIS Biosecurity Division	USDA	Coordinates biosecurity related research conducted for DHS or FSIS by ARS. Assist in conducting Carver-Shock analysis on biosecurity agents
ARS MOU with DMI, Inc.	DMI, Inc.	To cooperate in developing innovative new products to expand markets for U.S. dairy producers and processors
ARS MOU with the United Soybean Board	United Soybean Board	To improve coordination between the two organizations to better leverage resources applied to the research necessary to develop value-added non-food, non-feed, products using soybeans as a feedstock
ARS partnership with DMI, Inc., the National Dairy Council, and the Department of Defense, Combat Feeding	DMI, Inc.	Designed to leverage government, industry and university resources to greater overall effectiveness and efficiencies, increase collaboration, and help to achieve a more profitable dairy industry
Asian Tiger Mosquito Areawide IPM Project	ARS	Coordination and consultant
ASM Steering Committee for Research Colloquium	American Society of Microbiology (ASM)	To occur in 2011 on Meeting Global Water Needs (includes food safety)
Association of Public Health Veterinarians	AVMA	Communicate public health information among veterinarians working in State, Local, and Federal government
BEP Animal Health Initiatives	ARS, DoS	Scientific Diplomacy
Biobased Products and Bioenergy Coordination Council	REE Undersecretary	The Biobased Products and Bioenergy Coordination Council (BBCC) was established by the Secretary of Agriculture to provide a forum through which USDA agencies will coordinate, facilitate and promote research, development, transfer of technology, commercialization, and marketing of biobased products and Bioenergy using renewable domestic agricultural and forestry materials. This includes promoting information sharing, strategic planning, and providing policy advice to the Secretary. (see www.ars.usda.gov/bbcc)
Biochem 20/20	Contractor	Biosecurity
Biodefense Backstopping	subPCC - DoD	Coordinate International collaborative efforts in developing countries
Bioenergy Crop Assistance Program (BCAP) Project Area Selection Criteria Working Group	Farm Service Agency	BioEnergy Science Team assisting FSA in developing science-based criteria for evaluation BCAP proposals
Biofuels Sustainability Criteria and Indicators Sub-committee	Biomass Research & Development Board	Develop criteria and indicators for sustainable biomass production
Biological Threat Reduction Program	DOD	Coordinate international collaborative efforts to enhance the development of a veterinary infrastructure and animal health research in developing countries
Biomass Conversion Interagency Working Group	Biomass R&D Initiative Board	Coordinate Federal-wide efforts in support of converting ligno-cellulosics to fuels
Biomass R&D Board - Environmental Health & Safety	Congress/EPA/USDA	Identify EH&S hazards and benefits related to practices and technologies of components of the biofuels supply chain
Biosurety working group	NSABB	Advise Federal government on developing personnel reliability standards
Biotechnology Coordinating Committee	Across USDA	Consistent communication regarding biotech w/in USDA

ARS Inter-Agency Working Group Participation		
Group name	**Sponsoring Organization**	**Brief purpose**
Borlaug Global Rust Initiative	USDA, CG Centers, Gates Foundation, multiple wheat growing countries	Address Ug99 and other virulent wheat stem rusts
Cattle Fever Tick Eradication Program	APHIS	Coordination of research and operations
CBRN Countermeasures	Federal	Biosecurity Research
CEAP Working Group	NRCS	Coordinate grazingland CEAP activities
Citrus Greening Coordinating Group	ARS, APHIS, Florida Citrus Mutual	To coordinate research to combat citrus greening disease in cooperation with APHIS, University collaborators, and IFAS.
Citrus Greening Research Planning Taskforce	ARS	Plan national research programs to develop and implement management strategies for citrus greening and canker.
Classified Life Sciences Research Interagency Working Group	ARS, HHS, DHS, NIH, CDC, USAF, OSTP, FPA, FSIS	To coordinate interagency activities related to classification of research.
Climate Change Carbon Cycle Interagency Working Group	US Climate Change Science Program	Info sharing, research coordination
Climate Change Ecosystems Interagency Working Group	US Climate Change Science Program	Info sharing, research coordination
Climate Change Land Use/Land Cover Interagency Working Group	US Climate Change Science Program	Info sharing, research coordination
Climate Change North American Carbon Project Steering Committee	US Climate Change Science Program	Research coordination
Climate Change Water Cycle Interagency Working Group	US Climate Change Science Program	Info sharing, research coordination
Codex Alimentarius	Codex- FDA coordinating US group	Intergovernmental Task Force on Antimicrobial Resistance
Colony Collapse Disorder Steering Committee	ARS	Coordination of research for Colony Collapse Disorder.
Combase	USDA/FSA-UK	Collaborate on food safety research: share food safety information
COMEXA (Comision Mexicano-Estados Unidos Para La Eradicacion del Gusano Barrenador de Ganados)	APHIS	Coordination
Committee on Environment, Natural Resources, & Sustainability (CENRs) Subcommittee on Water Availability & Quality (SWAQ)	OSTP (USGS and EPA are co-leads)	Coordinate water activities across all Federal agencies with water missions.
COPEG (Comision Panameno-Estados Unidos Para La Eradicacion del Gusano Barrenador de Ganados)	APHIS	Coordination
Core Group	Office of Pest Management Policy (USDA ARS) (participants include all USDA agencies involved in pesticide research or policy development)	Provide coordination of pesticide related issues across USDA

ARS Inter-Agency Working Group Participation		
Group name	**Sponsoring Organization**	**Brief purpose**
CRWG committee on Practices for Enhancing Personnel Reliability and the Culture of Responsibility in High Containment Labs	Interagency	Evaluate standards for personnel for high containment laboratories
Department of Defense Biological Threat Reduction Program (BTRP) Review	DoS, DoD, HHS, and USDA	Interagency Coordination
Deployed Warfighter Protection Program	DoD	Coordination of research and development
DHS AG/Food Sub IPT	Interagency	Coordination of research and development
DHS Chemical-Biological Capestone IPT	Interagency	Coordination of research and development
DHS S&T Chemical Countermeasures	USDA	The mission of the committee is to enhance and coordinate the nation's capability to anticipate, prevent, and protect, respond to and recover from chemical threat attacks through innovative research, development, and transition capabilities. Specific focus NSTC Task Force on Non-Traditional Chemical Agents: Research and Development Plan
DHS/NTA	USDA	The committee identifies and evaluates food and water capability, and countermeasure gaps for non-traditional agents (NTAs)
DHS-OMB-MAX	USDA	3 groups: Coordinating Homeland Security Science and Technology; Agriculture; and Rapid Detection Working Group
Diabetes Mellitus Interagency Coordinating Committee	NIH	Provide input on plans for research/treatment/education of diabetes
Dietary Guidance Working Group	USDA	Review federal nutrition publications for compliance with Dietary Guidelines for Americans
USDA Combined Drought and Water Team	USDA	Coordinate drought research, monitoring, and water-based decision making in USDA; advise Sec'y and agencies.
Dual Use Research working group	NSABB	Advise Federal government on developing Dual use research guidelines
EFSA Scientific Colloquium on Assessing HealthBenefits of Controlling Campylobacter in the Food Chain ASM Research Colloquium on Global Food Safety	EFSA	Provide guidance on potential interventions in poultry for Campylobacter
EU-US Safe Food	EC	Share food safety information
FADT Subcommittee, Veterinary Countermeasures	ARS, DHS, APHIS, EPA, DoD	IWG
Fed Emergency Response Network	Federal	Coordinate Emergency responses to biosecurity: methods validation
Federal Experts Security Advisory Panel (FESAP)	Interagency	Security of Select Agent Policies
Federal Interagency Committee for Management of Noxious and Exotic Weeds (FICMNEW)	Federal Interagency	Provide Technical Guidance to Federal Invasive Species Response (Weeds)
Federal Interagency Committee on Invasive Terrestrial Animals and Pathogens (ITAP)	Federal Interagency (USDA and DOI Co-Chair)	Provide Technical Guidance to Federal Invasive Species Response (Invertebrates, Vertebrates, Plant and Animal Pathogens)

ARS Inter-Agency Working Group Participation		
Group name	**Sponsoring Organization**	**Brief purpose**
Federal-State Potato Research Program	ARS-National Potato Council	To conduct research on emerging pests of potato in a Federal-State partnership to address high priority areas
Feedstock Production Interagency Working Group, Genetic Improvement	Biomass Research & Development Board	Develop Interagency Strategic Plan for Bioenergy
Food Allergy Clinical Guidelines Coordinating Committee	NIAID	Oversee process of developing guidelines on food allergy
Food Defense R&D Interagency Committee	USDA	Coordination of Food Defense research and development between DHS, USDA, HHS, and any other pertinent agencies
Foreign Animal Disease Threat (FADT) Subcommittee, Basic Research Working Group	ARS, NSF, DHS, HHS	IWG
Foreign Animal Disease Threat Subcommittee	NSTC	Coordinate Foreign Animal Disease countermeasures and research
Forest Service	Forest Service	Interagency Coordination
FSU Animal Health Initiatives	ARS, DoS	Scientific Diplomacy
Garden Rose Council	Rose Nursery industry	To coordinate research efforts to address issues of high priority to the Garden Rose industry
Global Change Task Force	Office of Chief Economist	Information sharing among USDA agencies with climate change activities
Global Foot-and-Mouth Disease Research Alliance (GFRA)	ARS, APHIS, DHS	Global Foot-and-Mouth Disease Research Alliance to support FAO/OIE global control and eradication initiative
Global Health Initiative (GHI) Interagency Research Committee	ARS, NIH, CDC, NIFA, OSTP	1. To identify several high-impact research questions and potential "game changers" in global health; 2. To determine how the GHI Interagency Research Committee (IRC) can facilitate GHI plus partner country implementation of GHI's Principle #7, "Promote Research and Innovation;"3. To identify how individual agencies/initiatives can align current and planned global health research efforts to advance GHI principles and targets;
Global Research Alliance on Agricultural Greenhouse Gases		To bridge gaps in research on agricultural greenhouse gas emissions, and to coordinate such research on an international scale, ensuring that scientists share their findings with research communities and farmers in other countries as well as their own. Shafer is international Croplands coordinator
Global Water Cycle Interagency Work Group	Climate Change Science Program (CCSP)	Develop new, innovative science concepts to incorporate into the CCSP global water cycle science plan
Human Nutrition Coordinating Committee	USDA	Share information among USDA agencies whose mission includes nutrition-chaired by ARS
Human Studies Review Board	EPA	Expert consultation
ICT-Prague`	USDA/Czech Republic	Collaborate on food safety research; share food safety information
ILSI Carbohydrates Committee	International Life Sciences Institute	Focus on issues of importance to food industry
Implementation Team for Joint China National Energy Administration (NEA)-DOE-USDA MOU	Foreign Agricultural Service	Implement Joint NEA-DOE-USDA MOU for advanced biofuels production research.

ARS Inter-Agency Working Group Participation		
Group name	**Sponsoring Organization**	**Brief purpose**
Informal interagency group for responding to OIG study on USDA control of genetically-engineered crop holdings	Office of the Secretary, APHIS, ARS	Developed USDA-wide response to OIG study of how USDA managed holdings of genetically-engineered crops
Informal interagency group on OECD biosecurity and biobanks	State Department	Develops US government positions on OECD developed guidelines for biological resource center and related topics
Inter Agency Residue	Federal	Share food safety information
Interagency Cross-Cutting Group on Climate change and Human Health	USGCRP (OSTP)	Develop priorities, outreach, and strategies for adaptation to climate change
Interagency Feedstock Production Working Group	Bioenergy R&D Initiative Board	co-chair, Identify research needs and make recommendations
Interagency Grazinglands Working Group	USDA (ARS & NIFA)	Coordinate grazingland activities between USDA & DOI
Interagency Native Plant Conservation Alliance (PCA)	DOI	Promote & develop interagency and private partnerships
Interagency Water Working Group	State Department	Coordinate federal water agencies/international focus
Interagency Working Group on Climate Change and Public Health	EPA, NIH	Coordination
Interagency Working Group on Domestic Animal Genomics	OSTP	Review progress, needs & opportunities in animal genomics research
Intergovernmental Risk Assessment Consortium	All Federal agencies- FDA runs it	Share information on risk assessment
Intergovernmental Select Agents and Toxins Technical Advisory Board	Interagency	Interagency Coordination
International Association for Food Production	IAFP	sharing information on food safety and science issues- yearly meeting and journal
International Bioengagement Program	subPCC- State Department	Coordinate international collaborative animal health research and biosafety activities
IR-4	USDA, NIFA, and ARS (participants include university researchers and crop industry reps,)	Generate data needed to develop research data to support new EPA tolerances and labeled product uses for minor crops (specialty crops)
IWG Molecular Vaccines	DoD, ARS, NIH, FDA	IWG
IWG on Prion Science	NIH, ARS, APHIS, EPA, NSF	IWG
JCR: Food Agriculture Sector, DHS Team	DHS	Biosecurity
Joint Subcommittee on Aquaculture	OSTP	Coordination of Aquaculture activities across federal agencies
Judicious Use of Antibiotics	USDA	Development of action and research goals
Methyl Bromide Alternatives Outreach Conference Program Committee	ARS, EPA, and industry	To plan and organize the annual International Methyl Alternatives and Emissions Control Research Outreach Conference
Methyl Bromide Quarantine taskforce (NEW)	State /EPA/USDA	To provide technical input to State/EPA policy makers on methyl bromide quarantine issues.
Methyl Bromide Technical Options Committee [MBTOC]	United Nations Environmental Programmes	Provide technical input to the signatories of the Montreal Protocol.
Microbe Project Inter- Agency Working Group	Federal	Genomics of organisms
MOST-SJTU	USDA/China	Collaborate food safety Res

ARS Inter-Agency Working Group Participation		
Group name	**Sponsoring Organization**	**Brief purpose**
MOU with GIPSA/FGIS	GIPSA/FGIS	To address the research priorities of GIPSA/FGIS in development measurement technologies for grain quality
National Barley Improvement Committee/American Malting Barley Association	Barley producers/industry	Barley stakeholder groups
National Berry Crop Initiative	Berry industry (ARS and NIFA participate)	To coordinate industry efforts to address issues of importance, including research, to the berry industry.
National Clean Plant Network	APHIS	Protects U.S. specialty crop agriculture and the environment from the spread, through asexual propagation, of targeted plant pathogens and pests that cause economic damage
National Coalition for Childhood Obesity Research	HHS	Collaboration among USDA, NIH, CDC and Robert Wood Johnson Foundation on prevention of childhood obesity
National Corn Growers Assoc./USDA Corn Germplasm Committee	Corn producers/industry	Corn stakeholder group
National Culture Collection Initiative	American Phytopathological Society	Develop a National System for Preservation and Distribution of Plant-associated Microbes
National Dairy Research Program	Dairy Management Inc., USDA (ARS and NIFA), HHS (National Institutes of Health) and DOD	Coordinate research on issues of importance to the dairy industry
National Dairy Research Program, Dairy Management	ARS/NIH/DoD	Partnership to advance research on nutrition and food processing issues of concern to the dairy industry.
National Environmental Protection Act Interagency Working Group	EPA	Info sharing, training
National Grape and Wine Initiative	National Grape and Wine Initiative (participants include representatives from table grape, raisin, wine, and juice sectors of the grape industry, ARS, NIFA, Extension, universities)	Identify industry needs that can be addressed through agricultural research, identify resources for the research, coordinate and conduct the research, transfer new knowledge and technologies from researchers to the industry
National Meeting Program Planning Committee for Plant Breeder Coordinating Committee	Several	Planning 2009 annual meeting at the Monona Terrace Convention Center in Madison, Wisconsin
National Oat Improvement Committee	Oat producers, industry	Oat stakeholder group
National Plant Breeding Coordinating Committee	NIFA	Support of plant breeding
National Plant Disease Recovery System	ARS and Land Grant University Institutions, DHS	As directed by HSPD-9, ARS is lead institution to develop a National Plant Disease Recovery system to respond to intentional and/or natural plant disease outbreaks.
National Plant Germplasm Coordinating Committee	ARS, NIFA, ESCOP	Communicates the value of the National Plant Germplasm System and strives to enhance its support
National Science and Technology Council	Chair – Ann Mills, Deputy Under Secretary for NR&E	Information exchange between Federal agencies on ecosystem services research, programs, and projects.
National Sclerotinia Intitiative	ARS with United Soybean Board, National Sunflower Association, National Canola Association, Peanut Council	To conduct research in partnership with Universities to address white mold related diseases and disorders.

ARS Inter-Agency Working Group Participation		
Group name	**Sponsoring Organization**	**Brief purpose**
National Sorghum Producers Assoc./USDA Sorghum Germplasm Committee	Sorghum producers, industry, researchers	Sorghum stakeholders
National Swine Improvement Federation	Swine Industry and Universities	Coordinate public swine genomics research and develop infrastructure to incorporate genomics information into the swine genetic evaluation system
National Vegetable Crops Initiative	NIFA	To develop a strategic plan for the continued growth and sustainability of vegetable crop production in the United States.
National Wheat Improvement Committee/National Association of Wheat Growers	Wheat industry, producers, researchers	ARS provides information on the funding needs of the wheat quality labs to the National Improvement Committee to be considered for recommendation to the National Association of Wheat Growers among their legislative priorities
NIDDK Advisory Council	NIDDK	Provide advice to NIDDK director -ARS is one of three ex officio agencies represented (DoD and VA are others)
NIFA	NIFA	Interagency Coordination
NIFA Grant Award External Steering Committee	Kansas State University	Provides scientific and stakeholder input
NIFA/ARS Biotech Risk Assessment Grants Program	ARS, NIFA	Biosafety research grant management and ARS/NIFA coordination
NIFA-FSRRN	USDA	Share food safety information
NIH Nutrition Coordinating Committee	HHS, NIH	Information sharing among NIH Institutes and other federal agencies conducting nutrition research.
NIH Trans-Agency Complementary and Alternative Medicine Coordinating Committee	NCCAM	Share information on complementary and alternative medicine research in federal government
Northwest Small Fruit Research Center	Northwest Center for Small Fruit Research	To coordinate high impact research which is responsive to the needs of the small fruit and nursery industries in the Northwest US
NSABB (National Science Advisory Board for Biosecurity)	Interagency	Coordination
NSABB Personnel Reliability Working Group	NIH	Review existing mechanisms and make recommendations for improvements
NSTC Subcommittee on Standards	Interagency	Develop standards for CBRN equipment
Nutrition Coordinating Committee	NIH	Share nutrition information among HHS agencies -ARS is USDA representative
OECD Scientific Collections Activity	OECD (International)	Develop Plan for Managing Collections of OECD Members
Office of Dietary Supplements Inter-agency work group	NIH	Information sharing among federal agencies conducting nutrition research and dietary supplements research
Office of Pesticide Programs	EPA	Development of research goals
Organic Working Group	USDA	Information exchange between USDA agencies on organic programs.
OSTP/IWG on Plant Genomes	OSTP	Coordination of plant genomics research among U.S. federal agencies
OSTP/IWG on Scientific Collections	OSTP	Develop a Plan for Maintaining Federal Scientific Collections
Overseas Biological Control Laboratories	ARS	Administration

ARS Inter-Agency Working Group Participation		
Group name	**Sponsoring Organization**	**Brief purpose**
Pest Information Platform for Education and Extension (PIPEE) Strategic Planning Committee	NIFA, RMA	To develop an integrated national system facilitated by information technology to provide centralized, useful tools with reliable information for IPM practitioners. Mapping of Soybean rust and soybean aphid
Pierce's Disease Task Force	Wine and Grape Industry	Coordinate ARS Pierce's Disease Research
Plant Breeder Coordinating Committee	Several	The PBCC serves as a forum for issues and opportunities of national and global importance to the public and private sectors of the U.S. national plant breeding effort.
POC for ARS Veterinary Workforce Planning Committee	Interagency (All govt agencies with Veterinarians)	Interagency Coordination
PROCINORTE	ARS	Scientific Diplomacy
Program Planning Committee for Soybean Rust Symposium	ARS	Planning 2009 Soybean Rust Symposium
Public Health Pesticide Committee	CDC	Coordination
RAC Biosafety Working Group	NIH	Provide support and recommendations to the NIH Recombinant DNA Advisory committee on biosafety issues
Rift Valley Fever Coordination	DoS and ARS	Workshop
Risk Assessment Consortium	Federal	Share food safety information
SARE – Sustainable Agriculture, Research & Extension, National Operations Committee	NIFA	Coordinate and communicate SARE activities among regions and other Federal agencies.
Science and Technology task force of JSA	JSA	Develop a strategic research and technology development plan for aquaculture across federal agencies
Science of Science Policy Interagency Task Group	OSTP, NSF	Address the need for better tools, methods, and data for improving our understanding of the efficacy and impact of science and technology policy decisions.
Scientific Committee for National Foundation for Infectious Diseases	NFID	Coordinate yearly scientific meetings in infectious disease
Scientific Forum on Invasive Species	APHIS, FS	Coordinate Research and Response to Invasive Species of Forest Areas
Screwworm Eradication Program	APHIS	Coordination of research and operations
Secretary's Bioenergy Decision Tool	Office of Energy Policy and New Uses, Office of the Chief Economist	Develop a place-based decision tool that provides information about USDA programs and resources that can be used by rural communities and investors to develop renewable energy projects.
Select Agent Tiering Committee	Interagency	Tier Select Agents
Small & Beginning Farm Coordinators	USDA	coordinate USDA activities to meet group's needs
South Atlantic Methyl Bromide Areawide project	ARS, EPA, and industry	To plan and prioritize research projects.
Steering Committee for the Food Safety Research and Response Network	USDA	Facilitate university based research food safety
Subcommittee on Sedimentation	USGS, Dept of Interior, Advisory Committee on Water Information, Water Information Coordination Program	Supports development of equipment, methodologies, and calibration for the collection, analysis, interpretation, and interchange of fluvial-sediment data and related technical information.

ARS Inter-Agency Working Group Participation		
Group name	**Sponsoring Organization**	**Brief purpose**
Sub-PCC on International Bioengagement	DoS, DoD, HHS, and USDA	Interagency Coordination
Sugarcane Research Planning Taskforce	ARS	Provides innovative solutions for sustainable sugarcane production.
Technical Representative to National Beef Cattle Evaluation Consortium	Beef Industry and Universities	Coordinate cattle genomics research and develop infrastructure to incorporate genomics information into the beef cattle genetic evaluation system
Technical Representative to National Pork Board Animal Science Committee	Swine Industry and Universities	Coordinate public swine research for traits relating to production efficiencies, pork quality and genomics
Tekes/Academy Finland	USDA/Finland	Collaborate food safety Res; share food safety information
Transfederal Biosafety Taskforce	USDA-HHS	Assess the current federal biosafety program, identifies gaps and solutions to improve the biosafety system
U.S. Wheat & Barley Scab Initiative	USDA, wheat/barley producers, millers, bakers	Reduce wheat mycotoxins and scab losses
Ug99 Wheat Stem Rust Action Team	ARS, APHIS, NIFA, OPMP	Coordinate Ug99 Wheat Stem Rust Response
UK-Food Standards	USDA/UK	Collaborate on food safety research; share food safety information
UK-International Food Research	USDA/UK	Collaborate on food safety research; share food safety information
US Animal Health Association	USAHA	Share information on animal health and related fields
US Group on Earth Observations (USGEO)	CENR	Fed agency info sharing & coordination; US rep to International GEO
US/EC Taskforce on Biotechnology	USDA, EU	Coordinates US and EC Biotechnology Research
USDA Barley Germplasm Committee	USDA	Barley researchers/industry
USDA BioEnergy Science Team (BEST)	REE, FS, AMS, OEPNU	Provide science support by ARS, ERS, NASS, NIFA, FS, AMS, and OEPNU to other agencies in the Department.
USDA Biotechnology Coordinating Group	USDA (USDA Coordinator, Michael Schectman)	Coordinate Plant and Animal Biotech Regulatory Policy and Research
USDA Corn Germplasm Committee	USDA	Corn researchers/industry
USDA Global Research Alliance Steering Committee	USDA	
USDA Invasive Species Coordinator Committee	USDA (USDA Coordinator Hilda Diaz-Soltero, Director)	Coordinate USDA Invasive Species Response
USDA Know Your Farmer Committee	USDA Dep. Sec.	Coordinate efforts to connect citizens with agriculture and nutrition
USDA Market-Based Environmental Stewardship Coordination Council	USDA OSEC	Provide agency-level advisory to the USDA Office of Ecosystem Services and Markets and the Secretary, who co-chairs the interdepartmental Environmental Services Board. Establish guidelines and science-based methods to measure the environmental benefits from conservation and land management activities in support of emerging environmental services markets.
USDA One Health Joint Working Group	ARS, APHIS, FAS, NIFA	Technical group to support One Health MAC
USDA Peoples' Garden	USDA	Promote citizens' involvement with agriculture through the Peoples' Garden
USDA Pollinators' Committee	ARS	Coordinating response to pollinators decline
USDA Remote Sensing Coordination Committee	Office of Chief Economist	Information sharing among USDA agencies

ARS Inter-Agency Working Group Participation		
Group name	**Sponsoring Organization**	**Brief purpose**
USDA Rice Germplasm Committee	USDA	Rice researchers/industry
USDA Risk Assessment Group	USDA	Share risk assessment info among USDA agencies
USDA Sorghum Germplasm Committee	USDA	Sorghum researchers/industry
USDA Sustainable Development Council	Chief Economist's Office	Coordinate USDA-wide sustainable activities
USDA Water Team	USDA	Coordinate USDA's water activities to meet Secretary's High Priority Performance Goals for Water Chair - Ann Mills, Deputy Under Secretary for NR&E
USDA Wheat Germplasm Committee	USDA	Wheat researchers/industry
USDA-ARS-FDA	USDA	Collaborate on food safety research; share food safety information
USDA-ARS-FSIS	USDA	Collaborate on food safety research; share food safety information
USDA-ARS-NIFA	USDA	Share food safety information
USDA-wide committee	Committee on Environmental & Natural Resources (NSTC)	Advises Executive Office on science and technology to support water availability
US-EC Biotechnology Task Force	OSTP	Foster U.S.-EC science collaborations
USGEO Architecture & Data Mgmt Sub Group		Facilitate data sharing among agencies & others
USGEO Policy Sub Group	CENR	Develop U.S. earth observations policy
USGEO Strategic Assessments Sub Group	CENR	Assess and prioritize U.S. earth observation needs (air, land, sea)
Various committees/ task groups of Office of Environmental Markets	USDA	OEM has a unique role in the Federal government's efforts to develop uniform standards and market infrastructure that will facilitate market-based approaches to agriculture, forest, and rangeland conservation.
West Coast Methyl Bromide Areawide project	ARS, EPA, and industry	To plan and prioritize research projects.
Working Group within the risk assessment consortium on nanotechnology	IRAC	Produce recommendations for Federal agencies for research and policy