FY 2011 Explanatory Notes
Agricultural Research Service

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AGRICULTURAL RESEARCH SERVICE

Purpose Statement

The Agricultural Research Service (ARS) was established on November 2, 1953, pursuant to authority vested in the Secretary of Agriculture by 5 U.S.C. 301 and Reorganization Plan No. 2 of 1953, and other authorities.

ARS is the principal in-house research agency of the U.S. Department of Agriculture (USDA). Congress first authorized Federally supported agricultural research in the Organic Act of 1862, which established what is now USDA. That statute directed the Commissioner of Agriculture "to acquire and preserve in his department all information he can obtain by means of books and correspondence, and by practical and scientific experiments." The scope of USDA's agricultural research programs has been expanded and extended more than 60 times since the Department was created.

ARS research is authorized by the Department of Agriculture Organic Act of 1862 (7 U.S.C. 2201 note); Agricultural Research Act of 1935 (7 U.S.C. 427); Research and Marketing Act of 1946 (P.L. 79-733), as amended (7 U.S.C. 427, 1621 note); Food and Agriculture Act of 1977 (P.L. 95-113), as amended (7 U.S.C. 1281 note); Food Security Act of 1985 (P.L. 99-198) (7 U.S.C. 3101 note); Food, Agriculture, Conservation, and Trade Act of 1990 (P.L. 101-624) (7 U.S.C. 1421 note); Federal Agriculture Improvement and Reform Act of 1996 (P.L. 104-127); and Agricultural Research, Extension, and Education Reform Act of 1998 (P.L. 105-185). ARS derived most of its objectives from statutory language, specifically the "Purposes of Agricultural Research, Extension, and Education" set forth in Section 801 of FAIR.

The ARS mission is to conduct research to develop and transfer solutions to agricultural problems of high national priority and to 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; and provide economic opportunities for rural citizens, communities, and society as a whole.

ARS is committed to addressing the Department's priorities:

- Assist rural communities to create prosperity so they are self-sustaining, repopulating, and economically thriving.
- Ensure our national forests and private working lands are conserved, restored, and made more resilient to climate change, while managing our water resources.
- Help America promote agricultural production and biotechnology exports as America works to increase food security.
- Ensure that all of America's children have access to safe, nutritious, and balanced meals.

The agency's research programs – New Products/Product Quality/Value Added; Livestock/Crop Production; Food Safety; Livestock/Crop Protection; Human Nutrition; and Environmental Stewardship – are described under the "Status of Program" section.

Geographic Dispersion of Offices and Employees

ARS' Headquarters offices are located in the Washington, D.C. metropolitan area. The agency's research is organized under 21 national programs. Field activities are managed through eight area offices. Research is conducted at field locations in the United States, the District of Columbia, Puerto Rico, the Virgin Islands, and several foreign countries. Much of the work is conducted in direct cooperation with State Agricultural Experiment Stations, other State and Federal agencies, and private organizations.

As of September 30, 2009, there were 6,753 permanent, full-time employees including 488 in the headquarters offices and 6,265 in the field.

OIG Reports (Completed)

#02601-2-CH, 5/13/2009, Implementation of Renewable Energy Programs at the Agricultural Research Service.

#22601-1-SF, 7/15/2009, ARS Management Controls Over Research Agreements.

OIG Reports (In Progress)

#02601-1-CH, Adequacy of Controls Over the Release of Sensitive Data.

#50099-11-HY, Implementation of Research Misconduct Policy Within the USDA.

#50401-67-FM, 2009 USDA Consolidated Financial Statement Audit.

#50601-6-TE, Controls Over Plant Variety Protection and Germplasm Storage.

#50601-10-AT, Follow-up Report on the Security of Biological Agents at U.S. Department of Agriculture Laboratories.

#50601-14-TE, USDA's Role in the Export of Genetically Engineered Agricultural Commodities.

#50601-16-TE, Controls Over Genetically Engineered Animal and Plant Research.

#50601-17-TE, Controls Over Importation of Transgenic Plants and Animals.

#361132, Federal Requirements That May Delay Recovery Act Projects.

GAO Reports (Completed)

GAO-09-60, 11/5/2008, Coordinated Framework for Regulation of Genetically Modified Agriculture.

GAO-09-792, 9/9/2009, Contract Management: Agencies Are Not Maximizing Opportunities for Competition or Savings Under Blanket Purchase Agreements Despite Significant Increase in Usage.

GAO Reports (In Progress)

#120696, Global Positioning System.

#120788, DOD Research Facilities and Administration Cost Reimbursement.

#194749, Improving Federal Oversight and Accountability of Federal Grant Funds.

#320664, U.S. Global Food Security Strategy Agency Listing of Food Security-Related Programs and Activities.

#351320, DOD's Interagency Coordination for the Homeland Defense Operations and Civil Support Efforts in the United States.

#360855, Veterinarian Capabilities for Disease Prevention, Food Safety, and Defense.

#360867, Carbon Offsets.

#360910, Regulation of Dietary Supplements and Functional Foods.

#360973, Biofuels: Potential Effects and Challenges of Required Increases in Production and Use.

#361019, Energy-Water Nexus.

#361095, Management and Activities of the Propane Education and Research Council (PERC) and the National Oilheat Research Alliance (NORA).

#361131, Impact of Davis-Bacon Requirements on Recovery Act Programs.

#440674, Integration of U.S. Biosurveillance Efforts.

#450547, Improving Federal Agency Use of Performance Information.

#460579, High-Containment Laboratories: National Strategy for Oversight is Needed.

#450696, National Pandemic Implementation Plan Action Items Assessment.

#460599, Safety Reporting Options for Bio-Safety Labs.

AGRICULTURAL RESEARCH SERVICE

Available Funds and Staff Years
2009 Actual and Estimated 2010 and 2011

Item	Actual 2009		Estimated 2010		Estimated 2011	
	Amount	Staff Years	Amount	Staff Years	Amount	Staff Years
Salaries and Expenses	1,140,406,000	7,912	1,179,639,000	7,995	1,199,669,000	8,077
Miscellaneous Fees	3,717,740	--	--	--	--	--
Transfer from Department of Health and Human Services	--	--	2,000,000	--	--	--
Transfer from Office of Congressional Relations	140,000	--	--	--	--	--
Transfer from United States Department of State	2,912,905	--	--	--	--	--
Total, Salaries and Expenses	1,147,176,645	7,912	1,181,639,000	7,995	1,199,669,000	8,077
Buildings & Facilities	46,752,000	--	70,873,000	--	--	--
Recovery Act	176,000,000	--	--	--	--	--
Total, Buildings & Facilities	222,752,000	--	70,873,000	--	--	--
Total, Agricultural Research Service	1,369,928,645	7,912	1,252,512,000	7,995	1,199,669,000	8,077
Obligations under other USDA appropriations:						
Agricultural Marketing Service	324,996	1	320,000	1	320,000	1
Animal & Plant Health Inspection Service	14,422,008	35	14,143,000	35	14,143,000	35
Assistant Secretary for Civil Rights	122,434	1	120,000	1	120,000	1
Cooperative State Research, Education, & Extension Service	16,594,317	40	16,273,000	40	16,273,000	40
Economic Research Service	3,499,911	9	3,432,000	9	3,432,000	9
Farm Service Agency	442,857	1	434,000	1	434,000	1
Food & Nutrition Service	1,441,853	3	1,414,000	3	1,414,000	3
Food Safety & Inspection Service	4,034,333	9	3,956,000	9	3,956,000	9
Foreign Agricultural Service	605,166	2	593,000	2	593,000	2
Forest Service	1,956,563	5	1,919,000	5	1,919,000	5
Grain Inspection, Packers & Stockyards Administration	103,932	1	102,000	1	102,000	1
Hazardous Waste	4,985,000	12	4,889,000	12	4,889,000	12
National Agricultural Statistics Service	4,430,293	11	4,345,000	11	4,345,000	11
Natural Resources Conservation Service	2,854,688	7	2,799,000	7	2,799,000	7
Risk Management Agency	1,501,235	4	1,472,000	4	1,472,000	4
Rural Development	206,383	1	202,000	1	202,000	1

Available Funds and Staff Years
2009 Actual and Estimated 2010 and 2011

Item	Actual 2009		Estimated 2010		Estimated 2011	
	Amount	Staff Years	Amount	Staff Years	Amount	Staff Years
Other USDA Funds:						
(continued)						
Misc., Other USDA Funds.	121,603	- -	119,000	- -	119,000	- -
Total, Other USDA Appropriations.	57,647,572	142	56,532,000	142	56,532,000	142
Total, Agriculture Appropriations. .	1,427,576,217	8,054	1,309,044,000	8,137	1,256,201,000	8,219
Other Federal Funds:						
Agency for International Development	1,338,088	3	1,312,000	3	1,312,000	3
Centers for Disease Control and Prevention.	284,603	1	279,000	1	279,000	1
Department of Defense.	6,070,906	14	5,953,000	14	5,953,000	14
Department of Energy.	818,398	2	803,000	2	803,000	2
Department of Health & Human Services.	4,510,481	11	4,423,000	11	4,423,000	11
Department of Homeland Security.	3,041,701	7	2,983,000	7	2,983,000	7
Department of the Interior	1,444,435	4	1,417,000	4	1,417,000	4
Environmental Protection Agency.	834,110	2	818,000	2	818,000	2
National Aeronautics & Space Administration.	1,032,068	3	1,012,000	3	1,012,000	3
Nuclear Regulatory Commission. .	163,613	1	160,000	1	160,000	1
Misc., Other Federal Funds.	44,308	- -	43,000	- -	43,000	- -
Total, Other Federal Funds	19,582,711	48	19,203,000	48	19,203,000	48
Non-Federal Funds:						
Agtech Products	118,404	- -	116,000	- -	116,000	- -
Arizona, University of.	223,901	1	220,000	1	220,000	1
Arkansas, University of.	228,791	1	224,000	1	224,000	1
Binational Agricultural Research & Development (BARD).	237,173	1	233,000	1	233,000	1
California, State of.	1,548,147	4	1,518,000	4	1,518,000	4
California, University of.	758,043	2	743,000	2	743,000	2
Clean Water Services.	273,536	1	268,000	1	268,000	1
Clemson University.	268,569	1	263,000	1	263,000	1
Colorado State University.	147,637	- -	145,000	- -	145,000	- -
Cornell University.	763,507	2	749,000	2	749,000	2
Cotton Incorporated.	1,054,431	3	1,034,000	3	1,034,000	3
Florida, State of.	981,021	3	962,000	3	962,000	3

Available Funds and Staff Years
2009 Actual and Estimated 2010 and 2011

Item	Actual 2009		Estimated 2010		Estimated 2011	
	Amount	Staff Years	Amount	Staff Years	Amount	Staff Years
Non-Federal Funds: (continued)						
Florida, University of	227,067	1	223,000	1	223,000	1
Food and Agricultural Organization of the United Nations	345,579	1	339,000	1	339,000	1
Georgia, University of	309,008	1	303,000	1	303,000	1
Hispanic Serving Institutions National Program	1,322,559	3	1,297,000	3	1,297,000	3
Illinois, University of	197,095	1	193,000	1	193,000	1
Iowa, State of	244,307	1	240,000	1	240,000	1
Iowa State University	326,650	1	320,000	1	320,000	1
Kansas State University	171,568	1	168,000	1	168,000	1
Maryland, State of	191,406	1	188,000	1	188,000	1
Maryland, University of	124,690	- -	122,000	- -	122,000	- -
Minnesota, University of	454,672	1	446,000	1	446,000	1
National Pork Board	369,355	1	362,000	1	362,000	1
Nebraska, University of	134,500	- -	132,000	- -	132,000	- -
North Dakota State University	143,118	- -	140,000	- -	140,000	- -
Ohio State University	144,015	- -	141,000	- -	141,000	- -
Quarters Deductions	105,926	- -	104,000	- -	104,000	- -
Revocable Permits & Easements	561,527	- -	551,000	- -	551,000	- -
Rutgers University	194,420	1	191,000	1	191,000	1
Sale of Animals & Personal Property (Proceeds)	1,080,440	- -	1,060,000	- -	1,060,000	- -
South Dakota State University	422,488	1	414,000	1	414,000	1
South Florida Water Management District	502,318	1	493,000	1	493,000	1
Southern Region Sustainable Agriculture Research and Education Program	194,459	4	191,000	4	191,000	4
Tennessee, University of	116,311	- -	114,000	- -	114,000	- -
Texas Agrilife Research and Extension Center	414,413	1	406,000	1	406,000	1
Texas, State of	161,702	1	159,000	1	159,000	1
United Soybean Board	6,583,713	16	6,456,000	16	6,456,000	16
Washington State University	206,891	1	203,000	1	203,000	1
Misc., Non-Federal Funds	2,889,524	- -	2,834,000	- -	2,834,000	- -
Total, Non-Federal Funds	24,742,881	58	24,265,000	58	24,265,000	58
Miscellaneous Contributed Funds:	22,233,807	108	22,234,000	108	22,234,000	108
Total, Agricultural Research Service	1,494,135,616	8,268	1,374,746,000	8,351	1,321,903,000	8,433

AGRICULTURAL RESEARCH SERVICE

Permanent Positions by Grade and Staff Year Summary
2009 Actual and Estimated 2010 and 2011

	2009			2010			2011		
Grade	Head-quarters	Field	Total	Head-quarters	Field	Total	Head-quarters	Field	Total
ES-00	10	24	34	10	24	34	10	24	34
GS/GM-15	51	642	693	51	642	693	51	659	710
GS/GM-14	59	677	736	59	677	736	59	695	754
GS/GM-13	122	695	817	122	695	817	122	713	835
GS-12	91	506	597	91	506	597	91	519	610
GS-11	37	642	679	37	642	679	37	659	696
GS-10	2	9	11	2	9	11	2	9	11
GS-9	45	1,083	1,128	45	1,083	1,128	45	1,111	1,156
GS-8	16	425	441	16	425	441	16	436	452
GS-7	41	842	883	41	842	883	41	864	905
GS-6	30	361	391	30	361	391	30	370	400
GS-5	21	221	242	21	221	242	21	228	249
GS-4	7	36	43	7	36	43	7	37	44
GS-3	0	16	16	0	16	16	0	16	16
GS-2	0	8	8	0	8	8	0	8	8
Other Graded Positions.....	7	0	7	7	0	7	7	0	7
Ungraded Positions.....	0	583	583	0	583	583	0	583	583
Total Permanent Positions.....	539	6,770	7,309	539	6,770	7,309	539	6,931	7,470
Unfilled Positions end-of-year..	46	510	556	46	427	473	46	506	552
Total Permanent Full-Time Employment, end-of-year..	493	6,260	6,753	493	6,343	6,836	493	6,425	6,918
Staff Year Estimate.....	507	7,761	8,268	507	7,844	8,351	507	7,926	8,433

AGRICULTURAL RESEARCH SERVICE

SIZE, COMPOSITION AND COST OF MOTOR VEHICLE FLEET

The 2011 Budget Estimates propose the replacement of 9 passenger motor vehicles**.** These acquisitions will replace existing vehicles without additions to the fleet. Due to the timing of vehicle receipt and sales through the exchange/sale process, there may be an overlap in the vehicle receipt, replacement, and disposal inventory. However, we are not adding to the overall fleet.

Professional research and technical personnel primarily use the ARS motor vehicle fleet in conjunction with research studies and technical assistance. To conduct daily work, research personnel travel between agricultural research sites, state agricultural experiment stations, farms, ranches, and commercial firms, etc. Most of these sites are in rural locations and require a high degree of mobility. Use of common carriers is not feasible. Studies of cost requirements between private and government vehicles show that it is more economical to use government vehicles than to reimburse employees for the use of private vehicles.

It is the policy of ARS to pool vehicle use to keep the number of vehicles to a minimum. ARS requires quarterly vehicle operational reports and makes periodic surveys to determine the extent of vehicle use. During the biennial physical inventory process, ARS works to properly classify vehicles and to remove inactive vehicles from the inventory according to Federal property management regulations. ARS program managers are responsible for managing budgets and program needs to fulfill the agency's research mission. ARS bases replacement on program management, vehicle mileage/age, and funding. By Federal regulation, minimum replacement standards for passenger vehicles are three years or 60,000 miles, and for light trucks are six years or 60,000 miles. All proposed replacement vehicles exceed minimum standards.

Changes to the motor vehicle fleet. Changes to the ARS fleet inventory and FY2009 acquisitions are due to the American Recovery and Reinvestment Act (ARRA) vehicle replacement program. In May 2009, ARS qualified for replacement of 700 vehicles through the ARRA. The goal of the ARRA vehicle replacement program was to replace an eligible existing vehicle with a more fuel efficient vehicle, at no cost to the agency. Most all ARS vehicles allocated for replacement were over 10 years old. Program and fleet managers will need time to evaluate future planned replacements due to the unexpected opportunity to replace many older vehicles under ARRA.

The composition of the ARS fleet is primarily light duty trucks. Multi-purpose vehicles enable research personnel to haul equipment and transport personnel. Past practices have allowed ARS to decrease the number of passenger vehicles. However, it may be necessary to replace light duty vans with passenger vehicles to help reduce fuel costs. Under ARRA, ARS acquired many hybrid and alternative fueled vehicles to help reduce petroleum consumption. ARS will continue to review its fleet for opportunities to realign the fleet where necessary, without affecting the mission.

Impediments to managing the motor vehicle fleet. There are no identified impediments to managing the motor vehicle fleet in the most cost-effective manner. Unpredictable fuel and maintenance costs present challenges to project operating costs. Under the SmartPay2 contract, USDA did not receive detailed fleet transaction information as expected. VISA has now resolved this problem. However, USDA will continue to experience problems in capturing fleet costs for agencies with a Government-owned fleet. Since USDA did not convert to a new property/fleet inventory system there is no interface from the bank card system to USDA's fleet inventory system. Fleet managers must rely on a variety of systems and processes to capture fleet costs. We recommend that USDA pursue building an interface to its current system. Until this occurs, fleet managers will continue to rely on manual data input and multiple systems to capture fleet costs. Fleet managers should have effective tools for capturing and managing costs.

Size, composition and cost of agency motor vehicle fleet as of September 30, 2009 are as follows:

Size, Composition, and Annual Cost
(in thousands of dollars)

Fiscal Year	Number of Vehicles by Type *							Total # of Vehicles	Annual Operating Cost
	Sedans & Station Wagons	Light Trucks, SUVs and Vans 4X2	4X4	Medium Duty Vehicles	Ambulances	Buses	Heavy Duty Vehicles		
FY2008	299	1,441	848	1,017	0	1	34	3,640	$3,854
Change **	-43	-131	-19	-18	0	0	-1	-212	-48
FY2009	256	1,310	829	999	0	1	33	3,428	3,806
Change ***	2	345	17	-25	0	0	-3	336	168
FY2010	258	1,655	846	974	0	1	30	3,764	3,974
Change	0	-2	-2	4	0	0	0	0	238
FY2011	258	1,653	844	978	0	1	30	3,764	4,212

NOTES:

***** These numbers include vehicles that are owned by the agency and leased from GSA.

** The decrease is the result of a clean-up effort by one of our large research centers. The fleet had been inactive, but remained on the official inventory. Since the fleet was inactive, there are no significant changes to operating cost.

*** The increase is due to the allocation of vehicles under the ARRA vehicle replacement program.

Statement of Proposed Purchase of Passenger Motor Vehicles

Fiscal Year	Net Active Fleet at start of Fiscal Year	Disposals	Acquisitions			Net Fleet at end of Fiscal Year
			Replacements	Additions to Fleet	Total	
2009	250	74	75	0	75	251
2010	251	2	2	0	2	251
2011	251	9	9	0	9	251

The difference between the disposals and replacements in FY 2009, is because the disposal process was not completed when the end of year reports were generated. The large number of replacements in FY 2009 reflect changes to the fleet under the ARRA program.

AGRICULTURAL RESEARCH SERVICE
Proposed Language Changes

The estimates include appropriation language for this item as follows (new language underscored; deleted matter enclosed in brackets):

Salaries and Expenses:

For necessary expenses of the Agricultural Research Service and for acquisition of lands by donation, exchange, or purchase at a nominal cost not to exceed $100, and for land exchanges where the lands exchanged shall be of equal value or shall be equalized by a payment of money to the grantor which shall not exceed 25 percent of the total value of the land or interests transferred out of Federal ownership, [$1,179,639,000,] $1,199,669,000 [of which $44,138,000 shall be for the purposes, and in the amounts, specified in the table titled 'Congressionally Designated Projects' in the statement of managers to accompany this Act]: Provided, That appropriations hereunder shall be available for the operation and maintenance of aircraft and the purchase of not to exceed one for replacement only: Provided further, That appropriations hereunder shall be available pursuant to 7 U.S.C. 2250 for the construction, alteration, and repair of buildings and improvements, but unless otherwise provided, the cost of constructing any one building shall not exceed $375,000, except for headhouses or greenhouses which shall each be limited to $1,200,000, and except for 10 buildings to be constructed or improved at a cost not to exceed $750,000 each, and the cost of altering any one building during the fiscal year shall not exceed 10 percent of the current replacement value of the building or $375,000, whichever is greater: Provided further, That the limitations on alterations contained in this Act shall not apply to modernization or replacement of existing facilities at Beltsville, Maryland: Provided further, That appropriations hereunder shall be available for granting easements at the Beltsville Agricultural Research Center: Provided further, That the foregoing limitations shall not apply to replacement of buildings needed to carry out the Act of April 24, 1948 (21 U.S.C. 113a): Provided further, That funds may be received from any State, other political subdivision, organization, or individual for the purpose of establishing or operating any research facility or research project of the Agricultural Research Service, as authorized by law.

The change deletes a statement on earmark funding which is not requested in the budget.

AGRICULTURAL RESEARCH SERVICE

Lead-Off Tabular Statement

SALARIES AND EXPENSES

Appropriations Act, 2010	$1,179,639,000
Budget Estimate, 2011	1,199,669,000
Increase in Appropriations	+$20,030,000

AGRICULTURAL RESEARCH SERVICE

Summary of Increases and Decreases
(On basis of appropriation)

Item of Change	2010 Estimated	Pay Costs	Program Changes	2011 Estimated
Product Quality/Value Added	$111,056,000	+$1,132,000	+$5,854,000	$118,042,000
Livestock Production	87,883,000	+605,000	-3,576,000	84,912,000
Crop Production	214,108,000	+1,940,000	+4,970,000	221,018,000
Food Safety	107,597,000	+998,000	+5,000,000	113,595,000
Livestock Protection	90,216,000	+666,000	-10,961,000	79,921,000
Crop Protection	205,710,000	+1,718,000	+5,735,000	213,163,000
Human Nutrition	89,734,000	+353,000	+2,242,000	92,329,000
Environmental Stewardship	233,599,000	+2,453,000	-110,000	235,942,000
National Agricultural Library	22,233,000	+165,000	+846,000	23,244,000
Funds Included for Homeland Security	[39,170,000]	--	--	[35,808,000]
Repair and Maintenance	17,503,000	--	--	17,503,000
Total Available	1,179,639,000	+10,030,000	+10,000,000	1,199,669,000

NOTES: Research activities carried out in support of Homeland Security are reflected under the Food Safety, Livestock Protection, and Crop Protection program areas.

AGRICULTURAL RESEARCH SERVICE

Project Statement by Program
(On basis of appropriation)

	2009 Actual		2010 Estimated		Increase	2011 Estimated	
	Amount	Staff Years	Amount	Staff Years	or Decrease	Amount	Staff Years
Product Quality/Value Added	$107,485,585	893	$111,056,000	893	+$6,986,000	$118,042,000	918
Livestock Production	86,288,045	477	87,883,000	481	-2,971,000	84,912,000	475
Crop Production	204,178,191	1,531	214,108,000	1,558	+6,910,000	221,018,000	1,579
Food Safety	105,695,000	787	107,597,000	787	+5,998,000	113,595,000	793
Livestock Protection	82,954,642	525	90,216,000	534	-10,295,000	79,921,000	521
Crop Protection	200,313,952	1,356	205,710,000	1,365	+7,453,000	213,163,000	1,391
Human Nutrition	85,309,000	278	89,734,000	279	+2,595,000	92,329,000	279
Environmental Stewardship	225,138,696	1,935	233,599,000	1,950	+2,343,000	235,942,000	1,973
National Agricultural Library	23,357,841	130	22,233,000	148	+1,011,000	23,244,000	148
Repair and Maintenance	17,490,933	--	17,503,000	--	--	17,503,000	--
Total	1,138,211,885	7,912	1,179,639,000	7,995	+20,030,000	1,199,669,000	8,077
Collaborative Research Program	2,912,905	--	--	--	--	--	--
Miscellaneous Fees	120,242	--	--	--	--	--	--
Funds Included for Homeland Security	[35,454,000]	--	[39,170,000]	--	--	[35,808,000]	--
Total Available	1,141,245,032	7,912	1,179,639,000	7,995	+20,030,000	1,199,669,000	8,077
Unobligated Balance	5,931,613	--	--	--	--	--	--
Total Available or Estimate	1,147,176,645	7,912	1,179,639,000	7,995	+20,030,000	1,199,669,000	8,077
Miscellaneous Fees	(3,717,740)	--	--	--			
Transfer from Office of Congressional Relations	(140,000)	--	--	--			
Transfer from U. S. Department of State	(2,912,905)	--	--	--			
Total Appropriation	1,140,406,000	7,912	1,179,639,000	7,995			
Staff Years:							
Direct		7,912		7,995			8,077
Other		356		356			356
Total, Staff Year Estimate		8,268		8,351			8,433

NOTE: Research activities carried out in support of Homeland Security are reflected under the Food Safety, Livestock Protection, and Crop Protection program areas.

Justification of Increases and Decreases

ARS' FY 2011 Salaries and Expenses (S&E) Budget proposes an increase of $20 million above the FY 2010 level. The FY 2011 S&E Budget recommends an increase of $61.5 million in new and expanded research initiatives in human nutrition, food safety, global climate change, bioenergy/biomass, local food systems, animal and crop breeding and protection, reducing world hunger, Colony Collapse Disorder, and production systems to support sustainable agriculture. The budget also provides an increase of $10 million for pay costs and $1.8 million to develop a process to guide Department capital investments. The program increases proposed to fund critical research priorities are offset by the termination of $11.4 million in ongoing research programs as well as the elimination of $41.9 million in Congressionally-added earmarks.

New Products/Product Quality/Value Added

ARS is proposing under this program area a net increase of $6,986,000. This includes pay costs, and new and expanded research initiatives totaling $12,882,000, and decreases totaling $5,896,000.

a) An increase of $1,132,000 to fund increased Pay Costs.

Funding for pay costs is critical for recruiting and retaining top level scientists and staff, sustaining viable research programs, and carrying out USDA's intramural research mission. If pay costs are not fully funded, ARS will have to absorb those costs, be unable to fill critical scientist and personnel positions, and will have to reduce spending for much needed laboratory equipment, supplies, and other materials, thus diminishing the Department's research capacity to achieve its priority goals and outcomes.

b) An increase of $10,000,000 for Establishment of Regional Biofuels Feedstocks Research and Demonstration Centers.

Need for Change

A U.S. government-wide strategy for bioenergy, *Growing America's Fuels*, is being developed to achieve the Congressional mandate of 36 billon gallons of biofuels to be produced by 2022. The plan builds upon the President's May 5, 2009 memorandum forming the Biofuels Interagency Working Groups with Cabinet level USDA, Department of Energy (DOE), and Environmental Protection Agency (EPA) participation. The plan outlines an approach that utilizes the core competencies of USDA and other agencies across government and public-private partnerships to support the existing biofuels industry while accelerating the commercial establishment of advanced biofuels. Key features of the plan include: (i) strong management for results using a regional supply chain systems approach; (ii) continued support for development of first- and second-generation biofuels with a major focus on accelerating third generation (drop-in) biofuels development; and (iii) support of feedstock research and demonstration including perennial grasses to ensure sustainable supply chain development that minimizes transaction costs and creates wealth for farms and rural communities. The plan identifies USDA as having a significant leadership role in the development of improved varieties of dedicated biomass crops suited to different growing environments across the country, and the necessary sustainable production systems to dependably produce the biomass for advanced biofuel conversion facilities. Concurrently, GAO reports and projects developed by the Economic Research Service (ERS) highlight the impact that bioenergy feedstock production will have on soil and water resources, the availability of food and feed, and the environment. To implement the bioenergy strategy while maintaining the sustainability of agricultural productivity, ARS needs to establish regional feedstock research and demonstration centers by enhancing existing resources and using a hub-and-spoke system, and linking with robust partnerships with land grant and other universities, industry, and other Federal and State agencies, tribal nations, and international organizations.

Outcomes

Centers will be managed by ARS and will coordinate efforts for research conducted by other agencies and departments to accelerate the development and deployment of dedicated energy feedstocks and sustainable feedstock production systems for advanced biofuels suited for best participation within different regions across the U.S. by adapted feedstocks. Superior genetic varieties and cultivars for the kinds of feedstocks will be developed. Sustainable production and logistic systems that are suited to regional conditions, regional soil and water resources, and biofuel refinery specifications will be developed. Sustainable regional feedstock supply chain systems will be developed to link feedstock development, production, logistics, conversion, co-product production, and distribution. Economic, environmental, and social uncertainties will be identified upfront for all supply chain segments to build confidence for creating markets, investments, and credit that help provide long-term sustainable biofuel production supply chains.

Means to Achieve Change

- Develop five Regional Biofuels Feedstocks Research and Demonstration Centers in Different Regions of the Country to Emphasize Region Specific Crop and Sustainable Production Systems ($10,000,000). ARS will:

  -- Develop a Southeastern Center to focus on feedstock development and sustainable production in Florida, Georgia, South Carolina, Alabama, Mississippi, Louisiana, Arkansas, and Eastern Texas, and primarily focus on energycane, sorghum, and perennial grasses. There will be significant coordination with a Forest Service (FS) woody biomass center for multifunctional landscape management. Accelerate the development and deployment of dedicated energy feedstocks and sustainable feedstock production systems for advanced biofuels suited for best participation within the region by adapted feedstocks.
  -- Develop an East-Central Center to focus on feedstock development and sustainable production east of the 100th meridian: Nebraska, North Dakota, South Dakota, Minnesota, Iowa, Missouri, Wisconsin, Illinois, Michigan, Indiana, Ohio, Kentucky, Tennessee, Pennsylvania, Delaware, Maryland, Virginia, West Virginia, and focus primarily on perennial grasses, with significant consideration of existing corn grain ethanol and corn stover cellulosic biomass. Accelerate the development and deployment of dedicated energy feedstocks and sustainable feedstock production systems for advanced biofuels suited for best participation within the region by adapted feedstocks.
  -- Develop a Western Center to focus on New Mexico, Arizona, California, Nevada, and Utah, with primary emphasis on new oil seed crops and other new feedstocks. Accelerate the development and deployment of dedicated energy feedstocks and sustainable feedstock production systems for advanced biofuels suited for best participation within the region by adapted feedstocks.
  -- Develop a Northwestern Center to focus on Washington, Oregon, Idaho, Montana, Colorado, Wyoming, North Dakota, and South Dakota, with primary emphasis on oil seed crops. Accelerate the development and deployment of dedicated energy feedstocks and sustainable feedstock production systems for advanced biofuels suited for best participation within the region by adapted feedstocks.
  -- Develop a South-Central Great Plains Center to focus on Texas, Oklahoma, Kansas, and Southern Nebraska, with primary emphasis on biomass sorghum including sweet sorghum, alternatives to irrigated agriculture in the region due to diminishing water resource availability, and livestock utilization of coproducts from ethanol production. Accelerate the development and deployment of dedicated energy feedstocks and sustainable feedstock production systems for advanced biofuels suited for best participation within the region by adapted feedstocks.

c) An increase of $1,750,000 for an Evaluation of USDA's Research Facilities.

Need for Change

USDA has research facilities within several programs including the ARS, the FS, and the Animal and Plant Health Inspection Service (APHIS). Many of these facilities serve both intramural and extramural programs. The management and utilization of these assets requires a process to guide Department capital asset decisions consistent with program goals and the requirements of inherently governmental in-house programs.

Outcomes

USDA will have in place a process to guide facility development linked to program priorities.

d) A decrease of $5,896,000 in Congressionally-added earmarks to provide savings to finance higher priority research initiatives.

Need for Change

Research projects under this program activity have been identified for termination given that they represent Congressionally-added earmarks. The savings achieved from these terminations will be redirected to finance the higher priority agricultural research initiatives identified in the FY 2011 Budget, will improve program and operational efficiencies, and will serve to restrain Federal spending.

HQ, Biotechnology Research and Development Center
HQ, National Corn to Ethanol Research Pilot Plant
IL, Peoria, Crop Production and Food Processing
SD, Brookings, Biomass Crop Production

Livestock Production

ARS is proposing under this program area a net decrease of $2,971,000. This includes pay costs, and new and expanded research initiatives totaling $5,605,000, and decreases totaling $8,576,000.

a) An increase of $605,000 to fund increased Pay Costs.

Funding for pay costs is critical for recruiting and retaining top level scientists and staff, sustaining viable research programs, and carrying out USDA's intramural research mission. If pay costs are not fully funded, ARS will have to absorb those costs, be unable to fill critical scientist and personnel positions, and will have to reduce spending for much needed laboratory equipment, supplies, and other materials, thus diminishing the Department's research capacity to achieve its priority goals and outcomes.

b) An increase of $2,000,000 for research to Reduce World Hunger.

Need for Change

World hunger is a major threat to global stability. Population increases over the next 40 years are projected to occur most rapidly in regions of the world that are currently the most food stressed. The key to meeting the demands of the growing population will be improving animal health and productivity.

Developing animal production systems using low starch forage and phase feeding to produce high quality animal products with lower inputs is a strength of ARS' research that can be applied to

countries in need. Developing technologies to identify the animals most fit for a production system will speed selective breeding progress to adapt the animals to local conditions. The development of preventive measures to combat priority infectious diseases of livestock and poultry that impact the livelihood of people in developing countries (a major concern of the Food and Agriculture Organization and the World Organization for Animal Health) is critical. Until recently it was impossible to study the genes responsible for important traits like productivity, health, hardiness, or nutrient efficiency. These challenges are beginning to be met by exploiting the inherent potential in genomes. The development of high resolution genome sequences for cattle, chicken, and swine are providing the necessary infrastructure to conduct genomic selection. Among the traits most important for addressing world hunger will be animal health and feed efficiency.

Outcomes

Animal producers will benefit from reduced feed costs and avoid stock losses from mycotoxins. The health, feed efficiency, and productivity in food animals will be improved through the use of genetics and more efficient production systems.

Means to Achieve Change

- Collect Phenotypic Data and Use Genome Sequence Derived Markers to Characterize Germplasm for Traits of Importance in Food Animals **(**$600,000). ARS will:
  --Develop specific and genome-wide markers to determine allelic variation throughout food animal genomes. These markers will form the basis of genome-wide selection.
  --Conduct comparative analyses of genomic data between breeds used in the U.S. with those in countries in need to identify key differences associated with improving phenotypes.
  --Develop analytical models using single nucleotide polymorphic markers in breeds found in nations in need to improve genomic selection and the rate of genetic improvement.

- Use Genetics and Production Systems Approaches to Improve Health, Feed Efficiency and Productivity in Food Animals ($1,400,000). ARS will:
  --Identify genes and gene products that influence animal health, growth, and nutrition.
  --Develop proteomic technologies to characterize mechanisms of biological processes associated with improved feed efficiency.
  --Identify and characterize functional mutations that result in altered immune functions of food animals.
  --Determine whether polymorphisms of genes associated with innate immunity increase protective thresholds, and enhance the health food animals raised under conditions with high exposure to infectious diseases.
  --Identify and select ruminants (i.e., cattle and sheep) that are capable of producing a high quality carcass on a roughage diet with limited or no high starch feeds.
  --Develop production systems to optimize carcass quality with forage-based and low input feeding systems.

c) An increase of $3,000,000 for Improved Breeding Strategies and Germplasm to Enhance Food Production and Security.

Need for Change

The key to meeting the demands of the growing population will be improving animal health and productivity. More food must be generated from the resources available. The development of preventive measures to combat priority infectious diseases of livestock, poultry, and aquaculture species that impact the efficiency of production is critical. The completion of animal genome projects has the potential of causing a fundamental paradigm shift in agricultural and biomedical research.

Until recently it was impossible to study the genes responsible for important traits like health, productivity, hardiness, or nutrient efficiency. These challenges are beginning to be met by exploiting the information in genomes. The development of high resolution genome sequences for cattle, chicken, and swine, and the progress in other species such as turkey, trout, and catfish are providing the necessary infrastructure to conduct genomic selection. With sequence and marker information, we will be able to identify the genetic variations that impact disease outcomes and efficiency of nutrient use. These new research tools offer new opportunities to unravel complex traits such as disease resistance and production efficiency. Use of these tools will revolutionize our approaches to disease prevention and treatment, and improving production efficiency. ARS is well positioned to take a leadership role in the application of these new genetic tools to solve some of the most challenging problems in animal health.

Outcomes

As a result of research, catastrophic losses from new and emerging diseases will be avoided. Research in these areas will provide producers with scientific information to protect animal health and increase production efficiency. Information on the relationships between health, nutrients, growth, and feed efficiency can be used to reduce inputs to animal production and optimize animal health and animal product quality characteristics. The proposed research will have a wide range of applications, including the selection of animals with improved growth efficiency, and disease resistance, and the development of genetic-based performance prediction. Furthermore, diagnostics, vaccines, and biotherapeutics designed to convey disease resistance in genetically-defined animal populations will be produced. Reducing losses to disease will have local benefits to animal producers and also decrease the threat of the spread of disease. Improving immune responsiveness, environmental adaptability, and nutrient use efficiency in animal production systems will increase the productivity of animals in the U.S. and in developing countries by reducing the impact of diseases and the level of inputs required to achieve sustainable animal production. Improved accuracy of genetic value prediction and more rapid evaluations will reduce the numbers of broodstock held and evaluated.

Means to Achieve Change

- Beef Cattle and Swine Germplasm Improvement ($1,500,000). ARS will:
  -- Harness the expanding body of genomic information to improve feed efficiency and health through functional characterization of genes in beef cattle and swine germplasm.
  -- Identify animals with improved feed efficiency and less susceptibility to respiratory diseases.
  -- Research will provide graduate and post-graduate training opportunities.

- Dairy Cattle Genetic Improvement ($1,000,000). ARS will:
  -- Build genetic marker sets to rapidly identify and verify animals with improved reproductive performance and production efficiency. Correlation of cow performance with dense genetic marker sets will speed genetic improvement for multiple traits. New high density marker sets will increase the utilization of bovine genomic information across many different breeds.
  -- Research will provide graduate and post-graduate training opportunities.

- Trout Genetic Improvement ($500,000). ARS will:
  -- Develop of genome wide sequence and marker sets and analysis of associations with key traits in rainbow trout. These tools will speed improvement of production efficiency and reduced susceptibility to disease.
  -- Research will provide graduate and post-graduate training opportunities.

d) A decrease of $6,400,000 in Congressionally-added earmarks to provide savings to finance higher priority research initiatives.

Need for Change

Research projects under this program activity have been identified for termination given that they represent Congressionally-added earmarks. The savings achieved from these terminations will be redirected to finance the higher priority agricultural research initiatives identified in the FY 2011 Budget, will improve program and operational efficiencies, and will serve to restrain Federal spending.

AL, Auburn, Catfish Genome
AR, Booneville, Endophyte Research
AR, Stuttgart, Aquaculture Fisheries Center
AR, Stuttgart, Aquaculture Initiatives, Harbor Branch Oceanographic Institute
FL, Brooksville, Subtropical Beef Germplasm
HI, Hilo, Tropical Aquaculture Feeds

e) A decrease of $2,176,000 in ongoing research programs to provide savings to finance higher priority research initiatives.

Need for Change

Research projects under this program activity have been identified for termination given that they are: (1) considered by the Administration to be of lesser priority; (2) duplicative or can be accomplished more effectively elsewhere; or (3) can be more efficiently implemented with less overhead costs at another location. The savings achieved from these terminations will be redirected to finance the higher priority agricultural research initiatives identified in the FY 2011 Budget, will improve program and operational efficiencies, and will serve to restrain Federal spending.

WV, Beaver, Appalachian Farming Systems Research Center

Crop Production

ARS is proposing under this program area a net increase of $6,910,000. This includes pay costs, and new and expanded research initiatives totaling $12,893,000, and decreases totaling $5,983,000.

a) An increase of $1,940,000 to fund increased Pay Costs.

Funding for pay costs is critical for recruiting and retaining top level scientists and staff, sustaining viable research programs, and carrying out USDA's intramural research mission. If pay costs are not fully funded, ARS will have to absorb those costs, be unable to fill critical scientist and personnel positions, and will have to reduce spending for much needed laboratory equipment, supplies, and other materials, thus diminishing the Department's research capacity to achieve its priority goals and outcomes.

b) An increase of $764,000 for research to Reduce World Hunger.

Need for Change

World hunger is a major threat to global stability. Population increases over the next 40 years are projected to occur most rapidly in regions of the world that are currently the most food stressed. The key to meeting the demands of the growing population will be improving crop health and productivity.

Prevention of grain disease losses is critical to addressing world hunger. Maintaining steady supplies of grain crops, keeping grain marketing channels open, and avoiding grain shortages are essential. Unfortunately, new and emerging grain diseases are putting the world's grain supply at catastrophic risk. A virulent new wheat stem rust mutant, Ug99, has emerged in Eastern Africa that threatens wheat and barley production in Africa and Asia; North and South American wheat production is also at risk. Multiple grain staple crops including corn and sorghum are vulnerable to other fungal pathogens. Food and feed prepared from pathogen infested grains can contain harmful mycotoxins (i.e., aflatoxin, fumonosin, deoxynavalinol). Oats are vulnerable to crown rust, and rice is at risk to blast and sheath blight.

Maintaining and protecting the world's grain supply from these disease threats requires a concerted effort. ARS disease experts are often needed to identify and verify pathogen biotypes and mutants. Geneticists and breeders are needed to identify and incorporate genetic resistance genes into improved germplasm and new resistant varieties. ARS' grain crop germplasm and microbial collections provide invaluable sources of resistance genes and reference species. Often ARS researchers join in international scientific coalitions as has happened with the Borlaug Global Rust Initiative. ARS is uniquely suited for leading grain protection research because of its integrated combination of grain crop and cereal pathogen germplasm collections; its strong, highly productive grain crop genomics and breeding programs; its specialized cereal pathologists; and its national role in grain end-product quality and nutrition research.

Outcomes

As a result of the research, catastrophic losses from new and emerging cereal diseases will be avoided. Risk of grain shortages and high prices due to grain speculation and hoarding will be reduced. New germplasm and varieties with increased genetic protection will be released and made available to other grain breeding programs. Incorporation of more durable genetic protection, particularly in underserved areas, will constrict the international spread of new and emerging pathogens. Grain growers will benefit from reduced yield losses and economic gains, and from increased production with lower input costs. World hunger will be reduced for those in need by a more plentiful, economic, and safe supply of cereal foods.

Means to Achieve Change

- Strengthen Grain Disease Research to Protect the World Grain Supply ($764,000).
  ARS will:
  --Safeguard and expand collections of grain crop germplasm and cereal pathogen collections to conserve diverse genetic resources with needed resistance genes and reference samples.
  --Expand and strengthen cereal pathology research, especially for whole genome mapping and characterization to elucidate the basis for virulence and mutation.
  --Develop advanced bioinformatic and statistical genetic tools, such as grain trait indices, that strategically integrate genomic and phenotypic information to accelerate breeding grain crops.
  --Accelerate and strengthen collaborative international germplasm enhancement and breeding programs to increase disease protection in staple grain crops.

c) An increase of $4,289,000 for Crop Breeding to Enhance Food Production and Security.

Need for Change

Sustainability of our Nation's food supply depends on a continuous supply of improved plant varieties with protection from emerging diseases, insects, and damaging environmental conditions. While there has been major investment in the public and private sector in new genomic and biotechnology strategies for crop improvement, classical plant breeding research and expertise continues to be a major but unmet need. Developing improved seeds and new varieties requires effective methods and

expertise in selecting desired traits ("phenotyping") and field evaluation. There is an urgent national and international need for more research and expertise in classical, conventional plant breeding. New emerging diseases such as citrus greening and cereal rusts are threatening the future supply of food crops. Temperature extremes and reduced water supplies provide new challenges for crop production.

Breeding research is particularly needed to improve complex traits that require long-term research and challenging methods such as developing perennial grains with high seed yields, as well as integrating disease resistance and weather stress tolerance genes from wild and weedy relatives of crop plants. Perennial grain production systems offer benefits in soil and water conservation, and decreased dependence on fertilizer and fuel inputs. The Land Institute, Salinas, Kansas, has led in developing perennial grain varieties and production systems. More breeding and disease protection research is needed to increase the production capacity of perennial grains and to optimize perennial grain production systems.

The need for classical breeding research and expertise is growing, but the supply of trained classical plant breeders is diminishing worldwide. The entire plant breeding industry faces a shortage of trained plant breeders as a result of industry expansion. Also, traditional partner disciplines for plant breeding, such as statistics, plant pathology, physiology, and entomology have often shifted away from field-based, practical plant breeding applications. ARS has a force of more than 125 plant breeders, working in teams with plant pathologists, biologists, entomologists and other skilled crop scientists. Clearly, ARS has an obligation to increase training, and mentor more new plant breeders to meet this urgent need.

Outcomes

The proposed research will expand ARS' capacity to improve genetic resources and cultivars for the benefit of U.S. producers, seed companies, processors, and consumers. As a result, ARS and its partners will breed improved germplasm and varieties with higher yields, and improved disease and pest resistance, and resilience to weather extremes such as high temperature and drought. Methods and tools will be developed that will enable classical breeders to choose better breeding parents. More efficient genetic selection methods and experimental design will enable breeders to speed up variety development. Genes and traits that can more rapidly convert and adapt raw germplasm into adapted varieties will be identified. This is especially needed to strengthen development of perennial grains. Expanded training and mentoring of plant breeding researchers at the undergraduate, graduate, and post-graduate level will significantly expand the number of trained plant breeders.

Efforts from the research will result in the improved nutritional quality of cereals, grain legumes, fruits, and vegetables that are developed from the ARS germplasm.

Means to Achieve Change

- Expand the Knowledge and Tools Needed for Classical Plant Breeding ($1,739,000). ARS will:
  -- Conduct comprehensive trait ("phenotype") analysis of plant collections in collaboration with crop breeders, pathologists, agronomists to provide better parent selection.
  -- Expand research in breeding methods and genetic selection to enable classical breeders to breed faster and more efficiently.
  -- Expand the capacity of breeders to use and integrate genes and traits from tropical and other diverse genetic sources.
  -- Provide undergraduate, graduate, and post-graduate training in field and classical plant breeding methods.

- Enhance Plant Breeding for Sustainable Production and Climate Change Protection ($2,550,000). ARS will:
  -- Identify and manipulate genes associated with perennialism and domestication to speed up the development of perennial grains with higher seed yield.
  -- Combine expanded breeding with expanded research on perennial grain production systems.
  -- Expand breeding of fruits and grains for water use efficiency and drought tolerance.
  -- Develop new berries and stone fruit with longer harvest seasons and other improved traits that increase sustainable production.
  -- Phenotype and genotype crop germplasm collections for more effective breeding.
  -- Provide undergraduate, graduate and post-graduate training in breeding for sustainable production and acclimation to climate change.

d) An increase of $3,650,000 for research on Scientific Collections.

Need for Change

Agricultural productivity depends on access to key inputs (i.e., rich soils, fertilizers, water, and energy), the inherent genetic potential of crops and livestock, and effective defenses against diseases, pests, and environmental extremes that reduce agricultural production and producer profitability. The capacity of agricultural research effectively rests on a dynamic foundation of invaluable living animal, plant, and microbial genetic resources, and research tools in the form of scientific collections of preserved biological specimens. Today, critical components of that foundation are eroding – and some are imperiled – by lack of facilities, personnel and operating funds needed to meet the growing demands of global agricultural research. At the same time, demands for collections are increasing due to need for i) new genetic material for use in responding to climate change and dwindling water tables, ii) feedstocks for biofuel production and germplasm for increased productivity to meet rising human populations, iii) determination of host origin for developing biological control and other approaches for managing increasing numbers of insect, weed, and microbial pests gaining entry through ports due to increased travel and trade, and iv) microbial strain stocks needed for biosecurity purposes.

The USDA has principal responsibility for safeguarding the Nation's insect systematics collections, the latter needed for insect control. Insect collections are needed for: i) port identifications by APHIS and DHS; ii) developing pest management strategies based on an accurate knowledge of pest origin, distribution, and biology; iii) identification of new pollinators; and, iv) location and safe testing of natural enemies needed for biological control of insects and weeds. Fortunately, new molecular and visual technologies show promise for both speeding identification, and for instantaneously transmitting information such as insect specimen images via satellite from ports to taxonomists here or overseas, and that therefore can be employed to link collections into an international hub for rapid specimen identification.

New research will work to expand and protect valuable plant, insect, and microbial germplasm. For the plant germplasm system, ready access is needed for maximal exploitation. Researchers will more efficiently obtain needed accessions, contribute new plant information, and conserve more diverse resources using the GRIN-Global information system. Training in plant germplasm and information system management is a companion critical component. Because of the high cost of maintaining insect colonies, users of insect germplasm (e.g., APHIS, Department of Defense (DoD), and industry) have increasingly called for better means to produce and cryopreserve key species, e.g., honey bee lines (for resistance against agents that cause colony collapse disorder), fruit flies, boll weevil, and screwworm (for eradication), mosquitoes, ticks, and plant pests such as glassy-winged sharpshooter and citrus psyllid [vectors of Pierce's disease and citrus greening] (for testing of pesticides and determination of pest vulnerabilities), and their natural enemies (including insect natural enemies of weeds). Also, as transgenic insect lines become more abundant, the need for a simple means of preserving live insects is growing commensurately.

Outcomes

The proposed increase will enable ARS to expand activities to indentify, acquire, and secure unprotected genetic resources of plants, insects, and crop and veterinary associated microbes. A broad spectrum of genetic diversity in the form of viable and well documented germplasm will be conserved. Vulnerable or threatened genetic resources vital to national security will be safely stored and backed-up in secure facilities. Successful implementation will provide users with more dependable and more diverse sources of high quality genetic resources. Crops and veterinary animals will be better protected from pests through biological control, plant resistance and other management tools. Crop improvement for weather tolerance and end product quality will be accelerated. More effective use of the genetic resources for crop improvement will be facilitated by making the collections and related information more readily accessible and useful to crop and insect (e.g., bee) breeders, and scientists developing strategies for controlling diseases of crops, veterinary animals, and beneficial insects.

Means to Achieve Change

- Enhance Capacity to Conserve a Broad Diversity of National Plant Germplasm System Resources ($3,650,000). ARS will:
  -- Expand plant germplasm collection and conservation with a target for food security and crop protection, with a focus on small fruits/horticultural crops and vegetable crops.
  -- Expand plant genome databases by developing information technologies and sciences that will be critical to the success of new plant biology, including standardization, exchange, conservation, and analysis of biological information.
  -- Provide effective management of the Genetic Resources Information Network (GRIN)-Global system.
  -- Expand capacity and provide graduate and post-graduate training in the area of plant germplasm collections management.

e) An increase of $1,000,000 for the Development of Local Food Systems for the Urban Eastern Seaboard Region.

Need for Change

A substantial percentage of the food supply for the Eastern Seaboard Region, from Maine to Virginia, comes from outside sources with over 65 percent of the vegetables and 80 percent of the fruits consumed currently produced and shipped in from somewhere else. Although energy prices have more than doubled since 2002, there is little evidence that the food system is becoming more energy or "food miles" efficient. Many are asking how could food-related energy policies be used to reverse such trends. In addition, significant dependence on centralized and distantly produced foods is raising concerns that consumers, particularly in urban population centers, are vulnerable to risks of interrupted food supply due to health safety and natural disasters. What is needed is a system-wide assessment to find the most viable ways local-based production can be used to meet urban consumer demand.

Outcomes

Relying on the production of locally grown food can counter the challenges of rising transport costs, expanding populations, and vanishing farmlands. In addition, expanding opportunities for local food production can stimulate rural economies and offset the risk of food shortages in one area by increasing and diversifying local production in other areas. Using local-based production strategies can shorten the time fresh market produce spends in transport, which can boost overall quality by preserving nutrients, freshness, color, and taste, particularly to population centers that do not have ready access to fresh produce. Growers and food distributors will be able to make informed decisions about the kinds and quantities of locally grown crops to produce and sell. Policymakers will have

science-based information for developing and protecting the agricultural supply chain infrastructure, and ensuring affordable food supplies.

Means to Achieve Change

- Develop Local Food Systems for the Urban Eastern Seaboard Region ($1,000,000). ARS will:
  -- Identify the information needed to assess the actual capacity to produce food locally that meets the needs of a large urban population, and find out how this capacity changes as the seasons change.
  -- Compare county level data on weather, soil types, fertilizer use, land availability, water availability, projected changes in climate, and plant suitability from Maine to Virginia, and examine the constraints imposed by environmental, economic, social, and other geographic factors.
  -- Use the information developed to assess local food production potential and economic viability.

f) An increase of $500,000 for research on Colony Collapse Disorder of Honey Bees.

Need for Change

Honey bees are critical to the pollination of our Nation's fruits, nuts, berries, and vegetables, adding over $14 billion in farm gate value. The beekeeping industry, and growers that depend on the honey bee for pollination are facing a crisis because of Colony Collapse Disorder (CCD), a new syndrome that appeared throughout the country in late 2006, killing 25 percent of hives nationally and 80 to 90 percent of hives in some apiaries. Mitigation will depend on determining the cause of the syndrome, and finding practical, cost-effective solutions useful to the bee industry. Current hypotheses for the cause of CCD include: a new pathogen (e.g., a virus or nosema); a new pest (e.g., the varroa mite, which also acts as a vector for bee viruses; new pesticides (e.g., neonicotinoids); or, management changes (e.g., transporting bees across the country to California for pollination of increasing acreages of almonds).

New research will work to determine the causes of CCD and develop the means for mitigating its impact. Since CCD may be a consequence of unhealthy bees surviving through the winter, one focus will be on improving the health of overwintering colonies. Also, since bees depend on learning and memory for foraging for maintenance of colony homeostasis, any factors that effect these cognitive functions, will be the second focus of research. Bee viruses and pesticides that act as neurotoxins are particularly of interest. Program thrusts will address urgent and high priority items in the Federal Interagency CCD Action Plan.

Outcomes

The proposed research will result in stronger honey bee colonies able to meet the Nation's pollination needs for foods rich in vitamins and minerals while providing nutritious honey.

Means to Achieve Change

- Determine the Role of Pathogens and Other Stress Factors Such as Pesticides in CCD and Develop the Means for Mitigating their Effects ($500,000). ARS will:
  -- Determine potential synergistic effects of neonicotinoids and other pesticides on honey bee pathogens.
  -- Identify the physiological basis for bee responses to pathogens and pesticides, and develop therapeutic approaches (including those based on gene silencing) to boost those responses.

g) An increase of $750,000 for the World Food Prize.

Need for Change

The World Food Prize is given annually in recognition of those who have advanced human development by improving the quality, quantity, or availability of the world's food supply. Founded in 1986 by Nobel Peace Prize Laureate Dr. Norman E. Borlaug, the World Food Prize hosts a series of events in Des Moines, Iowa, each year attended by over 1,000 people representing more than 60 countries and 40 States. ARS is the Department's designated agency to support and partner with the World Food Prize Foundation in recognizing outstanding work in the field of humanitarian food assistance and relieving world hunger.

Outcomes

ARS funding will support the activities of the World Food Prize Foundation, a nonprofit, tax exempt foundation. The activities include speakers and distinguished participants; preparation of publications, brochures, and other materials; participation of students and teachers in the Youth Institute; and related staff and administrative support costs.

Means to Achieve Change

- Support World Food Prize ($750,000). ARS will:
  -- Finance the administrative costs in support of World Food Prize activities.

h) A decrease of $5,983,000 in Congressionally-added earmarks to provide savings to finance higher priority research initiatives.

Need for Change

Research projects under this program activity have been identified for termination given that they represent Congressionally-added earmarks. The savings achieved from these terminations will be redirected to finance the higher priority agricultural research initiatives identified in the FY 2011 Budget, will improve program and operational efficiencies, and will serve to restrain Federal spending.

AR, Booneville, Center for Agroforestry
AR, Booneville, Dale Bumpers Small Farms Research Center
DC, Washington, Medicinal and Bioactive Crops
GA, Dawson, Water Use Reduction
HI, Hilo, Pacific Basin Agricultural Research Center Staffing
MD, Beltsville, Potato Diseases
MN, St. Paul, Soybean Genomics
MN, St. Paul, Wild Rice
ND, Mandan, Northern Great Plains Research Laboratory
WV, Kearneysville, Computer Vision Engineer

Food Safety

ARS is proposing under this program area a net increase of $5,998,000. This includes pay costs, and new and expanded research initiatives totaling $5,998,000.

a) An increase of $998,000 to fund increased Pay Costs.

Funding for pay costs is critical for recruiting and retaining top level scientists and staff, sustaining viable research programs, and carrying out USDA's intramural research mission. If pay costs are not

fully funded, ARS will have to absorb those costs, be unable to fill critical scientist and personnel positions, and will have to reduce spending for much needed laboratory equipment, supplies, and other materials, thus diminishing the Department's research capacity to achieve its priority goals and outcomes.

b) An increase of $5,000,000 to Make America's Food Supply Safer.

Need for Change

Despite years of focused research and activities, the safety of the food supply continues to be a vital public health priority. Foodborne outbreaks are seen as major causes of illnesses and death, as well as economic devastation, both nationally and internationally. The full extent, specifically the cost/burden resulting from these outbreaks, remains unknown. The latest 2008 FoodNet Data from the Centers for Disease Control and Prevention (CDC) shows no significant progress toward the national health objectives for the last three years, suggesting there is a need for continued food safety research and practices. Food safety research poses numerous challenges because of the complexity of the production, processing, and distribution processes. Although often referred to as continuum, food safety is not a linear process, but rather the intertwining of food animals, plants, the environment, and humans to create opportunities for contamination, then transmission, by pathogens, chemicals, and or toxins.

The causes of many of the outbreaks also remain unresolved, but issues such as intensive food production, the globalization of the food and resulting international trade, changes in consumption habits, and travel and immigration of people are regarded as areas of interest. Regardless of the causes, food safety research must continue to be conducted and evolve, especially as technologies become more sensitive and provide more detailed data. Continued outbreaks of major commodity-specific foods that may directly impact regulation, industry, and trade require persistent focused attention.

Although major, recent outbreaks have been associated with cookie dough, peanut butter, and ground beef, contaminated fresh produce presents an increasingly serious issue. The trend towards a more healthy diet, with increased consumption of fresh produce in the form of fruits and vegetables, has coincided with an increased number of foodborne illnesses, deaths and chronic sequelae from produce contaminated with enteric pathogens such as E. coli O157:H7, Salmonella and viruses. Produce associated outbreaks now surpass illnesses from all other foods, including beef, poultry, and seafood. Equally troubling is that more people have been affected due to the size of these outbreaks. Produce outbreaks have been documented from both domestically grown and imported produce during the past 10 years, although in the past five years domestically grown associated outbreaks have far surpassed imported produce.

Understanding fresh produce outbreaks and preventing their reoccurrence is of paramount importance to the health and well-being of the general public, and to the economic viability of the U.S. produce industry. Some best management practices (BMPs) for pathogen prevention and control in produce have been implemented by industry, however, the scientific knowledge to identify the most critical issues is still lacking. Industry by necessity was required to implement intuitive practices in the short term to regain consumer confidence. The Food and Drug Administration (FDA) has recently released for public and industry comment, draft guidelines for the production of tomatoes, leafy greens, and melons. However, they are still in draft form and likely will be non-binding. A lack of scientific knowledge precludes consumer demands for strict and binding produce regulations. ARS, in particular the food safety program, has the broad-based interdisciplinary disciplinary expertise, in concert with our university, industry, and Federal agency partners, to address most if not all issues related to the contamination problem.

Allied to the issue is the ability to rapidly and unequivocally detect and identify contaminated produce. Challenges arise from either uncontrolled microbes entering through raw materials, contamination during processing, or from undesired chemical contaminants including chemical residues, and bacterial, fungal and plant toxins. Detection is required at the earliest possible stage in the food chain, avoiding or preventing the need for significant processing interventions, or the recall of food products from purchase endpoints. Research efforts will develop technologies for the entire food chain which allow the most effective and rapid detection and characterization capability.

ARS' research will reduce contamination through the development of strategies which predict and control the fate and transport of pathogens based upon epidemiological, ecologic, and environmental studies of pathogen introduction, persistence, movement, and survival in conventional and organically produced crops, from farm to fork. The agency will also enhance inspection and detection capabilities by developing and validating advanced multi-platform technologies to detect high consequence pathogens, toxins, and chemical residues, and attribute change in real or near-real time.

The ultimate goal is to develop interventions that are effective and their impact measured. There is not a single intervention, but rather a combination of interventions in pre- and post-harvest that are needed to control and prevent foodborne diseases and the transmission of pathogens. These interventions must be developed, implemented, and then measured to determine their effectiveness. These new detection technologies will help in the measurement and assessment.

Outcomes

The proposed increase will facilitate research in a wide range of critical food safety and public health areas. Epidemiologic studies (population-based) will help identify risk factors; population/ecologic data will determine attributes of the ecological communities in which pathogens are found. Knowledge of the attributes, interactions, and relationships within the community in which the pathogen lives is critical. Specifically, researchers will identify pathogen sources; pathogen introduction mechanisms; and pathogen introduction, transport, and migration within agricultural settings and watersheds that supply production fields. Research will be conducted to develop an understanding of pathogen survival which is critical to the development of strategies to prevent produce contamination. Research efforts using systems biology will provide critical information on understanding the genetic basis for pathogen survival and growth, the uptake and attachment to plant tissue, and the development and cause of changes in virulence. Epidemiologic research will help bridge pre- and post-harvest areas to identify and characterize pathogenic organisms and to understand the transmission of pathogens along the entire continuum. Epidemiology will help provide a scientific approach for sampling approaches for these extensive microbial studies.

ARS will lead in developing and validating detection and inspection technologies that have public health, regulatory, trade, industry and research use, that is, a commonality of interests between government and stakeholders. Effective and efficient technologies that can be readily implemented will allow improved response times to events; allow for the development of mechanisms for treating foods taken out of commerce; provide data to identify areas where interventions are most critically needed; and assisting in the implementation of Hazard Analysis and Critical Control Points programs by the FDA, Food Safety and Inspection Service (FSIS), and their regulated industries in developing and validating predictive microbial models and to providing data for identified data gaps.

Means to Achieve Change

- Develop and Validate Integrated Science-Based Management Practices to Prevent Preharvest Contamination of Produce by Enteric Pathogens; Develop Postharvest Intervention Strategies to Eliminate Any Pathogen Contamination; and Develop and Validate Detection and Sensing Technologies ($5,000,000). ARS will:

-- Determine how pathogens are introduced into the environment through epidemiologic and ecologic studies; determine their prevalence and levels of contamination in/on: water sources (rain, flooding, and irrigation) prior to and used during growing and harvest cycles; soil amendments (manure); farm animals; wildlife; produce handlers; visitors; and equipment.
-- Determine pathogen persistence and survival in the environment through studies on environmental factors; seasonality; production cycles; mechanism(s) of transference to edible plant surfaces; adjacent land use; buffer zones; water sources (irrigation); and fecal contamination by farm animals, wildlife, and other organisms (insects and protozoa).
-- Determine the role of epiphytic and soft rot microorganisms in pathogen internalization and/or attachment; and pathogen occurrence and movement.
-- Develop practices and tools to control and predict the fate and transport of pathogens.
-- Develop innovative processing intervention strategies to assure and maintain postharvest safety and quality.
-- Conduct field/epidemiologic studies to determine the prevalence, diversity, quantity colonization and survival of pathogens associated with crops produced conventionally and organically.
-- Develop and validate lab-based multi-platform (universal) contaminant detection technologies for high consequence pathogens, toxins and chemical residues.
-- Develop and validate multi-task on/in-line (field) inspection technologies (for all size processors) that detect contaminants and changes in attributes simultaneously at required line speeds (functioning in real or near real-time).
-- Develop database systems that allow for and enhance inspection, research, and defense capabilities.

Livestock Protection

ARS is proposing under this program area a net decrease of $10,295,000. This includes pay costs, and new and expanded research initiatives totaling $3,666,000, and decreases totaling $13,961,000.

a) An increase of $666,000 to fund increased Pay Costs.

Funding for pay costs is critical for recruiting and retaining top level scientists and staff, sustaining viable research programs, and carrying out USDA's intramural research mission. If pay costs are not fully funded, ARS will have to absorb those costs, be unable to fill critical scientist and personnel positions, and will have to reduce spending for much needed laboratory equipment, supplies, and other materials, thus diminishing the Department's research capacity to achieve its priority goals and outcomes.

b) An increase of $3,000,000 for Improved Animal Protection to Enhance Food Production and Security.

Need for Change

The key to meeting the demands of the growing population will be improving animal health and productivity. More food must be generated from the resources available. The development of preventive measures to combat priority infectious diseases of livestock, poultry, and aquaculture species that impact the efficiency of production is critical. The completion of animal genome projects has the potential of causing a fundamental paradigm shift in agricultural and biomedical research. Until recently it was impossible to study the genes responsible for important traits like health, productivity, hardiness, or nutrient efficiency. These challenges are beginning to be met by exploiting the information in genomes. The development of high resolution genome sequences for cattle, chicken, and swine, and the progress in other species such as turkey, trout, and catfish are providing the necessary infrastructure to conduct genomic selection. With sequence and marker information, we will be able to identify the genetic variations that impact disease outcomes and efficiency of nutrient

use. These new research tools offer new opportunities to unravel complex traits such as disease resistance and production efficiency. Use of these tools will revolutionize our approaches to disease prevention and treatment, and improving production efficiency. ARS is well positioned to take a leadership role in the application of these new genetic tools to solve some of the most challenging problems in animal health.

Outcomes

As a result of research, catastrophic losses from new and emerging diseases will be avoided. Research in these areas will provide producers with scientific information to protect animal health and increase production efficiency. Information on the relationships between health, nutrients, growth, and feed efficiency can be used to reduce inputs to animal production and optimize animal health and animal product quality characteristics. The proposed research will have a wide range of applications, including the selection of animals with improved growth efficiency, and disease resistance, and the development of genetic-based performance prediction. Furthermore, diagnostics, vaccines, and biotherapeutics designed to convey disease resistance in genetically-defined animal populations will be produced. Reducing losses to disease will have local benefits to animal producers and also decrease the threat of the spread of disease. Improving immune responsiveness, environmental adaptability, and nutrient use efficiency in animal production systems will increase the productivity of animals in the U.S. and in developing countries by reducing the impact of diseases and the level of inputs required to achieve sustainable animal production. Improved accuracy of genetic value prediction and more rapid evaluations will reduce the numbers of broodstock held and evaluated.

Means to Achieve Change

- Poultry Genetic Improvement for Animal Health Traits ($500,000). ARS will:
  -- Identify specific gut microbes that may account for differences between high and low feed efficiency in individual birds.
  -- Determine if there is a correlation between pathogen subclinical infections and feed efficiency.

- Development of New Tools to Control Bovine Tuberculosis ($750,000). ARS will:
  -- Develop genetically-modified *Mycobacterium bovis* vaccines designed to induce long lasting protective immune responses and allow the implementation of DIVA (differentiating infected from vaccinated animals) strategies.

- Development of New Tools to Control Bovine Respiratory Diseases ($750,000). ARS will:
  -- Conduct metagenomics analyses of respiratory samples isolated from feedlot cattle. Design new vaccine platforms that more broadly prevent the polymicrobial infections associated with the bovine respiratory disease complex.

- Development of Rapid Response to issues and emergencies relating to animal health, food safety and security ($1,000,000). ARS will:
  -- Monitor for emergence, prepare for arrival, and/or react to immediate animal health crises in American and global agriculture.

c) A decrease of $10,770,000 in Congressionally-added earmarks to provide savings to finance higher priority research initiatives.

Need for Change

Research projects under this program activity have been identified for termination given that they represent Congressionally-added earmarks. The savings achieved from these terminations will be redirected to finance the higher priority agricultural research initiatives identified in the FY 2011 Budget, will improve program and operational efficiencies, and will serve to restrain Federal spending.

HQ, Lyme Disease 4 Poster Project
HQ, National Bio and Agro Defense Facility
FL, Gainesville, Mosquito Trapping Research/West Nile Virus
KS, Manhattan, Arthropod-Borne Animal Disease Research Laboratory
LA, New Orleans, Formosan Subterranean Termites
LA, New Orleans, Termite Species in Hawaii
MD, Beltsville, Poultry Diseases
NY, Greenport, Animal Vaccines

d) A decrease of $3,191,000 in ongoing research programs to provide savings to finance higher priority research initiatives.

Need for Change

Research projects under this program activity have been identified for termination given that they are: (1) considered by the Administration to be of lesser priority; (2) duplicative or can be accomplished more effectively elsewhere; or (3) can be more efficiently implemented with less overhead costs at another location. The savings achieved from these terminations will be redirected to finance the higher priority agricultural research initiatives identified in the FY 2011 Budget, will improve program and operational efficiencies, and will serve to restrain Federal spending.

LA, New Orleans, Formosan Subterranean Termites

Crop Protection

ARS is proposing under this program area a net increase of $7,453,000. This includes pay costs, and new and expanded research initiatives totaling $9,718,000, and decreases totaling $2,265,000.

a) An increase of $1,718,000 to fund increased Pay Costs.

Funding for pay costs is critical for recruiting and retaining top level scientists and staff, sustaining viable research programs, and carrying out USDA's intramural research mission. If pay costs are not fully funded, ARS will have to absorb those costs, be unable to fill critical scientist and personnel positions, and will have to reduce spending for much needed laboratory equipment, supplies, and other materials, thus diminishing the Department's research capacity to achieve its priority goals and outcomes.

b) An increase of $4,750,000 for Crop Protection to Enhance Food Production and Security.

Need for Change

Sustainability of our Nation's food supply depends on a continuous supply of improved plant varieties with protection from emerging diseases, insects, and damaging environmental conditions. While there has been major investment in the public and private sector in new genomic and biotechnology strategies for crop improvement, classical plant breeding research and expertise continues to be a major but unmet need. Developing improved seeds and new varieties requires effective methods and expertise in selecting desired traits ("phenotyping") and field evaluation. There is an urgent national and international need for more research and expertise in classical, conventional plant breeding. New emerging diseases such as citrus greening and cereal rusts are threatening the future supply of food crops. Temperature extremes and reduced water supplies provide new challenges for crop production.

Breeding research is particularly needed to improve complex traits that require long-term research and challenging methods such as developing perennial grains with high seed yields, as well as integrating

disease resistance and weather stress tolerance genes from wild and weedy relatives of crop plants. Perennial grain production systems offer benefits in soil and water conservation, and decreased dependence on fertilizer and fuel inputs. The Land Institute, Salinas, Kansas, has led in developing perennial grain varieties and production systems. More breeding and disease protection research is needed to increase the production capacity of perennial grains and to optimize perennial grain production systems.

The need for classical breeding research and expertise is growing, but the supply of trained classical plant breeders is diminishing worldwide. The entire plant breeding industry faces a shortage of trained plant breeders as a result of industry expansion. Also, traditional partner disciplines for plant breeding, such as statistics, plant pathology, physiology, and entomology have often shifted away from field-based, practical plant breeding applications. ARS has a force of more than 125 plant breeders, working in teams with plant pathologists, biologists, entomologists and other skilled crop scientists. Clearly, ARS has an obligation to increase training, and mentor more new plant breeders to meet this urgent need.

Outcomes

The proposed research will expand ARS' capacity to improve genetic resources and cultivars for the benefit of U.S. producers, seed companies, processors, and consumers. As a result, ARS and its partners will breed improved germplasm and varieties with higher yields, and improved disease and pest resistance, and resilience to weather extremes such as high temperature and drought. Methods and tools will be developed that will enable classical breeders to choose better breeding parents. More efficient genetic selection methods and experimental design will enable breeders to speed up variety development. Genes and traits that can more rapidly convert and adapt raw germplasm into adapted varieties will be identified. This is especially needed to strengthen development of perennial grains. Expanded training and mentoring of plant breeding researchers at the undergraduate, graduate, and post-graduate level will significantly expand the number of trained plant breeders.

Efforts from the research will result in the improved nutritional quality of cereals, grain legumes, fruits, and vegetables that are developed from the ARS germplasm.

Means to Achieve Change

- Enhance Plant Breeding for Disease and Insect Protection ($3,750,000). ARS will:
  -- Improve citrus germplasm to protect from citrus greening.
  -- Breed legume germplasm with enhanced disease and pest protection.
  -- Breed oats, wheat, and barley with protection to Ug99 and other cereal rusts.
  -- Provide undergraduate, graduate, and post-graduate training in field and classical plant breeding for disease and insect protection.

- Develop Rapid Response to Issues and Emergencies Relating to Plant Health, and Food Safety and Security ($1,000,000). ARS will:
  -- Monitor for emergence, prepare for arrival, and/or react to immediate plant health crises in American and global agriculture.

c) An increase of $3,250,000 for research on Scientific Collections.

Need for Change

Agricultural productivity depends on access to key inputs (i.e., rich soils, fertilizers, water, and energy), the inherent genetic potential of crops and livestock, and effective defenses against diseases, pests, and environmental extremes that reduce agricultural production and producer profitability. The capacity of agricultural research effectively rests on a dynamic foundation of invaluable living animal,

plant, and microbial genetic resources, and research tools in the form of scientific collections of preserved biological specimens. Today, critical components of that foundation are eroding – and some are imperiled – by lack of facilities, personnel and operating funds needed to meet the growing demands of global agricultural research. At the same time, demands for collections are increasing due to need for i) new genetic material for use in responding to climate change and dwindling water tables, ii) feedstocks for biofuel production and germplasm for increased productivity to meet rising human populations, iii) determination of host origin for developing biological control and other approaches for managing increasing numbers of insect, weed, and microbial pests gaining entry through ports due to increased travel and trade, and iv) microbial strain stocks needed for biosecurity purposes.

The USDA has principal responsibility for safeguarding the Nation's insect systematics collections, the latter needed for insect control. Insect collections are needed for: i) port identifications by APHIS and DHS; ii) developing pest management strategies based on an accurate knowledge of pest origin, distribution, and biology; iii) identification of new pollinators; and, iv) location and safe testing of natural enemies needed for biological control of insects and weeds. Fortunately, new molecular and visual technologies show promise for both speeding identification, and for instantaneously transmitting information such as insect specimen images via satellite from ports to taxonomists here or overseas, and that therefore can be employed to link collections into an international hub for rapid specimen identification.

New research will work to expand and protect valuable plant, insect, and microbial germplasm. For the plant germplasm system, ready access is needed for maximal exploitation. Researchers will more efficiently obtain needed accessions, contribute new plant information, and conserve more diverse resources using the GRIN-Global information system. Training in plant germplasm and information system management is a companion critical component. Because of the high cost of maintaining insect colonies, users of insect germplasm (e.g., APHIS, DoD, and industry) have increasingly called for better means to produce and cryopreserve key species, e.g., honey bee lines (for resistance against agents that cause colony collapse disorder), fruit flies, boll weevil, and screwworm (for eradication), mosquitoes, ticks, and plant pests such as glassy-winged sharpshooter and citrus psyllid [vectors of Pierce's disease and citrus greening] (for testing of pesticides and determination of pest vulnerabilities), and their natural enemies (including insect natural enemies of weeds). Also, as transgenic insect lines become more abundant, the need for a simple means of preserving live insects is growing commensurately.

Outcomes

The proposed increase will enable ARS to expand activities to indentify, acquire, and secure unprotected genetic resources of plants, insects, and crop and veterinary associated microbes. A broad spectrum of genetic diversity in the form of viable and well documented germplasm will be conserved. Vulnerable or threatened genetic resources vital to national security will be safely stored and backed-up in secure facilities. Successful implementation will provide users with more dependable and more diverse sources of high quality genetic resources. Crops and veterinary animals will be better protected from pests through biological control, plant resistance and other management tools. Crop improvement for weather tolerance and end product quality will be accelerated. More effective use of the genetic resources for crop improvement will be facilitated by making the collections and related information more readily accessible and useful to crop and insect (e.g., bee) breeders, and scientists developing strategies for controlling diseases of crops, veterinary animals, and beneficial insects.

Means to Achieve Change

- Enhance Capacity to Conserve Insect Germplasm ($1,000,000). ARS will:
  -- Develop means for cryopreservation of beneficial insects, pests of crops and veterinary animals, and their natural enemies.
  -- Develop a system for storage of beneficial and pest insect germplasm.

- Enhance Insect Systematics Capacity ($750,000). ARS will:
  -- Expand development of barcoding and other molecular methods for insect systematics.
  -- Begin to develop a U.S. centered Insect Identification Network that relies on state-of-the-art transmission of visual images.

- Enhance Microbial Germplasm and Systematics Collections Capacity ($1,500,000). ARS will:
  -- Strengthen key collections of microbes associated with crop diseases and those microbes useful for controlling invasive crop pests and weeds.

d) A decrease of $2,265,000 in Congressionally-added earmarks to provide savings to finance higher priority research initiatives.

Need for Change

Research projects under this program activity have been identified for termination given that they represent Congressionally-added earmarks. The savings achieved from these terminations will be redirected to finance the higher priority agricultural research initiatives identified in the FY 2011 Budget, will improve program and operational efficiencies, and will serve to restrain Federal spending.

HQ, Northwest Center for Small Fruits
MD, Beltsville, Biomedical Materials in Plants
MN, St. Paul, Cereal Disease

Human Nutrition

ARS is proposing under this program area a net increase of $2,595,000. This includes pay costs, and new and expanded research initiatives totaling $6,753,000, and decreases totaling $4,158,000.

a) An increase of $353,000 to fund increased Pay Costs.

Funding for pay costs is critical for recruiting and retaining top level scientists and staff, sustaining viable research programs, and carrying out USDA's intramural research mission. If pay costs are not fully funded, ARS will have to absorb those costs, be unable to fill critical scientist and personnel positions, and will have to reduce spending for much needed laboratory equipment, supplies, and other materials, thus diminishing the Department's research capacity to achieve its priority goals and outcomes.

b) An increase of $6,400,000 for research on Human Nutrition.

Need for Change

Obesity prevalence among adults and children in the U.S. has tripled in the last 30 years. During the same time the *Dietary Guidelines for Americans* (DGA) have been issued by USDA in partnership with the Department of Health and Human Services with their most recent revision in 2005 shifting the emphasis from prevention of chronic diseases to prevention of obesity. Despite the DGA forming the basis for Federal food and nutrition policy and the requirement of USDA nutrition assistance programs to provide meals that meet the DGA, few Americans have diets that come close to the recommendations.

The reasons that Americans do not eat as recommended by the DGA are not well understood. Simplistic explanations like "healthy food doesn't taste good" or "low-fat diets will lead to healthy weight" have been disproven repeatedly by research. It is also apparent that simply providing

information on good nutrition to people, while essential, is not sufficient to motivate the behavior changes needed to meet the DGA recommendations.

Knowledge of the conscious and unconscious factors that affect decisions by children and adults when making specific food choices is needed to know what will successfully motivate the behavior changes needed to reverse the trends in obesity over the past decades. Importantly, it is not known if the two age categories (i.e., children/adults) or the various ethnic and racial groups who have higher levels of obesity, and increased medical costs as a result, make their food and physical activity choices based on different criteria from the rest of the population.

Much of the popular nutrition and weight management information available to the American people is of suspect quality. A recent best selling book series provides lists of foods to eat or avoid that will control body weight. Internet-based information is considered even less reliable by experts yet is the most accessible by the public.

The President's priorities include assuring that American's children and the world's children have access to safe, nutritious, and balanced meals. Studies of children's eating behaviors have repeatedly demonstrated that providing healthy foods does not ensure consumption of those foods. Likewise, having access to the opportunity for physical activity does not guarantee it will occur. Determination of how and why people make these choices is essential to developing programs that both provide opportunities and motivate behavior changes is essential.

The National Agricultural Library's Nutrition.gov site was launched in November 2004; a major renovation was completed in February 2008. The Nutrition.gov Web site contains more than 1,000 links to current nutrition information on healthy eating, physical activity, and food safety. The Web site received 12 million hits in 2009 making it one of the most accessed government sites. Providing science-based dietary guidance is critical to enhancing the public's ability to making healthy choices in reducing obesity and other food related diseases.

Outcomes

The proposed increase will fund a study to identify barriers and facilitators to following the DGA in multiple locations nationwide, in children and adults, and in three racial and ethnic groups. Innovative methods are being used to more effectively elicit the information required to conduct a full-scale study of what goes into the decision making on food and physical activity choices. Study results on perceived barriers and facilitators to the DGA will be combined with data collected on actual dietary intake, physical activity measurements, age, gender, race/ethnicity, geographic locations, medical history, weight history, household demographics, and so forth. This knowledge will enable us to determine the types of programs needed to effect real changes in behavior. We will know if there is a universal message that resonates with consumers or if we have to tailor campaigns to specific target populations. While this approach has been taken in limited ways by commercial advertisers, this has never been considered by nutritional educators.

The proposed increase for NAL's Nutrition.gov site will enhance nutrition information related to children's healthy weight gain during growth and ways by which obesity can be prevented.

Means to Achieve Change

- Discover Barriers and Facilitators to Following the DGA, the Basis for all Federal Nutrition Policy ($4,500,000). ARS will:
  -- Study 8,400 children and their caretakers to determine factors that help or hinder compliance with Federal nutritional recommendations. This large number is required to provide sufficient statistical ability to discern meaningful differences among the various age and ethnic groups

being studied. New campaigns to motivate behavior change in eating and physical activity will result from this research.

- Personalize Prevention through Diet, Behavior, and Genomics ($500,000). ARS will:
  -- Identify genes or genetic markers through ethnic groups that respond to diet and physical activity.

- Improve the Usefulness of the "What We Eat in America Survey" to Other Federal Agencies ($900,000). ARS will:
  -- Develop research tools for evaluating the food consumption and integrated software/hardware database platform that supports the needs of other USDA agencies, such as, the Food and Nutrition Service and the ERS, and other Federal agencies, such as NIH, CDC, FDA, and EPA.

- Enhance Nutrition Information to Consumers through Nutrition.gov ($500,000). ARS will:
  -- Make available information on means to improve the nutrition of children. Since most of the nutrition information on this site is aimed at adults, significantly increase scientifically verified information about children's healthy weight gain during growth and ways by which obesity can be prevented.

c) A decrease of $4,158,000 in Congressionally-added earmarks to provide savings to finance higher priority research initiatives.

Need for Change

Research projects under this program activity have been identified for termination given that they represent Congressionally-added earmarks. The savings achieved from these terminations will be redirected to finance the higher priority agricultural research initiatives identified in the FY 2011 Budget, will improve program and operational efficiencies, and will serve to restrain Federal spending.

AR, Little Rock, Sorghum Research
LA, New Orleans, Diet Nutrition and Obesity Research
LA, New Orleans, Phytoestrogen Research
MA, Boston, Human Nutrition Research
NC, Kannapolis, North Carolina Human Nutrition Center
TX, Houston, Human Nutrition Research

Environmental Stewardship

ARS is proposing under this program area a net increase of $2,343,000. This includes pay costs, and new and expanded research initiatives totaling $14,139,000, and decreases totaling $11,796,000.

a) An increase of $2,453,000 to fund increased Pay Costs.

Funding for pay costs is critical for recruiting and retaining top level scientists and staff, sustaining viable research programs, and carrying out USDA's intramural research mission. If pay costs are not fully funded, ARS will have to absorb those costs, be unable to fill critical scientist and personnel positions, and will have to reduce spending for much needed laboratory equipment, supplies, and other materials, thus diminishing the Department's research capacity to achieve its priority goals and outcomes.

b) An increase of $6,250,000 for Development of Production Systems to Support Sustainable Agriculture.

Need for Change

American farms generate more than $200 billion in goods and services on 442 million acres, but many farms are suffering from commodity prices that have remained relatively unchanged for decades, while the costs of fuel and other purchased inputs have continued to rise. In addition, there is increasing competition from overseas markets where production costs are comparatively low, and increasing pressures within the U.S. caused by urban expansion and the need to protect water resources from nonpoint source pollution from agriculture. 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 abundant and high quality supplies of fresh water, clean air, and healthy ecosystems. The challenges producers face regarding productivity, profitability, and natural resource stewardship are complex, and research to enhance agricultural sustainability must span the entire range of scales of physical and biological processes on the land, from the microscopic to entire watersheds. Management and assessment technologies are needed that enable and support different agricultural production systems to determine how changing or new technology will affect their productivity, profitability, energy efficiency, and natural resource stewardship. Although current research addresses a wide range of challenges to sustainability, processes operating at the extremes of geographic and temporal scales defy/stretch our current ability to monitor and assess the impact of broad policy and environmental changes (e.g., bioenergy and climate change), amid their inherent complexities. Integrative assessment and predictive technologies need to be developed that implement the most modern techniques and methods in recognition of agriculture's changing presence on the land to solve problems in resource management and sustainable production.

Outcomes

Research will leverage ARS' capabilities for long-term production and environmental management trials in watersheds to develop strategies to sustain agricultural productivity in the Mississippi River Basin (which represents approximately one-third of the U.S.) while reducing unwanted exports from agricultural lands and effectively managing water resources in light of increasing demands from multiple users (i.e., agriculture, industry, municipalities, the environment). The structure, composition, physiological activities, and ecology of complex microbial communities in soil, water, and air, and key associations with crops and livestock will be examined. Metagenomic approaches will be utilized to facilitate further study of the physiology and ecology of microorganisms that cannot be obtained through traditional microbiology. How changes in environment or management options affect microbial communities and their beneficial or detrimental activities related to resource management, commodity production, and food safety will be identified.

Means to Achieve Change

- Enhance Agricultural Sustainability and Resource Management in the Mississippi River Basin ($2,500,000). ARS will:
  - -- Use a systems approach to integrate agricultural and municipal objectives for maximum benefits sustaining the long-term productivity of agriculture in urbanizing landscapes and along urban-to-rural gradients.
  - -- Conduct research to enable maintaining natural resource integrity in agricultural landscapes as production systems change in response to economically driven market forces.
  - -- Conduct research to enhance income streams for rural communities through landscape scale restoration efforts to develop nutrient credit trading markets.
  - -- Enhance the sustainability of agricultural productivity in highly erodible landscapes of the Lower Mississippi River Basin through improved, targeted management and conservation practices to reduce nutrient and pesticide losses, erosion, and sediment loading.

- Improve Environmental Quality and Production Efficiency by Managing Microorganisms in Agricultural Systems ($3,750,000). ARS will:
  -- Develop improved characterization, understanding, and manipulation of microbial communities in soil and water; increase capabilities to identify and track characteristics and changes of microbial populations in the field that affect resource quality and food safety; and examine responses of microbial communities to changing environmental or management conditions that can alter the distribution, movement, biological activity, and survival of microbes in the environment.
  -- Increase crop uptake of nitrogen, improve crop yield, reduce production costs, and reduce environmental impacts of nitrogen fertilizers by improving management of microbial populations in the rhizosphere that are involved in nitrogen cycling and availability; improve capabilities to identify and track characteristics and changes of nitrogen cycling microbial communities in the field; and determine how microbial competition in the root zone among species and communities of microbes affect improvements in nitrogen availability and uptake by crop plants.
  -- Improve animal feed efficiency, reduce production costs, and reduce greenhouse gas emissions from livestock through improved characterization, understanding, and manipulation of microorganisms in the rumen and gut; and increase capabilities to identify and track characteristics and changes of microbial populations in livestock digestive tracts.

c) An increase of $5,436,000 for research to Adapt American Agriculture to a Changing Global Climate.

Climate change will pose new challenges for American agriculture in the future. Increasing demands on natural resources coupled with uncertainties in temperature changes and precipitation patterns require new strategies to ensure sustainable production to meet our food and biofuel needs. New knowledge and practices are needed to adapt agriculture to increasing abiotic stresses (e.g., extremes and variability in temperature and water availability) and other threats. Farmers and land managers need information and decision-support tools to adapt current agricultural systems to a changing environment, thus sustaining agricultural productivity while protecting our natural resources and ecosystem services.

Sustaining agricultural production requires new crop varieties with critical traits (including resistance to drought and extreme temperatures), strategies for new stand establishment of clonally propagated crops, and approaches to balance yield with environmental impact. Key physiological crop traits that convey tolerance or adaptation to changes in water availability and temperature are needed.

New management practices and decision-support tools and are needed to help agricultural producers and land managers take advantage of improved crop varieties, opportunities to benefit from market based incentives to reduce the Nation's net greenhouse gas footprint, and changes in water availability and temperature. New management options and decision tools are needed for sustaining production of food and biofuels on multi-functional landscapes, including pastures and rangelands, as temperature and water variability and extremes change in new patterns in time and space. If agricultural systems are managed carefully, they offer opportunities to mitigate the continued increase in greenhouse gas concentrations while sustaining agricultural productivity and other ecosystem services; thus, research on strategies and systems to reduce greenhouse gas emissions from agricultural practices is needed. Drought conditions, reduced snowpack, changes of precipitation variability, and increasing population are creating shortages of water for agriculture and ecosystem services. New and improved sustainable water management tools are needed to respond to climate changes that will impact the hydrology at the watershed scale and change seasonal crop demands and water supply and availability.

Outcomes

Research will result in high yielding and profitable crops tolerant to climate change and weather extremes, developed from crop collections that have been genotypically and phenotypically

characterized for traits such as drought and temperature extreme tolerance, ozone resistance, water use efficiency, rapid maturation, carbon dioxide response, and stand establishment. Farm income and rural communities' economies will be improved because crop yields and quality will be enhanced by resistance to widespread and increasing abiotic stressors. Land management practices guided by ARS' enhanced national carbon sequestration and greenhouse gas mitigation research network (the GRACEnet project) will provide data related to different agricultural management strategies that can lead to reductions in net greenhouse gas emissions from agricultural production systems by 15 to 25 percent, and farmers will be compensated accurately in carbon credit trading programs. The number of farmers eligible for carbon credit payments will be increased by carbon sequestration and greenhouse gas footprint data from the GRACEnet project expanded into biomass and specialty crops, and into farming systems around the world. Research results will be applied to achieve sustainability through optimizing agricultural yield, carbon sequestration, greenhouse gas mitigation, and preservation of other desirable ecosystem services. Farmers, ranchers, and communities within watersheds will realize increased income because costs of water management, competition for supplies, and environmental mediation of contaminants will be lowered.

Means to Achieve Change

- Provide Validation and Verification of Offset Markets ($1,211,000). ARS will:
  -- Identify farming practices that provide a sustainable balance of crop production (including specialty crops), soil carbon sequestration, net greenhouse gas emissions, and other ecosystem services. Through the GRACEnet project and related carbon storage models, which are unique ARS activities and products, ARS national research initiatives provide a foundation for early agricultural carbon credit trading systems. Expansion of the existing network builds on success to date and ensures continuity and precision of information needed for as yet unstudied crop systems and regions.

- Increase the Resilience of Crops and Production Systems to the Abiotic Stresses of Climate Change and Weather Extremes, Resulting in Healthier, High Yielding Crops ($2,893,000). ARS will:
  -- Develop tools and practices that enable agricultural systems to manage water supply; adapt to extremes of precipitation that affect soil moisture, runoff, and erosion; conserve soil and water resources; and maintain or enhance biodiversity and ecosystem services.
  -- Develop weather tolerant germplasm and improve genetic and physiological models to predict crop responses to changing conditions, thus enabling crop producers to adapt to climate change.

- Better Understand and Mitigate the Effects of Climate Change in Production Systems through Improved Water Management ($1,332,000). ARS will:
  -- Produce a prediction tool for farmers, ranchers, and communities to avoid water shortages and conflicts over water quality and supplies, based on predictive capabilities developed from decades of ARS watershed research and National Agricultural Statistics Service cropland data that indicate planted acreage and yield.
  -- Produce a web accessible management tool based on geospatial information on crop condition, soil moisture, drought monitoring, and hydrologic models which leads producers, land managers, and communities to efficient and cost-effective water use.

d) A decrease of $5,763,000 in Congressionally-added earmarks to provide savings to finance higher priority research initiatives.

Need for Change

Research projects under this program activity have been identified for termination given that they represent Congressionally-added earmarks. The savings achieved from these terminations will be

redirected to finance the higher priority agricultural research initiatives identified in the FY 2011 Budget, will improve program and operational efficiencies, and will serve to restrain Federal spending.

AL, Auburn, Improved Crop Production Practices
CA, Brawley/Riverside, Water Management Research Laboratory
MD, Beltsville, Bioremediation Research
MD, Beltsville, Foundry Sand By-Products Utilization
MS, Oxford, Seismic and Acoustic Technologies in Soils Sedimentation Laboratory
PA, Kutztown, Livestock-Crop Rotation Management
WA, Prosser, Forage Crop Stress Tolerance and Virus Disease Management
WI, Madison, Dairy Forage Research Center

e) A decrease of $6,033,000 in ongoing research programs to provide savings to finance higher priority research initiatives.

Need for Change

Research projects under this program activity have been identified for termination given that they are: (1) considered by the Administration to be of lesser priority; (2) duplicative or can be accomplished more effectively elsewhere; or (3) can be more efficiently implemented with less overhead costs at another location. The savings achieved from these terminations will be redirected to finance the higher priority agricultural research initiatives identified in the FY 2011 Budget, will improve program and operational efficiencies, and will serve to restrain Federal spending.

WV, Beaver, Appalachian Farming Systems Research Center

Library and Information Services

ARS is proposing under this program area a net increase of $1,011,000. This includes pay costs, and new and expanded initiatives totaling $1,665,000, and decreases totaling $654,000.

a) An increase of $165,000 to fund increased Pay Costs.

Funding for pay costs is critical for recruiting and retaining top level scientists and staff, sustaining viable research programs, and carrying out USDA's intramural research mission. If pay costs are not fully funded, ARS will have to absorb those costs, be unable to fill critical scientist and personnel positions, and will have to reduce spending for much needed laboratory equipment, supplies, and other materials, thus diminishing the Department's research capacity to achieve its priority goals and outcomes.

b) An increase of $1,500,000 for the National Agricultural Library for Digital Information Services.

Need for Change

The National Agricultural Library (NAL) is the largest and most accessible agricultural research library in the world. NAL offers free Web-based access to agricultural information through its core site, www.nal.usda.gov.

NAL's specialized Information Services provide access to comprehensive and essential information resources focusing on specific aspects of agricultural subjects. In addition to general reference services, NAL provides other Internet access to key digital information. Examples of special emphasis services include: Alternative Farming; Animal Welfare; Food and Nutrition; Food Safety; Invasive Species; Rural; and Water Quality. Currently, information on biomass, biofuels, and sustainability is lacking.

Outcomes

Solving complex problems related to long-term agricultural productivity and environmental stewardship requires large, comprehensive data sets on carbon sequestration and greenhouse gas emissions, tillage and management studies, and conservation program benefits accessible to the entire scientific community. The proposed increase will provide the necessary information.

Means to Achieve Change

- Provide Access to Sustainability and Environmental Data Sets for the Scientific Community ($1,500,000). ARS will:
  -- Develop unified accessible sources of databases developed from research on agriculture and the environment, such as research on carbon sequestration and greenhouse gas emissions, tillage and management studies, and conservation program benefits.

c) A decrease of $654,000 in Congressionally-added earmarks to provide savings to finance higher priority research initiatives.

Need for Change

Research projects under this program activity have been identified for termination given that they represent Congressionally-added earmarks. The savings achieved from these terminations will be redirected to finance the higher priority agricultural research initiatives identified in the FY 2011 Budget, will improve program and operational efficiencies, and will serve to restrain Federal spending.

MD, Beltsville (NAL), National Center for Agricultural Law

AGRICULTURAL RESEARCH SERVICE
Proposed FY 2011 Program Increases and Decreases

Initiative	New Products/ Product Quality	Livestock Production	Crop Production	Food Safety	Livestock Protection	Crop Protection	Human Nutrition	Environmental Stewardship	NAL	TOTAL
Biofuels Feedstocks Research & Demonstration Centers	10,000,000									10,000,000
Evaluation of ARS'/ USDA's Research Facilities	1,750,000									1,750,000
Reduce World Hunger		2,000,000	764,000							2,764,000
Breeding Strategies/Germplasm to Enhance Food Production/ Security		3,000,000	4,289,000							7,289,000
Scientific Collections			3,650,000			3,250,000				6,900,000
Development of Local Food Systems			1,000,000							1,000,000
Colony Collapse Disorder of Honey Bees			500,000							500,000
World Food Prize			750,000							750,000
Food Safety				5,000,000						5,000,000
Animal/Crop Protection to Enhance Food Production/ Security					3,000,000	4,750,000				7,750,000
Human Nutrition							6,400,000			6,400,000
Production Systems to Support Sustainable Agriculture								6,250,000		6,250,000
Global Climate Change								5,436,000		5,436,000
NAL Digital Information Services									1,500,000	1,500,000
Subtotal, Program	11,750,000	5,000,000	10,953,000	5,000,000	3,000,000	8,000,000	6,400,000	11,686,000	1,500,000	63,289,000
Pay Costs	1,132,000	605,000	1,940,000	998,000	666,000	1,718,000	353,000	2,453,000	165,000	10,030,000
Program Reductions	(5,896,000)	(8,576,000)	(5,983,000)	--	(13,961,000)	(2,265,000)	(4,158,000)	(11,796,000)	(654,000)	(53,289,000)
TOTAL	$6,986,000	($2,971,000)	$6,910,000	$5,998,000	($10,295,000)	$7,453,000	$2,595,000	$2,343,000	$1,011,000	$20,030,000

AGRICULTURAL RESEARCH SERVICE

Geographic Breakdown of Obligations and Staff Years
2009 Actual and Estimated 2010 and 2011

Location	2009 Amount	2009 Staff Years	2010 Amount	2010 Staff Years	2011 Amount	2011 Staff Years
ALABAMA, Auburn	$8,554,580	57	$7,819,000	57	$7,082,000	56
ALASKA, Fairbanks	5,138,149	29	5,476,000	29	5,476,000	29
ARIZONA						
Maricopa	9,424,436	80	9,744,000	80	11,274,000	86
Tucson	4,780,884	39	4,956,000	41	5,136,000	42
Total	14,205,320	119	14,700,000	121	16,410,000	128
ARKANSAS						
Booneville	4,770,042	20	4,881,000	20	3,208,000	20
Fayetteville	1,688,279	15	1,631,000	15	1,631,000	15
Little Rock	9,175,374	10	6,483,000	10	6,361,000	10
Stuttgart	8,512,872	74	8,743,000	74	7,649,000	69
Total	24,146,567	119	21,738,000	119	18,849,000	114
CALIFORNIA						
Albany	39,457,558	289	40,814,000	287	43,096,000	298
Davis	11,707,338	89	10,976,000	89	11,336,000	90
Parlier	12,430,113	100	11,801,000	101	12,611,000	104
Riverside	5,718,337	46	5,891,000	47	5,675,000	45
Salinas	4,895,258	49	4,917,000	49	4,917,000	49
Shafter	1,332,112	13	1,458,000	13	1,458,000	13
Total	75,540,716	586	75,857,000	586	79,093,000	599
COLORADO						
Akron	2,051,467	19	2,053,000	19	2,053,000	19
Fort Collins	15,143,009	141	15,798,000	140	17,176,000	147
Total	17,194,476	160	17,851,000	159	19,229,000	166
DELAWARE						
Newark	2,070,337	18	2,076,000	18	2,076,000	18
DISTRICT OF COLUMBIA						
National Arboretum	10,336,151	77	11,535,000	77	11,435,000	77
Headquarters Federal Administration	84,121,393	507	80,478,000	507	80,478,000	507
Total	94,457,544	584	92,013,000	584	91,913,000	584
FLORIDA						
Brooksville	1,287,341	12	2,182,000	15	1,252,000	15
Canal Point	2,898,578	37	2,894,000	37	2,894,000	37
Fort Lauderdale	2,483,957	27	2,557,000	27	2,557,000	27
Fort Pierce	12,653,800	118	11,649,000	119	12,324,000	121
Gainesville	13,918,351	130	13,409,000	131	12,100,000	128
Miami	4,780,764	48	4,578,000	48	4,579,000	48
Winter Haven	2,485,214	23	2,650,000	23	2,650,000	23
Total	40,508,005	395	39,919,000	400	38,356,000	399

AGRICULTURAL RESEARCH SERVICE

Geographic Breakdown of Obligations and Staff Years
2009 Actual and Estimated 2010 and 2011

Location	2009 Amount	2009 Staff Years	2010 Amount	2010 Staff Years	2011 Amount	2011 Staff Years
GEORGIA						
Athens	27,897,482	228	28,295,000	230	28,544,000	233
Byron	3,555,574	38	3,658,000	38	3,658,000	38
Dawson	4,227,659	44	4,967,000	44	3,887,000	38
Griffin	2,332,643	21	2,324,000	21	2,684,000	22
Tifton	9,895,494	99	9,713,000	99	12,413,000	109
Total	47,908,852	430	48,957,000	432	51,186,000	440
HAWAII, Hilo	10,351,320	57	11,488,000	60	9,564,000	60
IDAHO						
Aberdeen	6,283,442	54	6,024,000	55	6,474,000	57
Boise	2,185,750	23	2,147,000	23	2,147,000	23
Dubois	2,217,535	21	2,154,000	21	2,154,000	21
Kimberly	3,540,969	37	3,592,000	37	3,592,000	37
Total	14,227,696	135	13,917,000	136	14,367,000	138
ILLINOIS						
Peoria	34,802,224	265	36,064,000	264	35,833,000	264
Urbana	5,720,289	41	5,382,000	41	5,382,000	41
Total	40,522,513	306	41,446,000	305	41,215,000	305
INDIANA, W. Lafayette	7,764,204	68	7,768,000	68	7,903,000	69
IOWA, Ames	48,365,261	444	51,189,000	453	54,879,000	467
KANSAS, Manhattan	10,539,185	82	16,529,000	107	13,829,000	107
KENTUCKY						
Bowling Green	2,567,216	14	2,589,000	14	2,589,000	14
Lexington	2,792,090	16	2,641,000	16	2,641,000	16
Total	5,359,306	30	5,230,000	30	5,230,000	30
LOUISIANA						
Baton Rouge	3,066,321	29	2,586,000	30	2,586,000	30
Houma	3,443,744	40	4,077,000	40	4,077,000	40
New Orleans	28,951,301	187	30,736,000	187	22,329,000	157
Total	35,461,366	256	37,399,000	257	28,992,000	227
MAINE, Orono	3,038,103	27	3,258,000	30	3,708,000	32
MARYLAND						
Beltsville	144,835,495	945	165,286,000	965	175,600,000	1,010
Frederick	5,556,963	44	5,642,000	44	6,092,000	46
Total	150,392,458	989	170,928,000	1,009	181,692,000	1,056
MASSACHUSETTS, Boston	15,573,594	11	15,604,000	11	15,739,000	13
MICHIGAN, East Lansing	4,845,393	41	4,606,000	41	4,606,000	41

AGRICULTURAL RESEARCH SERVICE

Geographic Breakdown of Obligations and Staff Years
2009 Actual and Estimated 2010 and 2011

Location	2009 Amount	2009 Staff Years	2010 Amount	2010 Staff Years	2011 Amount	2011 Staff Years
MINNESOTA						
Morris	2,802,757	28	2,649,000	28	2,649,000	26
St. Paul	7,405,731	58	7,520,000	60	9,069,000	66
Total	10,208,488	86	10,169,000	88	11,718,000	92
MISSISSIPPI						
Mississippi State	9,069,655	75	9,235,000	75	9,235,000	75
Oxford	13,476,749	94	14,367,000	97	14,907,000	99
Poplarville	5,312,545	40	5,179,000	40	5,179,000	40
Stoneville	37,951,759	307	38,433,000	306	38,456,000	309
Total	65,810,708	516	67,214,000	518	67,777,000	523
MISSOURI, Columbia	8,910,138	74	9,122,000	74	9,662,000	76
MONTANA						
Miles City	3,425,323	27	3,345,000	27	3,345,000	27
Sidney	5,078,819	51	5,147,000	51	5,147,000	51
Total	8,504,142	78	8,492,000	78	8,492,000	78
NEBRASKA						
Clay Center	19,105,419	116	19,624,000	116	22,729,000	125
Lincoln	5,785,697	60	5,996,000	60	8,696,000	70
Total	24,891,116	176	25,620,000	176	31,425,000	195
NEW MEXICO						
Las Cruces	5,960,249	49	6,044,000	49	6,044,000	49
NEW YORK						
Geneva	4,030,350	33	3,906,000	33	4,896,000	37
Greenport	5,545,572	32	5,218,000	32	4,302,000	32
Ithaca	10,989,178	57	10,622,000	57	11,072,000	59
Total	20,565,100	122	19,746,000	122	20,270,000	128
NORTH CAROLINA						
Raleigh	9,465,475	85	9,420,000	86	9,420,000	86
NORTH DAKOTA						
Fargo	14,811,574	130	15,815,000	131	16,490,000	133
Grand Forks	8,644,015	51	9,581,000	51	9,581,000	51
Mandan	3,851,591	40	3,938,000	40	3,449,000	39
Total	27,307,180	221	29,334,000	222	29,520,000	223
OHIO						
Columbus	1,467,920	17	1,481,000	17	2,021,000	21
Coshocton	1,281,585	13	1,253,000	13	1,253,000	13
Wooster	5,984,862	49	5,069,000	49	5,069,000	49
Total	8,734,367	79	7,803,000	79	8,343,000	83

AGRICULTURAL RESEARCH SERVICE

Geographic Breakdown of Obligations and Staff Years
2009 Actual and Estimated 2010 and 2011

Location	2009 Amount	2009 Staff Years	2010 Amount	2010 Staff Years	2011 Amount	2011 Staff Years
OKLAHOMA						
El Reno	5,363,062	48	5,372,000	48	5,822,000	52
Lane	2,123,243	19	1,966,000	19	1,966,000	19
Stillwater	3,573,453	32	3,668,000	32	3,668,000	32
Woodward	1,630,078	17	1,649,000	17	1,649,000	17
Total	12,689,836	116	12,655,000	116	13,105,000	120
OREGON						
Burns	3,208,719	26	2,732,000	27	2,732,000	27
Corvallis	13,119,132	115	11,884,000	117	12,334,000	119
Pendleton	1,924,357	18	1,965,000	18	1,965,000	18
Total	18,252,208	159	16,581,000	162	17,031,000	164
PENNSYLVANIA						
University Park	4,529,818	40	4,225,000	40	4,415,000	41
Wyndmoor	34,201,905	223	35,504,000	222	35,665,000	227
Total	38,731,723	263	39,729,000	262	40,080,000	268
SOUTH CAROLINA						
Charleston	4,437,820	42	4,444,000	42	4,444,000	42
Clemson	2,275,658	22	2,360,000	22	2,360,000	22
Florence	4,144,851	35	4,157,000	35	5,282,000	39
Total	10,858,329	99	10,961,000	99	12,086,000	103
SOUTH DAKOTA						
Brookings	3,987,500	38	4,099,000	38	2,974,000	36
TEXAS						
Beaumont	1,332,060	15	1,432,000	15	1,432,000	15
Bushland	6,741,343	46	6,974,000	46	6,974,000	46
College Station	16,320,112	150	16,250,000	149	16,722,000	157
Houston	14,033,766	7	13,975,000	7	13,705,000	7
Kerrville	5,454,068	49	5,675,000	49	5,675,000	49
Lubbock	9,228,564	99	9,057,000	99	9,057,000	99
Temple	3,599,250	34	3,593,000	34	3,593,000	34
Weslaco	10,049,252	107	9,717,000	107	9,717,000	107
Total	66,758,415	507	66,673,000	506	66,875,000	514
UTAH, Logan	8,743,286	82	9,027,000	85	9,027,000	85
WASHINGTON						
Prosser	3,715,937	28	3,506,000	28	3,326,000	28
Pullman	16,604,611	130	16,547,000	130	18,527,000	137
Wapato	4,473,299	52	4,475,000	52	4,475,000	52
Wenatchee	2,079,861	22	2,112,000	22	2,112,000	22
Total	26,873,708	232	26,640,000	232	28,440,000	239

AGRICULTURAL RESEARCH SERVICE

Geographic Breakdown of Obligations and Staff Years
2009 Actual and Estimated 2010 and 2011

Location	2009 Amount	2009 Staff Years	2010 Amount	2010 Staff Years	2011 Amount	2011 Staff Years
WEST VIRGINIA						
Beaver	7,117,952	50	7,396,000	57	- -	- -
Kearneysville	7,233,881	65	7,560,000	68	7,470,000	68
Leetown	6,923,526	33	7,175,000	33	7,625,000	36
Total	21,275,359	148	22,131,000	158	15,095,000	104
WISCONSIN, Madison	15,194,017	111	18,370,000	129	16,785,000	129
WYOMING						
Cheyenne	2,144,680	24	2,318,000	24	2,318,000	24
Laramie	2,946,426	24	- -	- -	- -	- -
Total	5,091,106	48	2,318,000	24	2,318,000	24
PUERTO RICO						
Mayaguez	2,901,875	34	2,843,000	34	2,843,000	34
OTHER COUNTRIES						
Argentina, Buenos Aires	608,149	- -	533,000	- -	533,000	- -
France, Montpellier	3,151,387	2	3,085,000	2	3,085,000	2
Total	3,759,536	2	3,618,000	2	3,618,000	2
Extramural and Funds Administered from Headquarters-Held Funds	22,115,293	(356)	27,759,000	(356)	27,794,000	(356)
Repair & Maintenance of Facilities	17,490,933	- -	17,503,000	- -	17,503,000	- -
Funds included for Homeland Security	[35,454,000]	- -	[39,170,000]	- -	[35,808,000]	- -
Unobligated Balance	5,931,613	- -	- -	- -	- -	- -
Subtotal, Available or Estimate	1,147,176,645	7,912	1,179,639,000	7,995	1,189,639,000	8,077
Miscellaneous Fees	-3,717,740	- -	- -	- -	- -	- -
Transfer from Office of Congressional Relations	-140,000	- -	- -	- -	- -	- -
Transfer from U. S. Departmei of State	-2,912,905	- -	- -	- -	- -	- -
Pay Costs	- -	- -	- -	- -	10,030,000	- -
Total, Available or Estimate	1,140,406,000	7,912	1,179,639,000	7,995	1,199,669,000	8,077

AGRICULTURAL RESEARCH SERVICE
Salaries and Expenses

Classification by Objects
2009 Actual and Estimated 2010 and 2011

		2009	2010	2011
Personnel Compensation:				
Headquarters		$52,927,498	$54,286,000	$55,035,000
Field		513,935,758	527,130,000	534,405,000
11	Total personnel compensation	566,863,257	581,416,000	589,440,000
12	Personnel benefits	151,630,937	155,722,000	157,728,000
13	Benefits for former personnel	451,081	- -	- -
	Total pers. comp. & benefits	718,945,274	737,138,000	747,168,000
Other Objects:				
21	Travel and transportation of persons	16,314,403	16,705,000	16,996,000
22	Transportation of things	3,079,019	3,382,000	3,445,000
23.1	Rent payments to GSA	24,316	- -	- -
23.2	Rental payments to others	1,267,985	1,393,000	1,419,000
23.3	Communications, utilities and misc. charges	49,289,303	52,537,000	52,560,000
24	Printing and reproduction	1,850,084	2,275,000	2,066,000
25.1	Advisory and assistance services	836,618	919,000	936,000
25.2	Other services	17,357,636	18,567,000	20,497,000
25.3	Purchases of goods and services from Government Accounts	635,580	698,000	711,000
25.4	Operation and maintenance of facilities	39,973,349	42,995,000	42,605,000
25.5	Research and development contracts	142,795,430	149,604,000	152,145,000
25.6	Medical care	652,820	717,000	730,000
25.7	Operation and maintenance of equipment	8,938,309	9,892,000	9,995,000
25.8	Subsistence and support of persons	237,729	- -	- -
26	Supplies and materials	80,776,258	86,816,000	86,040,000
31	Equipment	38,298,439	40,455,000	40,819,000
32	Land and structures	4,717,288	5,181,000	5,278,000
41	Grants, subsidies, and contributions	15,255,192	15,962,000	16,259,000
	Total other objects	422,299,758	448,098,000	452,501,000
Total direct obligations		1,141,245,032	1,185,236,000	1,199,669,000
Position Data:				
Average Salary, ES positions		$176,195	$180,718	$183,212
Average Salary, GS positions		$68,560	$69,622	$69,897
Average Grade, GS positions		10.4	10.4	10.4

AGRICULTURAL RESEARCH SERVICE

Status of Program

The Agricultural Research Services' (ARS) major research programs -- New Products/Product Quality/Value Added; Livestock/Crop Production; Food Safety; Livestock/Crop Protection; Human Nutrition; and Environmental Stewardship -- address the Department's priorities. A brief summary of the agency's selected accomplishments and current research activities including the National Agricultural Library are detailed below.

New Products/Product Quality/Value Added

Current Activities:

ARS has active research programs directed toward (1) improving the efficiency and reducing the cost for the conversion of agricultural products into biobased products and biofuels, (2) developing new and improved products to help establish them in domestic and foreign markets, and (3) providing higher quality, healthy foods that satisfy consumer needs in the United States and abroad.

Selected Examples of Recent Progress:

Commercialization of a hidden stored grain insect detection system. Grain kernels infested by insects may show no indication on their exterior, but often contain hidden larvae. Although grain is always inspected for insect infestations upon shipping and receiving, often infested samples go undetected. Many methods for detecting infested wheat have been developed but none has seen widespread use due to expense or inadequate accuracy, or both. Engineers at Manhattan, Kansas modified a simple laboratory roller mill system to measure and analyze the electrical conductance of wheat as it was crushed. This facilitated detection of wheat kernels with live insects hidden inside of them. The apparatus which is inexpensive can inspect a one kilogram sample in less than one minute. A Cooperative Research and Development Agreement (CRADA) was formed with the Total Manufacturing Company to produce and market commercial versions of the roller mill. The technology is currently being adopted by General Mills, Inc. More widespread adoption of this technology is expected in the next few years.

Joint release of new soft winter wheat cultivars that improve the overall quality of Eastern U.S wheat. Scientists at Wooster, Ohio joined in the release notices of the soft white wheat cultivars "Ambassador" and "Coral" from Michigan State University; the soft red winter wheat cultivar "Red Amber" from Michigan State University; and the soft red winter wheat cultivars "Shirley, 3434, 5205," and "Jamestown" from Virginia Polytechnical Institute. All represent improvements in disease resistance and grain yield, and are of similar or higher quality to the existing cultivars they are replacing.

Biobased fertilizers. Fertilizer costs have risen dramatically, a problem that has affected food production costs and, ultimately food prices. Researchers at Albany, California developed a fertilizer encapsulation matrix which, in lieu of chemicals, contains entrapped functional microbes that fix nitrogen, and release nutrients, growth promoters, and insecticides into the soil for extended periods of time. The biobased fertilizer reduces the number of fertilizer applications that are required, saving labor and energy, and helping protect the environment. Biobased fertilizers could benefit farmers in the U.S. and developing countries that have more limited resources.

Apple- and tomato-based natural antimicrobial containing edible films. Americans are increasingly concerned over the safety of their foods. Researchers at Albany, California, with support from a National Institute of Food and Agriculture (NIFA) funded Agriculture and Food Research Initiative, are developing novel natural antimicrobial containing films from apples and tomatoes. Incorporation of natural essential oils from oregano, thyme, cinnamon, all spice, clove, and lemon grass into apple- and tomato-based films and coatings were found to be active against E. coli 0157:H7, Salmonella, and Listeria. Films have been

applied to hams and chicken, and their effectiveness has been verified on these foods. In addition, tests are underway to test the effectiveness of films against E. coli 0157:H7 in spinach. Concurrent sensory evaluations of films on foods are being performed to confirm sensory acceptability of these novel films. Continuous production methods have been developed to support future commercialization of the technology.

New value-added lentil products. In the U.S., one in 133 consumers is considered to be allergic to gluten (Celiac disease). According to the USDA, the gluten-free market is currently valued at approximately $700 million and is expected to increase to $1.7 billion by the year 2010. Using extrusion technology, novel, lentil-based snacks rich in gluten-free dietary fiber and protein were developed by researchers at Albany, California in collaboration with the California Departments of Food Science and Human Nutrition, and Biological Systems Engineering at Washington State University in support of growers represented by the U.S. Dry Pea and Lentil Council. The value-added, lentil-based snacks had a high acceptance rating by a sensory panel. The products and technology developed will be submitted as part of an invention entitled "Extruded Legumes." The commercialization of value-added lentil-based, gluten-free products will benefit a large number of consumers allergic to gluten, and will increase demand for this commodity.

High yield switchgrass strain. ARS plant scientists developed a strain of switchgrass that, when grown in Eastern Nebraska, produced a potential ethanol yield of 355 gallons per acre—20 gallons per acre greater than that of the previous best cultivar. This is the first publicized example of a switchgrass strain specifically bred for improved conversion to ethanol.

Rapid predictive method for ethanol yield from biomass feedstocks. Conventional wet chemistry analyses of biomass for composition and tests for conversion to ethanol are time consuming and expensive. ARS scientists developed Near-Infrared Reflectance Spectrometry (NIRS) calibrations for predicting biomass ethanol yield (per ton) for switchgrass. The NIRS measurements provide data on cell wall composition, cell wall sugars, soluble sugars, lignin, released and fermented glucose from cell wall cellulose, released cell wall pentoses, and other biomass quality attributes. The calibrations enable rapid and accurate estimation of theoretical ethanol yield from both hexose and pentose sugars, as well as total theoretical ethanol yields. Calibrations will be useful for feedstock breeding, genetics, and management research, and can also be used by biorefiners to determine ethanol yield from a particular biomass feedstock.

Livestock Production

Current Activities:

ARS' livestock production program is directed toward (1) safeguarding and utilizing animal genetic resources, associated genetic and genomic databases, and bioinformatic tools; (2) developing a basic understanding of the physiology of livestock and poultry; and (3) developing information, tools, and technologies that can be used to improve animal production systems. The research is heavily focused on the development and application of genomics technology to increase the efficiency and product quality of beef, dairy, swine, poultry, aquaculture, and sheep systems. Current areas of emphasis include increasing efficiency of nutrient utilization, increasing animal well-being and reducing stress in production systems, increasing reproductive rates and breeding animal longevity, developing and evaluating non-traditional production systems (e.g., organic, natural), and evaluating and conserving animal genetic resources.

Selected Examples of Recent Progress:

Genetic progress increased in dairy cattle using genomic and phenotypic technologies. Genomic predictions were transitioned from a research project to a production system in FY 2009, when the United States became the first country to replace official traditional genetic evaluations with genomic evaluations based on direct examination of DNA. Numerous changes were made to the USDA genetic evaluation program to enable efficient management of genomic information, incorporate it in official USDA evaluations, and distribute those evaluations to stakeholders. Artificial insemination and breed

organizations can now use an online query to designate animals to be genotyped, determine if the animal has already been nominated, and check the reason a genotype was rejected. Four commercial laboratories provide genotypes that are stored in the USDA national dairy database. The most recent international evaluations are combined with genomic and traditional data into a single evaluation that includes all available information. This research led to the development of a Web site (http://aipl.arsusda.gov/) to catalog and manage the genetic evaluations for 20 million dairy cattle and goats for yield (milk, fat, protein, and component percentages) and fitness (mastitis resistance, longevity, conformation, and reproduction) traits and economic indexes, as well as supporting documentation. This Web site is utilized by dairy industries worldwide, including producers, breed registry societies, artificial insemination organizations, milk recording associations, and dairy records processing centers, as well as industry and university researchers. The availability of genetic evaluations and supporting documentation on the Web site allows earlier access to estimates of genetic merit, which significantly increases genetic progress for economically important traits that contribute to dairy production efficiency. Improvements in dairy production efficiencies help lower the real costs of dairy products to consumers, making high quality animal products more readily available to consumers domestically and internationally. Improved production efficiencies also decrease the production of greenhouse gases by reducing the need for feed and fuel. This research program has ongoing international collaborations with Australia, Canada, Netherlands, Scotland, and Sweden to improve the genetic evaluation and improvement of dairy animals worldwide. These collaborations provide opportunity to leverage funding and scientific expertise and also help to ensure international food security by rapidly disseminating technology to enhance the productivity and efficiency of global meat and milk production.

Protein fusions developed to combat mastitis in dairy cattle. *Streptococcus aureus* is a notorious pathogen that causes chronic bovine mastitis in dairy cattle. The unique ability of *S. aureus* to hide in mammary cells provides a high level of protection from immune defenses and from conventional antibiotics, usually resulting in the culling of between 8 and 15 percent of the U.S. dairy cow herd annually, due to chronic infection. To combat this significant economic threat to the dairy industry, ARS scientists have developed a fusion of two proteins capable of killing *S. aureus*. This technology is not limited to just mammary cells; it may have novel antimicrobial application in many other areas. This research will improve dairy industry production efficiencies and enhance dairy cow health and welfare, improving the profitability and competitiveness of dairy producers. Improvements in dairy production efficiencies help lower the real costs of dairy products to consumers, making high quality animal products more readily available to consumers domestically and internationally. This research program has ongoing international collaborations with Pakistan, Russia, Switzerland, the United Kingdom, and Spain to develop related technologies in dairy cattle and other ruminant species.

National Animal Germplasm Program enhances genetic security and improves germplasm storage technologies. The security of U.S. animal genetic resources was significantly improved with the total germplasm collection increased to over 540,000 samples, an 18 percent increase from FY 2008. In addition, preliminary research projects were initiated by ARS scientists to ensure the long term viability of the germplasm collection. Beef semen has been cryopreserved since the 1950s, but the viability of samples in long storage has not been scientifically evaluated. Results indicated that storage time has not affected fertility. Additional research was conducted to improving the efficiency of mating procedures with cryopreserved germplasm involving a non-surgical procedure for artificially inseminating sheep. The procedure has been shown effective with fresh ram semen (55 percent fertility). However, cryopreserved semen is significantly lower and therefore requires further exploration for methods or technologies to overcome this limitation. Also, 1,194 samples from 263 animals left the repository for animal generation, germplasm evaluation, or DNA studies. One example of the value of the germplasm storage was demonstrated through a genetic distancing study involving U.S. sheep breeds and five breeds from Kazakhstan. It was determined that the Kazakh breeds were clustered and separated from U.S. breeds, with the exception of the Karakul breed. This research is important to identify the genetic variation in the sheep industry for economically important traits and to protect as much diversity as possible in the National Animal Germplasm Program. This research program has ongoing international collaborations with

Canada, Brazil, and Tunisia to facilitate germplasm storage and to develop cooperative data base management protocols.

Improved Atlantic salmon released to industry. Scientists at the National Cold Water Marine Aquaculture Center in Franklin, Maine in collaboration with industry evaluated the growth of salmon from their breeding program in commercial sea cages. A salmon line was selected for increased growth. Eggs from this improved line were provided to commercial producers. Utilization of improved fish will increase the profitability and sustainability of coldwater marine aquaculture in the U.S. and provide a quality seafood product to U.S. consumers.

Crop Production

Current Activities:

ARS' crop production program focuses on developing and improving ways to reduce crop losses while protecting and ensuring a safe and affordable food supply. The research program concentrates on effective production strategies that are environmentally friendly, safe to consumers, and compatible with sustainable and profitable crop production systems. Research activities are directed at safeguarding and utilizing plant genetic resources and their associated genetic, genomic, and bioinformatic databases that facilitate selection of varieties and/or germplasm with significantly improved traits.

Current research activities attempt to minimize the impacts of crop pests while maintaining healthy crops and safe commodities that can be sold in markets throughout the world. ARS is conducting research to discover and exploit naturally occurring and engineered genetic mechanisms for plant pest control, develop agronomic germplasm with durable defensive traits, and transfer genetic resources for commercial use. ARS will be providing taxonomic information on invasive species that strengthens prevention techniques, aids in detection/identification of invasive pests, and increases control through management tactics that restore habitats and biological diversity.

Selected Examples of Recent Progress:

Corn research unlocks basis of natural diversity and reveals genetics of flowering and hybrid vigor. ARS researchers at Ithaca, New York; Columbia, Missouri; and Raleigh, North Carolina with support from the National Science Foundation, have developed and characterized the largest set of mapping lines for complex trait dissection in any species. The scientists found that most natural genetic variation in corn is the product of numerous genes working together, each with a small effect that could be manipulated by breeders. Corn flowering time was found to be controlled by numerous genes each with a small predictable effect. Their work also provided major insights into hybrid vigor, a key element of modern high yielding crops. The researchers discovered that hybrid vigor results from limited reshuffling of genetic diversity in certain regions of the genome. These new genetic resources and discoveries will accelerate progress in crop genetics and breeding which is required for future food security and resilience to climate change.

Early flowering genes identified that accelerate fruit tree breeding. Fruit tree breeding is a slow and expensive process because of the long delay between planting a seedling and its first flowering. Years of breeding and testing can be saved if that time is shortened. ARS scientists at Kearneysville, West Virginia have identified and incorporated into breeding stock a gene that promotes early flowering and fruiting, shortening the juvenile stage in plum from four years to less than one year. Once breeding results are achieved, the genetically engineered early flowering trait can be removed before varietal release, resulting in a tree that can be categorized as non-genetically engineered. Early flowering and fruiting will allow for the very rapid development of new and improved varieties of plum and other fruits, as well as forest and woody ornamental species.

New genes identified to protect wheat from the Ug99 wheat stem rust threat. More than 80 percent of the world's wheat varieties are vulnerable to the virulent new wheat stem rust strain, "Ug99," that has appeared

in Eastern Africa. New sources of Ug99 resistance are urgently needed to combat Ug99. In 2009, ARS researchers identified new sources of Ug99 genetic resistance in wild and weed relatives of wheat, and have made initial progress in incorporating those genes into bread wheat. ARS researchers in Manhattan, Kansas mapped and transferred a Ug99 resistance gene from the wild wheat *Triticum timopheevii*. ARS researchers in Fargo, North Dakota identified resistance genes from goatgrass and perennial wheatgrass species and are now advancing genetic resources to facilitate the use of these new resistance genes. ARS researchers in Raleigh, North Carolina identified 30 breeding lines with Ug99 resistance and are assessing those lines for agronomic traits in partnership with the International Wheat and Maize Agricultural Research Center for distribution globally. These new sources of genetic resistance to Ug99 are keys for breeding wheat with more durable resistance to Ug99 to protect the global grain supply.

Development of common bean germplasm lines with multiple disease resistance. Diseases are one of the principal constraints to common bean production. ARS scientists at Beltsville, Maryland, with collaborators at the University of Nebraska, developed common bean lines with resistance to bean rust and other major diseases of dry beans in the United States. Bean lines at Beltsville with several rust resistance genes, bean common mosaic, and bean common mosaic necrosis potyvirus resistance were hybridized with beans from University of Nebraska with resistance to common blight, halo bacterial blight, and white mold. Traditional selection and molecular marker analysis was used to identify lines with resistance to as many as five different diseases. A total of 34 advanced lines have been developed each carrying three or four rust resistance genes. Fourteen bean germplasm lines were of the Great Northern and 20 of the Pinto Market classes. These unique resistance gene combinations provide resistance to all known strains of the bean rust, bean common mosaic, and common mosaic necrosis viruses.

Corn genome sequence completed. ARS researchers at Ithaca, New York, along with collaborators at Washington University, Iowa State, the University of Arizona, and the Cold Spring Laboratory, compiled the comprehensive sequence of the corn genome with support of the National Science Foundation, Department of Energy, and NIFA. The researchers also used advanced DNA sequencing data to assemble a haplotype genetic map of the corn genome that details portions of the genome shared by 27 diverse inbred lines of corn. The map is designed to make it easier to link genes and genetic patterns with significant traits. The corn genome sequence and new genetic map will significantly accelerate breeding of corn and other crops to meet the challenge of increasing productivity and the challenges of climate change.

Wheat biotechnology used to characterize a wheat stripe rust resistance gene. U.S. wheat yield losses of up to $60 million occur each year due to stripe rust damage. ARS researchers at Albany, California and Pullman, Washington, with collaborators from the University of California at Davis have discovered a gene in a wild wheat relative that makes bread wheat more capable of resisting stripe rust. The researchers transferred the gene to susceptible wheat plants using biotechnology methods. Subsequent tests showed the transformed plants were resistant to multiple strains of stripe rust. Importantly, this gene protects adult wheat plants at warmer temperatures. Wheat breeders can now develop molecular markers to facilitate transfer of this gene into other varieties, giving producers new cost-effective varieties with stripe rust protection.

Transgenic papaya is approved for export to Japan. Transgenic papaya, developed by ARS scientists at Hilo, Hawaii, in collaboration with university scientists, may soon be exported to Japan. ARS scientists generated data required by Japan on the allergenicity of the transgene products, the characterization of the transgene inserts, the nutritional comparison of the genetically modified (GM) and non-GM papaya under various conditions, and the potential role of viral recombination on the risk assessment of transgenic papaya in Japan. A revised food safety petition for the transgenic papaya was approved by the Food Safety Committee of the Ministry of Health, Labor, and Welfare of Japan. Following discussions on labeling of the transgenic papaya and notification of the World Trade Organization, it is anticipated that the transgenic papaya will be deregulated in February 2010. This will be the first public sector “fresh” transgenic product to be marketed in a foreign country. Deregulation of the transgenic papaya will also expand Hawaii’s export market to Japan.

Airborne imaging system detects root rot in cotton fields. ARS scientists in College Station, Texas designed an airborne remote sensing system for detection of disease states/pest infestations in growing crops. The system consistently produced precise and easily interpretable images of the seasonal spread of root rot in a commercial cotton field. Through the rapid identification of this disease from an aerial platform, the area could be treated to limit the crop damage. This new technology provides for more efficient detection and assessment of disease/pest infestation status in important U.S. crops which will greatly aid growers and aerial applicators in protecting crops in an environmentally sensitive manner.

Food Safety

Current Activities:

Assuring that the United States has the highest levels of affordable, safe food requires that the food system be protected at each stage from production through processing and consumption from pathogens, toxins, and chemical contaminants that cause diseases in humans. The U.S. food supply is very diverse, extensive, easily accessible, and thus vulnerable to the introduction of biological and chemical contaminants through natural processes, intentional means, or by global commerce.

ARS' current food safety research is designed to yield science-based knowledge on the safe production, storage, processing, and handling of plant and animal products, and on the detection and control of toxin producing and/or pathogenic bacteria and fungi, parasites, chemical contaminants, and plant toxins. All of ARS' research activities involve a high degree of cooperation and collaboration with USDA's Research, Education, and Economics agencies, as well as with the Food Safety and Inspection Service (FSIS), Animal and Plant Health Inspection Service (APHIS), Food and Drug Administration (FDA), Centers for Disease Control and Prevention (CDC), Department of Homeland Security (DHS), and the Environmental Protection Agency (EPA). ARS also collaborates in international research programs to address and resolve global food safety issues.

Specific research efforts are directed toward developing new technologies that assist ARS stakeholders and customers, that is, regulatory agencies, industry, and commodity and consumer organizations, in detecting, identifying, and controlling foodborne diseases that affect human health.

Selected Examples of Recent Progress:

Water standards for produce production. Water quality in the production of leafy green produce is a critical issue. The California Leafy Green Marketing Agreement recommends that water containing less than 235 MPN (most probable number) E. coli/100 ml be used in irrigating leafy greens in the field. ARS scientists in Beltsville, Maryland evaluated these standards in the production of spinach plants. E. coli were only detected immediately after irrigation and none were recovered one or two days after irrigation. Repeated irrigation of spinach plants with water complying with the standards did not increase the persistence of E. coli on foliar surfaces. These data indicate that the irrigation water standards are sufficiently stringent to limit the introduction and persistence of pathogenic E. coli on the surface of spinach plants. The FDA and the leafy green produce industry will directly benefit from these findings.

Salmonella in tomatoes. Foodborne illness outbreaks associated with consumption of Salmonella contaminated tomatoes are a significant ongoing problem. These outbreaks have negatively impacted public health, consumer confidence in tomatoes, and the U.S. economy. ARS scientists in Beltsville, Maryland determined the microbial profile of fresh tomatoes, investigated pathogen internalization pathways, and assessed the practicality and efficacy of consumer stem scar removal in reducing food safety risks. Studies revealed that the vast majority of microorganisms were located on or near the stem scars. The vascular bundles connecting the stem scar and internal tissues play a critical role in pathogen internalization. Washing tomatoes with chlorinated water effectively inactivates surface attached microorganisms, but not internalized pathogens. Physical removal of stem-scar and underlying tissues, along with surface washing, significantly reduces both surface attached and internalized microorganisms.

This research enables tomato growers and packers as well as restaurants, harvesters, and processors to develop reliable strategies and practices to reduce pathogen internalization in post-harvest handling. This research received a scientific award from the produce industry.

Serotyping Salmonella. Definitively characterizing Salmonella species isolated from foods is a critical issue for the FSIS and other regulatory agencies. ARS scientists at Athens, Georgia developed a multiplex polymerase chain reaction (PCR) Salmonella serotyping technique for high-throughput analysis. The multiplex PCR assay can identify the top 50 serotypes isolated which represent 85 percent of all clinically isolated Salmonella which has been adapted to a high-throughput platform by incorporation of capillary analysis of the multiplex PCR products. The impact of the research will be immediate. The technique, which requires little training, no specific anti-sera, and works in standard DNA sequencing instruments, could replace traditional serotyping for most Salmonella isolates. It facilitates the determination of up to 90 isolates in 24 hours with very little hands on time at a cost of $1.50 per sample as compared to several days and about $40 for traditional serotyping. The technique is currently being tested and validated by several Federal and State public health laboratories in the U.S. and also by the Public Health Agency of Canada.

Listeria risk assessment. Not all strains of Listeria monocytogenes have an equal ability to cause disease in humans. In order to assess the capacity to determine relative public health risk, ARS completed a comparative genetic analysis of more than 500 isolates collected through FSIS surveillance. The research demonstrated that a substantial fraction (48 percent) of isolates from ready-to-eat (RTE) foods at processing harbor mutations that significantly reduce their virulence and their potential threat to public health. Conversely, strains responsible for the majority of human illnesses are rare (6 percent) in RTE food at processing, demonstrating that it should be possible to enhance intervention and inspection activities in the rare instances when such isolates are encountered. ARS also found that the strain typing method currently used by USDA/FSIS and public health agencies cannot accurately predict the potential public health risk of individual isolates without integrating information from DNA sequence-based typing technologies that directly target the genetic changes responsible for reduced ability to cause infection. ARS scientists developed an integrated subtype database. The impact of their work will enable public health and regulatory agencies to more fully utilize the data they currently collect to assess risk.

Poultry vaccines. Some microorganisms, particularly bacteria, cause serious disease in commercial poultry and can be of importance in causing food poisoning in poultry products reaching the consumer. New methods are needed to minimize the effects of such microorganisms; development of effective vaccines would be very beneficial. ARS scientists, in collaboration with Texas A&M University scientists, used high energy electron-beam (E-beam) irradiation to render Salmonella non-viable as an infectious agent, while retaining the necessary antigenic properties to stimulate a strong immunological response in poultry. The research established that broiler chickens exposed to E-beam treated bacteria were much more efficient in fighting off subsequent infections by normal, viable bacteria, suggesting that the irradiated bacteria could serve as a vaccine. This finding is important because, although vaccines against viruses are well known and relatively easy to create, development of effective vaccines against bacteria have historically been much more difficult. E-beam technology appears to be much more effective than X-rays in generating good bacterial vaccines, and should be of great value in development of vaccines to protect poultry from serious diseases while also contributing to enhanced microbial food safety in humans.

Seafood safety. Improving the safety of oysters and shrimp is a critical issue for the FDA. Producers will be under stricter regulatory control due to new legislation proposed for implementation in 2010. ARS funded scientists at Mississippi State University evaluated the use of X-ray technology for approved regulatory intervention to reduce bacterial pathogen levels. In half- and whole-shell oysters and ready to eat shrimp, over one million cells of E. coli O157: H7, Salmonella, *Shigella flexneri* and *Vibrio parahaemolyticus* could be killed with X-ray treatments of between 2 to 5kGy. More importantly, X-ray treatment did not kill the oysters even with the highest dose (5 kGy). This research will have a direct impact on producers particularly in Southern States who are eager for an alternative pathogen intervention process that does not impact product quality.

Salmonella-almond intervention. The almond industry in the U.S. is valued at over $4 billion. Currently, the industry uses hot air for roasting almonds, an inefficient process that is unable to achieve adequate reduction of Salmonella on almonds. ARS scientists in Albany, California developed a fast heating process for roasting almonds using infrared heat, followed by continuous heating with hot air. A Salmonella surrogate strain on the kernels was decreased 100-fold below the required level 7-logs while also decreasing roasting time by 60 percent. This method, which is more cost effective than the current process, will reduce the level of foodborne illnesses and increase trade with the European Union.

Detection of biofilms on food processing surfaces. Food safety risks posed by pathogenic bacteria, such as E. coli and Salmonella may increase when bacteria remain on inadequately sanitized food processing/handling surfaces. Biofilms are produced that increase microbial adhesion and survival on those surfaces. ARS scientists in Beltsville, Maryland developed a fluorescence imaging system that can detect microbial biofilms on the surfaces of materials commonly used in food processing and handling (i.e., stainless steel, polypropylene plastic, granite). In association with an industry partner, ARS is developing a portable handheld imaging device that can be used to assist regulatory agencies in their inspection of food processing and distribution facilities. The technology may also be useful to DHS and the military.

Livestock Protection

Current Activities:

ARS' animal health program is directed at protecting and ensuring the safety of the Nation's agriculture and food supply through improved disease detection, prevention, control, and treatment. Basic and applied research approaches are used to solve animal health problems of high national priority. Emphasis is given to methods and procedures to control animal diseases.

The research program has ten strategic objectives: (1) establish ARS' laboratories into a fluid, highly effective research network to maximize use of core competencies and resources; (2) access specialized high containment facilities to study zoonotic and emerging diseases; (3) develop an integrated animal and microbial genomics research program; (4) establish centers of excellence in animal immunology; (5) launch a biotherapeutic discovery program providing alternatives to animal drugs; (6) build a technology driven vaccine and diagnostic discovery research program; (7) develop core competencies in field epidemiology and predictive biology; (8) develop internationally recognized expert collaborative research laboratories; (9) establish a best-in-class training center for our Nation's veterinarians and scientists; and (10) develop a model technology transfer program to achieve the full impact of ARS' research discoveries.

ARS' current animal research program includes eight core components: (1) biodefense research, (2) animal genomics and immunology, (3) zoonotic diseases, (4) respiratory disease, (5) reproductive and neonatal diseases, (6) enteric diseases, (7) parasitic diseases, and (8) transmissible spongiform encephalopathies.

Selected Examples of Recent Progress:

2009 pandemic H1N1 Influenza A virus. Soon after the emergence of the pandemic H1N1 Influenza A virus in April 2009, ARS scientists began research using virus samples provided by the Centers for Disease Control and Prevention (CDC). The first step was to address the safety of pork by evaluating whether meat, blood, and tissue from pigs infected with the new 2009 pandemic A/H1N1 influenza virus would be free of the infectious virus. Thirty-five week old cross-bred pigs from a herd free of swine influenza virus were inoculated to determine the susceptibility of swine to the human virus and also address whether meat, blood, and tissue from pigs infected with the pandemic 2009 A/H1N1 influenza virus are free of the infectious virus. Pigs were observed daily for clinical signs of disease and nasal swabs and fresh samples from lung, tonsil, inguinal lymph node, liver, spleen, kidney, skeletal muscle (ham), and colon contents were tested by the most sensitive virus detection assays at three, five, and seven days post-infection. Live 2009 A/H1N1 influenza virus was only detected in the respiratory tract of infected pigs and the virus did not appear to spread and replicate in other tissues.

Biotherapeutics feed supplements for poultry health. ARS scientists have worked with industry to develop novel biotherapeutic antibodies as feed supplements to enhance the disease resistance of poultry flocks to gastrointestinal pathogens that impact food safety and production gains. Applied advanced technologies in avian immunology and genomics have led to identifying novel molecules that have been shown to enhance host innate immunity, decrease early mortality, and reduce the use of antibiotics in poultry production. These innovations will reduce economic losses due to enteric diseases in poultry and will decrease the use of many antibiotics that are associated with human drug resistances. These novel dietary immunomodulation strategies to enhance poultry health have implications for human health, farm animal security, and increasing the production capabilities of poultry industries worldwide.

New vaccine strategies for controlling bovine babesiosis. *Babesia bovis* and *B. bigemina* are important causative agents of bovine babesiosis known as Cattle Tick Fever (CTF), which was a significant problem in the Southern U.S. until the 1940s when the tick vectors were eradicated by intensive dipping of cattle with chemicals to kill the ticks (acaracides). However, the tick that spread CTF are present in a buffer zone along the Rio Grande and have begun to spread and, thus, pose the threat of an outbreak of CTF in the Mexico-U.S. border regions. The threat of reintroducing CTF, into the U.S. from Mexico has increased as: 1) the USDA-APHIS surveillance program involves only ticks, no surveillance is performed to identify cattle carrying the babesia organism; 2) at least a million cattle come from Mexico each year, which may carry babesia; 3) ticks resistant to current control chemicals have been reported in Northern Mexico and Southern United States; 4) there is an increase in the number of wild deer along the border that can carry the ticks and babesia; and 5) there is no drug or vaccine approved for use in the U.S. to treat CTF. The lack of a vaccine for control of CTF leaves U.S. cattle vulnerable to the disease upon reintroduction. It is estimated that the cost of controlling vector ticks alone in the first year, should they spread outside the current quarantine zone into the U.S., is over $1.3 billion. Critical progress was made in developing a long acting anti-babesial and anti-tick vaccine by placing anti-tick genes into babesia organisms that are incapable of causing disease. This could result in a vaccine potentially efficacious in preventing both tick infestation and CTF.

Resistance to parasiticides. Conservative estimates are that gastrointestinal (GI) parasites cost the American cattle industry over $2 billion dollars per year. This cost is based on the treatment with chemicals to kill intestinal worms and the decreased productivity and growth associated with their presence, even in subclinically infected cattle. This easily makes GI worms or nematodes the most costly parasitic infection of American cattle. Although the drugs currently used to control cattle intestinal worms worldwide are generally efficacious and safe, global resistance by parasites to drugs is rapidly on the rise. Recent studies indicate that current control programs are not sustainable, and will soon be ineffective in some management systems. In addition, consumers' increasing attention to food safety is raising their awareness and concerns over the presence of drug residues in their food. There is growing evidence that parasites may alter the host immune system in such a way that infested animals are more susceptible to colonization by other animal or human pathogens. In collaboration with APHIS and two university collaborators, a national survey of effectiveness of current chemical treatment practices used in cattle to control intestinal parasites was conducted. While the analysis is still ongoing, preliminary results indicate an increase in resistance by cattle intestinal parasites to the most common drugs used to control them. Additional research is being conducted to investigate the genetic variation in the parasites resistant to treatment compared to non-resistant parasite populations. These are critical first steps in investigating the increasing problem of resistance to products that kill parasites and using population genetics to quantify the resistance of intestinal parasites and identifying genetic markers associated with drug resistance in intestinal worms.

Residual barrier treatments for control of mosquitoes and sand flies to protect U.S. troops. ARS scientists with the Mosquite & Fly Research Unit in Gainesville, Florida carried out field trials of barrier treatments in multiple environments to assess efficacy against natural mosquito and sand fly populations. Four styles of U.S. military desert and woodland camouflage netting and tent systems, any of which could be routinely provided to current U.S. military units, were treated with one of two synthetic pyrethroids (bifenthrin and

lambda-cyhalothrin) and set out in two desert environments. In addition, naturally occurring desert xeric vegetation in the Coachella Valley site in California was treated with a residual barrier of bifenthrin on two occasions. One cold mist conventional backpack sprayer was used for all treatments of artificial substrates, but a variety of cold mist and electrostatic sprayers was used for the two vegetation treatments. Efficacy of barriers was assessed in the field with a schedule of regular overnight mosquito population sampling within and outside of treated and untreated netting perimeters using a variety of traps. Efficacy of treated barriers was assessed in the lab by measuring mortality in bioassays on temporal samples of cut vegetation or material using colony reared female mosquitoes. Overall results from vegetation treatments indicated a significant reduction in mosquitoes in field counts and lab assays for up to one month; overall results of material treatments indicated significant reduction mosquitoes or sand flies in field counts and lab assays for up to eight months. The results suggest that, as an enhancement to the current Department of Defense pest management system barrier treatments may provide protection from vector-borne diseases for deployed troops in desert habitats by significantly reducing densities of mosquitoes or sand flies.

Crop Protection

Current Activities:

ARS research on crop protection is directed toward epidemiological investigations to understand pest and disease transmission mechanisms and to identify and apply new technologies that increase our understanding of virulence factors and host defense mechanisms. Currently, ARS' research priorities include (1) identification of genes that convey virulence traits in pathogens and pests; (2) factors that modulate infectivity, gene functions, and mechanisms; (3) genetic profiles that provide specified levels of disease and insect resistance under field conditions; and (4) mechanisms that facilitate the spread of pests and infectious diseases.

ARS is developing new knowledge and integrated pest management approaches to control pest and disease outbreaks as they occur. Its research will improve the knowledge and understanding of the ecology, physiology, epidemiology, and molecular biology of emerging diseases and pests. This knowledge will be incorporated into pest risk assessments and management strategies to minimize chemical inputs and increase production. Strategies and approaches will be available to producers to control emerging crop diseases and pest outbreaks.

Selected Examples of Recent Progress:

Genome of the citrus greening bacterium sequenced. ARS scientists in Fort Pierce, Florida, in collaboration with other ARS and university researchers, have completely sequenced the genome of *Liberibacter asiaticus*, the likely bacterial causative agent of citrus greening disease. Knowledge of the bacterial genome will be used to better understand the microbe's enzymatic and metabolic pathways, nutritional requirements, and factors that permit it to be vectored by the Asian citrus psyllid and to be pathogenic in citrus. Such knowledge can be exploited to interrupt disease transmission and to find cures for the disease.

Release of biological control agent for waterhyacinth. Waterhyacinth is a major weed problem in the waterways of Southern United States. Florida spends around $3 million per year in managing this weed. APHIS Technical Advisory Group recommended approval for field release of *Megamelus scutellaris* against waterhyacinth. This biological control agent was recently developed by ARS scientists in Argentina in cooperation with ARS scientists in Fort Lauderdale, Florida. The successful release and establishment of natural enemies in the United States should result in permanent reduction of waterhyacinth, reducing the need for pesticides and other damaging control methods.

Pheromone-based management of Colorado potato beetle. The Colorado potato beetle is one of the most destructive pests of crops including potatoes, tomatoes, and eggplant. The beetle has rapidly developed resistance to pesticides and other control measures, thus alternative methods of management are urgently

needed. Moreover, the Colorado potato beetle has continued its worldwide spread and is now a threat to areas of Asia including China, and Australia. Recently, ARS scientists in Beltsville, Maryland discovered an aggregation pheromone for the Colorado potato beetle which attracts both sexes. A trapping system utilizing the aggregation pheromone is being developed which is effective in capturing the beetle in the field throughout the growing season. These results demonstrate the effectiveness of the pheromone in the field, and portend its usefulness for management and for surveys of endemic populations of the pest or detection of its spread.

Saltcedar biological control and assessment. Saltcedar is an exotic shrub to small tree that has invaded approximately 50 million acres of riparian lands in the Western United States. Natural enemies, leaf beetles from Asia and Europe were tested and released into North American field sites. The beetles established well, increased exponentially in numbers, spread hundreds of miles, and have repeatedly defoliated saltcedar causing significant weed mortality in many locations. Federal and State agencies are now using these ARS developed biological control agents to help control saltcedar in over 15 States in the Western U.S.

New Fusarium Head Blight (scab) varieties and management tools developed. Scab has caused over $1 billion in losses to wheat and barley producers in the United States. The U.S. Wheat and Barley Scab Initiative managed by ARS is combating scab through the development of resistant wheat varieties and new management tools for producers. New, partially resistant wheat varieties from university and ARS breeding programs in North Dakota, Minnesota, Michigan, Illinois, Indiana, Kentucky, Virginia, North Carolina, Missouri, Kansas, and other States were developed in 2008 and 2009. Growers are adopting the resistant varieties, especially in scab prone regions. In North Dakota in 2009, growers planted over 57 percent of the hard red spring wheat acreage in resistant varieties. A new management Web site called "Scab Smart" was activated by the Scab Initiative that provides information on scab forecasting, fungicides, and crop rotation. The benefits of the Initiative were realized in 2009 with only moderate scab losses reported in a year with weather conditions in the United States that were conducive to major scab losses as in previous years.

Human Nutrition

Current Activities:

Maintenance of health throughout the lifespan along with prevention of obesity and chronic diseases via food-based recommendations are the major emphases of ARS' human nutrition research program. These health-related goals are based on the knowledge that deficiency diseases are no longer important public health concerns. Excessive consumption has become the primary nutrition problem in the American population. This is reflected by increased emphasis on prevention of obesity from basic science through intervention studies to assessments of large populations. ARS' research program also actively studies bioactive components of foods that have no known requirement but have health promoting activities.

Four specific areas of research are currently emphasized: (1) nutrition monitoring and the food supply, e.g., a national diet survey and the food composition databank; (2) dietary guidance for health promotion and disease prevention, i.e., specific foods, nutrients, and dietary patterns that maintain health and prevent disease; (3) prevention of obesity and related diseases, including research as to why so few of the population follow the *Dietary Guidelines for Americans*; and (4) life stage nutrition and metabolism, in order to better define the role of nutrition in pregnancy and growth of children, and for healthier aging.

Selected Examples of Recent Progress:

Effective intervention for weight loss in minority children. Few studies with the goal of improving the health of children through weight loss actually succeed. Researchers at the ARS Nutrition Center in Houston, Texas conducted a school-based intervention for overweight Mexican-American children. The

intervention included a high level of intensity and parental involvement. The study, which led to sustained weight loss, may serve as a model for delivering effective interventions to high risk populations.

Inadequate supply of food and poor cognitive function. An inadequate supply of food impacted cognitive performance among a group of over 1,300 Puerto Rican adults living in Massachusetts. Scientists at the ARS Nutrition Center in Boston, Massachusetts found an insufficient supply of food in this group was 12 percent; further, about half that group reported very low food security. "Food insecurity" was associated with lower scores on several tests for mental performance. The importance of USDA's nutrition assistance programs in maintaining health becomes more critical as the number of Americans without adequate food supplies increases during economic hard times.

Golden Rice is an effective source of vitamin A. Vitamin A deficiency leads to premature disability and millions of deaths worldwide each year. Scientists from the ARS Nutrition Centers in Houston, Texas and Boston, Massachusetts proved that the second generation of Golden Rice provides enough beta-carotene (that is readily converted to vitamin A) to satisfy the requirements for this essential vitamin. Widespread consumption of this rice would help eliminate this nutrient deficiency.

Body size affects vitamin D levels. Scientists at the ARS Nutrition Center in Boston, Massachusetts found that increasing body weight decreases absorption of vitamin D and results in lower blood levels of this essential vitamin among elderly Americans. This finding is important for making recommendations about how much vitamin D is needed to raise blood levels to desirable levels. Since Americans are heavier, Vitamin D requirements may have increased, in part, as a result of increased body fat.

Folate helps preserve ends of chromosomes. The ends of chromosomes, called telomeres, regulate the integrity of DNA and when shortened, contribute to aging and cancer. Scientists at the ARS Nutrition Center in Boston, Massachusetts reported that folate levels in the blood influence telomere length by affecting both DNA integrity and DNA methylation in white blood cells from healthy men. Higher folate levels combined with longer telomeres are associated with slower aging and less cancer.

New dietary supplement ingredient database. A partnership between ARS scientists in Beltsville, Maryland and the National Institutes of Health, Office of Dietary Supplements resulted in release of the Dietary Supplement Ingredient Database, Version 1, which is freely available on the Internet. This list of hundreds of multivitamin/mineral products is the first of several related goals to provide better dietary assessments of the American people. This database will be used by researchers who determine how much of various nutrients people consume. Since half the population takes dietary supplements, this new information will make estimates of intake more accurate and lead to better dietary recommendations for health.

Environmental Stewardship -- Water Quality; Air/Soil Quality; Global Climate Change; Range/Grazing Lands; Agricultural Systems Integration

Current Activities:

ARS' research programs in environmental stewardship support scientists at more than 70 locations. Emphasis is given to developing technologies and systems that support profitable production and enhance the Nation's vast renewable natural resource base.

ARS is currently developing the scientific knowledge and technologies needed to meet the challenges and opportunities facing U.S. agriculture in managing water resource quality and quantity under different climatic regimes, production systems, and environmental conditions. ARS' air resources research is developing measurement, prediction, and control technologies for emissions of greenhouse gases, particulate matter, ammonia, hydrogen sulfide, and volatile organic compounds affecting air quality and land surface climate interactions. The agency is a leader in developing measurement and modeling techniques for characterizing gaseous and particulate matter emissions from agriculture. In addition, ARS is evaluating strategies for enhancing the health and productivity of soils, including developing predictive

tools to assess the sustainability of alternative land management practices. Finding mechanisms to aid agriculture in adapting to changes in atmospheric composition and climatic variations is also an important component of ARS' research program.

ARS' range and grazing land research includes the conservation and restoration of the Nation's range land and pasture ecosystems and agroecosystems through improved management of fire, invasive weeds, grazing, global change, and other agents of ecological change. The agency is currently developing improved grass and forage legume germplasm for livestock, conservation, bioenergy, and bioproduct systems as well as grazing-based livestock systems that reduce risk and increase profitability. In addition, ARS is developing whole system management strategies to reduce production costs and risks.

Selected Examples of Recent Progress:

Real time measurement of corn nitrogen needs. Increasing fertilizer costs and environmental concerns associated with nutrients moving from agricultural fields into streams, rivers, and oceans have corn farmers interested in methods which help them apply precisely the amount of nitrogen (N) fertilizer that the corn requires. Research was conducted to assess the utility of light reflectance sensors for determining the most profitable N application rates for corn. Results demonstrated that sensor-based variable rate N fertilizer applications could generate an increase in returns ranging from $5 to $50 per acre, depending on the soil type. As fertilizer costs increase relative to the price of corn, the value of using canopy sensors for N management will also increase. Reduced N applications will save farmers money while benefitting the environment by reducing N losses.

Reducing erosion and increasing yields in furrow irrigated fields. Soil erosion produced by furrow irrigation reduces soil productivity and results in serious off-site environmental damage. Water Soluble Anionic Polyacrylamide (WSPAM) is used on millions of acres of furrow irrigated fields to control soil erosion, however, its long-term effectiveness and influence on crop productivity has not been evaluated. A seven year study at the Northwest Irrigation and Soils Research Laboratory in Kimberly, Idaho showed that WSPAM reduced furrow irrigation soil erosion by 20 tons per acre, while increasing dry bean yield 14 percent and silage corn yield 4.5 percent. Thus, the use of WSPAM to prevent soil erosion also improves crop productivity which offsets the cost of the practice to the producer.

Development of a green and profitable manure treatment technology. New or expanding swine production facilities in North Carolina are required to use manure management systems that meet the strictest environmental performance standards in the Nation. A second generation system was developed by ARS scientists and cooperators that met State environmental standards for manure management. The new on-farm treatment system used solid-liquid separation and nitrogen and phosphorus removal processes to remove high levels of several pollutants from manure wastewater, including almost all of the pathogens, odor causing constituents, and ammonia. Separated manure solids were converted in a centralized facility into composted materials and used for organic plant fertilizer, soil amendments, and plant growth media. Through these innovations and on-farm testing, significant cost reductions were achieved. This revamped system was two-thirds less expensive to build and operate than the first generation system (tested in 2003). Replacing anaerobic lagoon-based systems with the new technology also reduced greenhouse gas emissions by 97 percent. Producers can profit from this new system by selling both greenhouse gas emission reduction and water quality credits. Animal health and production also benefitted. Swine daily weight gain increased, feed conversion improved, animal mortality decreased, and 5.6 percent more hogs were sold per growing cycle. The new technology could help swine producing States protect existing jobs and possibly provide for future job expansion.

An all-weather satellite monitoring system to improve global agricultural forecasts. Knowledge of the condition of global vegetation is important for assessing agricultural production and forecasting yield. Conventional satellite-based vegetation sensors can only be used in daylight and cannot "see" through clouds; many parts of the world are plagued with almost constant cloud cover. ARS scientists at Beltsville, Maryland developed a new set of microwave indices that allow all-weather vegetation monitoring using

operational satellites. Because microwave measurements are sensitive to properties of the entire canopy rather than just the leaves, microwave indices can provide significant new information about vegetation condition and in many cases can "see" through plant canopies. Microwave indices provide a complementary dataset to conventional satellite data that improves our capacity to monitor global agricultural productivity from space. This information has the capacity to improve the timeliness and reliability of crop condition assessments and yield forecasts made by USDA's Foreign Agricultural Service and other agencies both in the U.S. and worldwide, with significant implications for improving international food security and agricultural adaptation to global climate change.

Wood chip bioreactors reduce nitrate exports from agricultural watersheds. Large quantities of nitrate can be exported from agricultural watersheds via subsurface drainage, with concentrations frequently exceeding 10 parts per million. Field studies have shown that when water flowing to drainage systems passes through buried wood chips, most of the nitrate is removed, but many factors, particularly variations in water flow and nitrate concentration, can influence the effectiveness of nitrate removal. Under controlled laboratory conditions, ARS scientists at Ames, Iowa investigated the ability of wood chips to remove nitrate from water at flow rates representative of waters entering subsurface drainage tiles in the field. Complete nitrate removal occurred at the lowest flow rate, but only 30 percent was removed at the highest flow rate. Microbial conversion of nitrate to inert molecular nitrogen gas (i.e., denitrification) was the dominant nitrate removal mechanism; amounts of nitrous oxide, an important greenhouse gas produced during denitrification, were not environmentally significant. Knowledge of these relationships can be used to improve the design of wood chip bioreactors to reduce nitrate exports from subsurface agricultural drainage systems, with significant implications for reducing agriculturally derived nitrate exports from tile drained agricultural watersheds. Research and extension scientists are already working with producers and environmental groups to test these kinds of wood chip bioreactors in the field.

Adoption of an improved Wind Erosion Prediction System (WEPS). During FY 2009, the WEPS model, developed by ARS scientists to measure wind erosion, was significantly improved to account for the absence of WINDGEN stations in the Western U.S. Insufficient data has resulted in significant disparities between adjacent stations in terms of wind energy. Wind data were transformed gradually between stations using geospatial weighted averaging of all data. Computer code was fully developed to perform a weighted average of as many stations as needed for interpolation purposes. All code was fully operational and integrated with the WEPS interface. This interpolation will facilitate a wider use of WEPS in areas of the U.S. where wind stations are absent, particularly in the intermountain region of the Western U.S. The WEPS model will be implemented in more than 3,000 Natural Resources Conservation Service (NRCS) field offices nationwide beginning in 2010.

Managing carbon sequestration in range lands. In the Intermountain West, there are about 50 million acres of pinyon-juniper woodlands that could represent a sizable carbon sink. ARS scientists at Reno, Nevada and Albany, California measured the spatial distribution of soil carbon (C) and nitrogen (N) in Great Basin pinyon-juniper stands and assessed the effects of prescribed burning on these elements. Prescribed burning caused immediate increases in surface soil C and N concentrations and potential nutrient losses, but over intermediate to longer time periods no statistically detectable change in soil C or N content occurred from burning. These findings have helped managers understand that using prescribed fires to reduce fuel loads, improve ecosystem health, and reduce the risk of catastrophic wildfires should not affect carbon sequestration over time.

Recovery -- a new grass cultivar to improve range land restoration. Western wheatgrass is an important native grass in many range land ecosystems, but its low rate of seed production and poor seedling vigor limit its use when quick establishment is needed to stabilize and restore degraded range lands. ARS scientists at Logan, Utah worked with the U.S. Army Corps of Engineers and the NRCS to develop and jointly release "Recovery," a superior and more easily established western wheatgrass. Developed and tested over 10 years, Recovery was designed for reseeding range lands following severe disturbance, frequent wildfires, and soil erosion. With a 20 percent increase in the rate of successful establishment, Recovery enables land managers to use a native grass species to help limit weed infestation and soil erosion

in systems where reestablishment of wheatgrass is inhibited by frequent disturbances. Recovery is being recommended by the NRCS and the Corps of Engineers for reseeding private, public, and military training lands throughout the Northern Plains and Intermountain West.

Organic cropping systems mitigate global climate change. Agriculture can contribute to or mitigate global climate change. Researchers at ARS in Beltsville, Maryland estimated the global warming potential of no-till, chisel-till, and organic cropping systems at the Beltsville Farming Systems Project. Global warming potential was greater in conventional no-tillage and chisel-tillage than in organic systems, primarily due to differences in soil carbon, and energy use among systems. Despite relatively low crop yields in organic systems, the ratio of global warming potential per unit of crop yield was also significantly higher in conventional no-tillage and chisel-tillage than in organic systems. Practices common in organic systems, including incorporating legume cover crops and animal manures into soil, can help reduce the effects of global climate change by increasing the amount of carbon in the soil. These results will benefit policymakers, farmers, and others interested in reducing the impact of agriculture on global climate change.

Increasing productivity of potato systems. Potato yield in the Northeast has remained stagnant for over 50 years despite increased inputs of pesticides, nutrients, and water. Additionally, numerous soil-borne diseases are a persistent problem in potato production. ARS research showed that by improving soil quality, potato plants developed more leaf area with greater and longer lasting photosynthetic potential, thereby increasing yield by as much as 50 percent. Several rotation crops having potential for reducing soil-borne diseases when managed as full season, green manure, or fall cover crops were evaluated. Canola and rapeseed rotations reduced certain soil-borne diseases by 30 percent to 80 percent. These findings provide potato growers with new technology and specific rotation guidance that make them more competitive in the global economy.

Methyl bromide alternatives for cut flower and bulb production. Cut flower and bulb production operations in California need effective replacements for preplant soil fumigation with methyl bromide (MB), which is typically applied by shanks in field operations and the "hot gas" method in enclosed operations (i.e., greenhouses, hoop houses). Multiple research and demonstration trials conducted by ARS scientists at Davis, California were completed in commercial plantings of Ranunculs and Calla Lily (in field operations), and iris, freesia, and snapdragon (in enclosed operations) to test drip applications of chloropicrin and combinations with 1,3-dichloropropene and metam sodium as alternatives to shank and hot gas applications of MB. The trials demonstrated to growers that drip applied alternatives provide pest control and crop yields equal to or better than those obtained with the conventional MB treatments. The research has resulted in commercial transition to the drip alternatives for cut flower and bulb production, and is reducing reliance on MB and fumigant emissions to the atmosphere.

Ultra-low oxygen treatment for postharvest control of western flower thrips on lettuce. The presence of western flower thrips on U.S. fresh commodities, including lettuce, is a major obstacle to their exportation to Taiwan. ARS researchers at Salinas, California have developed an efficacious, ultra-low oxygen (ULO) treatment to control the pest on harvested lettuce. A 3-day storage period immediately prior to ULO oxygen treatment of different lettuce cultivars achieved complete control of thrips without any negative effects on lettuce quality in a pallet scale study. The research reduced the overall time needed to complete ULO treatment and thereby made the ULO treatment more practical for commercial adaptation.

Library and Information Services

Current Activities:

The National Agricultural Library (NAL) is the largest and most accessible agricultural research library in the world. It provides services directly to the staff of USDA and to the public, primarily via the NAL Web site, http://www.nal.usda.gov. NAL was created with the USDA in 1862 and was named in 1962 a national library by Congress, as "the primary agricultural information resource of the United States." NAL is the premier library for collecting, managing, and disseminating agricultural knowledge. The Library is the

repository of our Nation's agricultural heritage, the provider of world class information, and the wellspring for generating new fundamental knowledge and advancing scientific discovery. It is a priceless national resource that, through its services, programs, information products, and Web-based tools and technologies, serves anyone who needs agricultural information. The Library's vision is "advancing access to global information for agriculture."

Selected Examples of Recent Progress:

Progress towards becoming "Digital NAL." For decades, NAL has delivered some services and content digitally. The goal of "Digital NAL" is to deliver information about all NAL programs and services digitally and to deliver as much content and as many services digitally as are permitted by law, technology, and funding. In 2009, NAL leadership and senior staff completed a planning process for becoming "Digital NAL." The most important priority identified is the completion of the AGRICOLA online catalog of NAL holdings. Without a complete online record, there is no way to identify the full extent of NAL collections, and NAL cannot compare its holdings with those of other institutions, to identify the unique and rare items at NAL which should be digitized first, and to identify which items at NAL are being digitized elsewhere. NAL undertook three assessments of the work and costs required to complete the AGRICOLA online catalog. Results will be available by early 2010. The second priority for NAL in moving towards "Digital NAL" is to complete, in 2010, an assessment by an expert marketing company of NAL's services and digital presence, with recommendations for actions that will improve knowledge of NAL and NAL digital services. The third priority is to evaluate options for mass digitization, beginning in 2010.

Delivering information and research services. NAL offers customers free access to agricultural information, primarily through its core site, www.nal.usda.gov. The NAL Web site provides federated searching across its suite of specialized Information Center sites and special NAL databases, including AGRICOLA (NAL's online catalog and index to journal articles), from a single search box that enables customers to quickly and easily navigate to their subject area of interest. NAL's FY 2009 total volume of direct customer transactions exceeded 93 million transactions, a 3 percent increase over FY 2008; NAL Web services continued to be ranked first, or on the first page, by major Web search engines. Services delivered digitally continued to grow while services based entirely on physical materials continued to decline. Highlights include: *Digitop*: USDA staff executed 1,248,182 full text downloads from DigiTop, 16 percent more than in FY 2008. *Expanded Web 2.0 services*: NAL continued to be an "early adapter" of new technologies within ARS and USDA; InfoFarm, NAL's first and acclaimed blog, was two years old at the end of FY 2009; InfoFarm was joined by seven other blogs, an NAL YouTube channel (part of the USDA YouTube channel), mashups, Facebook content, RSS feeds, placement of content/collection links in Wikipedia, Twitter-based services, and other Web 2.0 and social networking innovations. *Citation Analysis Services*: NAL staff provided bibliometric services to the ARS National Program staff and the REEO roadmap effort to help benchmark USDA science output and outcomes. NAL presented data regarding the extent (numbers of publications and numbers of citations), reach (breadth of disciplines citing), and use (what science is being cited and where) of articles published by USDA authors (primarily intramural). *Document Delivery*: About 40,000 document delivery requests were received in FY 2009. ARS and USDA requests increased 7 percent over 2008, at around 15,000 USDA requests, with about 2,800 of those from ARS. APHIS, FS, and ARS remain the agencies with the highest document delivery use. Non-USDA document delivery requests numbered 20,000 requests, a 12 percent decline from the previous year. Onsite requests held steady at 7,000. *Individual Reference Requests*: 5,505 reference requests were received; 812 from within USDA and 4,693 from outside USDA. 3,820 requests were received digitally, 55 percent of the total. *Publications Distributed*: 351,936 NAL produced publications were distributed. *Tours, training events, exhibits, technology demonstrations, etc.*: 111 tours, trainings, exhibits, and demonstrations were delivered in FY 2009. *Interagency Web Site Reviews*: Anticipated flat and/or reduced funding in FY 2010 prompted a review of interagency Web sites that NAL manages: Nutrition.gov; Invasivespeciesinfo.gov; and IBIDS (Dietary Supplements).

Developing digital content. By the end of FY 2009, NAL had 12,982 digitized items (773,620 pages). NAL items are digitized internally on a very limited basis, primarily to respond to urgent requests for content and to capture fragile publications. Large scale projects pass through an NAL committee that coordinates and sets standards for the work that is then accomplished through a contract with an external digitization vendor. With more than 50 million items in the book, journal and special collections, and tens of millions more pages in the manuscript collections, the NAL committee must devise effective processes for the mass digitization of NAL holdings, along with ways to identify items digitized by other institutions. With other libraries, NAL has tested equipment for digitizing large, fragile, and complex printed documents. NAL continues to work with other Federal libraries, land grant, and large research libraries to find solutions to the challenges of digitizing library collections. Digital content from outside NAL is also available via AGRICOLA**:** Over 75,000 articles and 6,000 instructional images are now available via unbreakable hyperlinks from the AGRICOLA Index. NAL also provides access to the full text of other freely available publications via AGRICOLA.

Building a digital repository**.** By the end of FY 2009, NAL's digital repository included about 33,000 items -- 13,000 items above NAL's FY 2009 goal of 20,000 items. About 1,300 items are added each month. NAL staff worked with ARS, the Economic Research Service, and other USDA agencies to identify and transfer key USDA-authored publications to the digital repository.

Enriching AGRICOLA**.** At the end of FY 2009, AGRICOLA included 5,201,141 records, of which 979,085 were online catalog records and 4,222,056 were indexing records. NAL added 12,236 cataloging records and 73,215 indexing records in FY 2009.

Developing public awareness and partnerships. NAL serves as the secretariat for the Agriculture Network Information Center (AgNIC) Alliance, a voluntary, collaborative partnership that hosts a distributed network of discipline specific agricultural information Web sites (http://www.agnic.org). AgNIC provides access to high quality agricultural information selected by its 60 AgNIC partners, including land-grant universities, NAL, and other institutions globally. The AgNIC Alliance continues to improve the information technology that supports the AgNIC portal. During 2009, the portal was redesigned, additional features were added to create a better search experience which offers Web 2.0 capabilities. AgNIC currently harvests over 25 relevant full text digital repositories from institutions worldwide in multiple languages, with the number of repositories harvested increasing. AgNIC staff and partners presented at multiple national and four international conferences in Belgium, Japan, Costa Rica, and England. *Interagency partnerships*: NAL continued to be very active in developing and maintaining partnerships to provide digital information services. Nutrition.gov, invasivespeciesinfo.gov, science.gov, and worldwidescience.org are multi-agency and multi-national Web portals to which NAL contributes digital content and leadership. NAL also continued to participate actively in other interagency groups such as PHPartners (Public Health) and CENDI (scientific and technical information management) to promote and leverage NAL's work.

Dietetic internship program. NAL hosted a graduation ceremony for the ninth class of dietetic interns from the University of Maryland. This is the only internship program that trains dietitians in information technology as it relates to the field of dietetics. Training is conducted for six weeks by NAL's Food and Nutrition Information Center. This collaborative effort between NAL and the university enhances the Library's ongoing efforts to "connect information with the customer" and prepares dietitians with practical skills for the real world.

AGRICULTURAL RESEARCH SERVICE
Proposed Language Changes

The estimates include appropriation language for this item as follows (new language underscored; deleted matter enclosed in brackets):

Buildings and Facilities:

> [For acquisition of land, construction, repair, improvement, extension, alteration, and purchase of fixed equipment or facilities as necessary to carry out the agricultural research programs of the Department of Agriculture, where not otherwise provided, $70,873,000, of which $70,873,000 shall be for the purposes, and in the amounts, specified in the table titled 'Congressionally Designated Projects' in the statement of managers to accompany this Act, to remain available until expended.]

The change deletes a statement that is no longer required in the language.

AGRICULTURAL RESEARCH SERVICE

Lead-Off Tabular Statement

BUILDINGS AND FACILITIES

Appropriations Act, 2010	$70,873,000
Budget Estimate, 2011	0
Decrease in Appropriations	-$70,873,000

AGRICULTURAL RESEARCH SERVICE

Summary of Increases and Decreases
(On basis of appropriation)

Item of Change	2010 Estimated	Changes	2011 Estimated
Alabama: ARS Research & Development Center	$3,500,000	-$3,500,000	0
California: Center for Advanced Viticulture and Tree Crop Research, Davis	3,000,000	-3,000,000	0
U. S. Agricultural Research Center, Salinas	3,654,000	-3,654,000	0
Connecticut: Center of Excellence for Vaccine Research, Storrs	3,654,000	-3,654,000	0
Florida: U. S. Agricultural Research Service Laboratory, Canal Point	3,422,000	-3,422,000	0
Hawaii: U. S. Pacific Basin Agricultural Research Center, Hilo	5,000,000	-5,000,000	0
Kentucky: Animal Waste Management Research Laboratory, Bowling Green	2,000,000	-2,000,000	0
Forage Animal Production Laboratory, Lexington	2,000,000	-2,000,000	0
Louisiana: ARS Sugarcane Research Laboratory, Houma	3,654,000	-3,654,000	0
Maryland: Beltsville Agricultural Research Center (BARC), Beltsville	3,000,000	-3,000,000	0
Mississippi: Biotechnology Laboratory, Lorman	1,500,000	-1,500,000	0
Jamie Whitten Delta States Research Center, Stoneville	4,000,000	-4,000,000	0
Missouri: National Plant & Genetics Security Center, Columbia	3,500,000	-3,500,000	0
Montana: Animal Bioscience Facility, Bozeman	3,654,000	-3,654,000	0
Nebraska: Systems Biology Research Facility, Lincoln	3,760,000	-3,760,000	0
New York: Center for Grape Genomics, Geneva	3,654,000	-3,654,000	0
Ohio: Greenhouse Production Research, Toledo	3,654,000	-3,654,000	0
Utah: ARS Agricultural Research Center, Logan	4,527,000	-4,527,000	0
Washington: ARS Research Laboratory, Pullman	3,740,000	-3,740,000	0
West Virginia: Appalachian Fruit Laboratory, Kearneysville	2,000,000	-2,000,000	0
Wisconsin: Dairy Forage Agricultural Research Center, Prairie du Sac	4,000,000	-4,000,000	0
Total Available	70,873,000	-70,873,000	0

AGRICULTURAL RESEARCH SERVICE

Project Statement
(On basis of available funds)

	2009 Actual	2010 Estimated	Increase or Decrease	2011 Estimated
Total Obligations……	$38,160,658	$38,573,200	-$23,973,200	$14,600,000
Unobligated Balances:				
Available Start of Year……	-194,775,835	-203,746,792	-32,299,800	-236,046,592
Unobligated Balance Permanently Reduced…… 1/	--	--	75,500,000	75,500,000
Available End of Year……	203,746,792	236,046,592	-90,100,000	145,946,592
Total Available or Estimate……	47,131,615	70,873,000	-70,873,000	0

1/ The table on the next page reflects a proposed rescission of unallocated, appropriated funding for projects that have been identified for termination given that they represent Congressionally-added earmarks. No work has begun for any of these projects.

Justification of Increases and Decreases

Buildings and Facilities

a) The budget does not include funding for Buildings and Facilities and proposes to cancel $75,500,000 in available balances from prior unrequested projects.

ARS proposes the rescission of unallocated appropriated funds for partially funded new buildings and facilities projects added by Congress, and from unobligated balances of completed facilities. Funding for these projects has been identified for termination given that they have not been fully funded and no work has begun. Partial funding of ARS' new buildings and facilities has not been as efficient as fully funding high priority, national needs such as for ARS' new National Centers for Animal Health in Ames, Iowa.

Location	Amount
AL, Auburn, ARS Research & Development Center	$422,105
CA, Davis, Center for Advanced Viticulture & Tree Crop Research	11,874,319
CA, Riverside, U.S. Salinity Laboratory	14,400
FL, Ft. Pierce, Subtropical Horticultural Research Center	100
ID, Aberdeen, Advanced Genetics Laboratory	200
ID, Hagerman, Aquaculture Facility	1,685,000
KY, Lexington, Forage Animal Production Research Laboratory	7,677,300
ME, Franklin/Orono, Aquaculture Research Facilities	1,995,000
MI, East Lansing, Avian Disease & Oncology Laboratory	63,200
MN, Morris, Soil & Water Laboratory	2,600
MN, St. Paul, Cereal Disease Laboratory	71,500
MO, Columbia, National Plant and Genetics Security Center	12,090,200
ND, Grand Forks, Human Nutrition Research Center	263,000
NM, Las Cruces, Jornado Experimental Range Management Laboratory	28,300
NY, Geneva, Center for Grape Genomics	10,626,519
NY, Ithaca, Center for Crop-Based Health Genomics	6,564,700
OH, Toledo, University of Toledo	5,645,819
TX, Lubbock, Plant Stress Laboratory	900
TX, Weslaco, Subtropical Agricultural Research Laboratory	18,500
UT, Logan, Agricultural Research Center	8,021,819
WA, Pullman, ARS Research Laboratory	8,434,519
TOTAL	75,500,000

AGRICULTURAL RESEARCH SERVICE
Buildings & Facilities

Classification by Objects
2009 Actual and Estimated 2010 and 2011

	2009	2010	2011
Other Objects:			
25.2 Other services……	$5,578,966	$9,425,000	$1,200,000
25.4 Operation and maintenance of facilities……	32,067,346	29,328,200	13,400,000
25.5 Research and development contracts……	514,346	0	0
Total B & F obligations……..	38,160,658	38,753,200	14,600,000

AGRICULTURAL RESEARCH SERVICE
Status of Construction Projects as of January 2010

Status of research facilities authorized or funded in prior years and reported as uncompleted in the 2010 Explanatory Notes, are as follows:

NOTE: POR: A study/document that defines the research program, associated space and equipment needs and associated design criteria. DESIGN: The design is either a conceptual design - designated as 35% - or a complete design designated as 100%.

Location and Purpose	Year	Amount of Funds Provided	Description
California, Albany	2000 Planning and Design	$2,600,000	Construction of Phases 1 and 2 of the Research and Development Facility is
Western Regional	2001 Construction	4,889,220	complete. Construction of Phase 3A was completed 1st Qtr 2009. The re-design of
Research Center	2002 Construction	3,800,000	the remaining work (Phases 3, 4, 5, and 6) is scheduled to be complete in the 1st Qtr
(R&D Facility)	2009 ARRA	25,360,000	2010. The construction contract award for the final phases 3 thru 6 is scheduled for
	Total	36,649,220	3rd Qtr 2010 with ARRA funding.
California, Davis	2004 Planning and Design	$2,684,070	POR was completed in the 2nd Quarter, FY 2007. Lease agreement with University
Center for Advanced	2005 Construction	2,976,000	is in progress.
Viticulture and Tree Crop Research	2006 Construction	3,588,750	
	2008 Construction	1,869,819	
	2009 Construction	2,192,000	
	2010 Construction	3,000,000	
	Total	16,310,639	
California, Salinas	2004 Planning and Design	$4,473,450	Design (100%) was completed in the 2nd Quarter, FY 2007.
Agricultural Research Station	2005 Planning and Design	2,976,000	
	2006 Construction	3,588,750	
	2008 Construction	1,869,819	
	2009 Construction	2,192,000	
	2010 Construction	3,654,000	
	Total	18,754,019	
Connecticut, Storrs	2008 Planning and Design	$1,869,819	POR is scheduled to be complete in 2nd Qtr 2010. Lease agreement with the
Center of Excellence for Vaccine Research	2009 Design & Construction	2,192,000	University is in progress.
	2010 Construction	3,654,000	
	Total	7,715,819	
District of Columbia	2000 Planning and Design	$500,000	Design (100%) of Bladensburg Road Entrance was completed 1st Qtr, 2006. The
U.S. National Arboretum	2001 Design & Construction	3,322,674	Administrative Building Modernization design was completed 1st Qtr, 2006. The
	2002 Design & Construction	4,600,000	construction of Phase 2, greenhouse and mechanical support space, was completed
	2003 Design & Construction	1,688,950	1st Qtr, 2009. $9 million of ARRA funds will be used to partially fund the
	2008 Construction	695,100	Administrative Building Modernization.
	2009 ARRA	9,000,000	
	Total	19,806,724	

Location and Purpose	Year	Amount of Funds Provided	Description
Florida, Canal Point	2008 Planning and Design	$521,325	POR is scheduled to be completed 3rd Qtr 2010 . Balance of design funds will be
Agricultural Research Service Lab	2009 Planning and Design	1,096,000	used to complete the Conceptual Design (35%). Lease agreement is in progress.
	2010 Construction	3,422,000	
	Total	5,039,325	
Georgia, Athens	2008 Planning and Design	$2,780,400	
Southeast Poultry Research	2009 Planning and Design	2,427,000	Draft POR was completed 1st Qtr 2007.
Laboratory	Total	5,207,400	
Hawaii, Hilo	1999 Planning and Design	$4,500,000	Design of Phases 1 and 2 is complete. Construction of Phase 1 was completed in the
U.S. Pacific Basin	2000 Construction	4,500,000	3rd Quarter, FY 2007. Repackaged phase 2 design (100%) to allow for
Agricultural Research	2001 Construction	4,989,000	construction within the available funding received thru FY 2009 is complete.
Center	2002 Construction	3,000,000	
	2003 Design & Construction	2,980,500	
	2004 Construction	4,831,326	
	2005 Construction	2,976,000	
	2006 Construction	3,588,750	
	2008 Construction	1,737,750	
	2009 Construction	1,565,000	
	2010 Construction	5,000,000	
	Total	39,668,326	
Idaho, Hagerman	2005 Planning and Design	$992,000	Lease agreement is in place. POR was completed in the 3rd Quarter, FY 2007.
Aquaculture Facility	2006 Construction	990,000	
	2008 Construction	695,100	
	2009 Construction	544,000	
	Total	3,221,100	
Illinois, Peoria	2000 Construction Design	$1,800,000	The modernization of the Chemical Wing was completed in 3 segments. Central
National Center for	2002 Construction	6,500,000	Wing Design (100%) is complete. The construction of phases 1 and 2 is complete.
Agricultural	2004 Construction	2,684,070	Construction for all remaining phases of the Central Wing is scheduled to be
Utilization Research	2005 Construction	2,976,000	awarded in the 2nd Qtr 2010 using ARRA funding.
(Central Wing)	2006 Construction	3,588,750	
	2008 Construction	1,869,819	
	2009 Construction	2,192,000	
	2009 ARRA	40,140,000	
	Total	61,750,639	

Location and Purpose	Year	Amount of Funds Provided	Description
Iowa, Ames	2001 Design & Construction	$8,980,200	The accelerated plan for the completion of the modernization of ARS/APHIS animal
National Centers for	2002 Design & Construction	40,000,000	facilities is in progress. The status of major components of the modernization are as
Animal Health	2002 Construction	50,000,000	follows:
	2002 APHIS Transfers	15,753,000	-Phase 1 Lab/Office (APHIS) was completed in FY 2004.
	(Supplemental)	(14,081,000)	-Large Animal BSL-3Ag facilities construction was completed in the 2nd Quarter,
	(Other Transfers)	(1,672,000)	FY 2007.
	2002 Construction	25,000,000	-Central Utility Plant & Infrastructure, Phase 1 and 2 construction is complete.
	2003 Construction	32,785,500	Phase 3 construction was completed in the 1st Qtr, 2009.
	2003 Construction	110,000,000	-Construction of the Consolidated Laboratory Facility was completed in the 2nd
	2005 Construction	121,024,000	Quarter, FY 2009.
	2006 Construction	58,212,000	-Low Containment Large Animal Facility construction was completed in the 1st Qtr
	Total	461,754,700	of 2009.
Kentucky, Bowling Green	2005 Planning and Design	$2,281,600	POR is complete for total project. Design (100%) for the Headhouse/Greenhouse
Animal Waste Management	2006 Construction	2,970,000	only was completed 3rd Qtr of FY 2008. Lease agreement is in place. The
Research Laboratory	2008 Construction	1,390,200	construction award of the GH/HH is scheduled for 3rd Qtr 2010. Conceptual (35%)
	2009 Construction	1,088,000	design for the laboratory/office is in progress.
	2010 Construction	2,000,000	
	Total	9,729,800	
Kentucky, Lexington	2005 Planning and Design	$2,976,000	
Forage Animal	2006 Construction	3,960,000	POR is complete. Lease agreement is in progress. Design (100%) awarded in the
Research Laboratory	2008 Construction	2,085,300	4th Quarter, FY 2007 for completion 2nd Qtr FY2010.
	2009 Construction	1,632,000	
	2010 Construction	2,000,000	
	Total	12,653,300	
Louisiana, Houma	2004 Planning and Design	$1,342,035	Design (100%) completed 4th Quarter, FY 2007. Repackaging of design to allow
Sugarcane Research	2005 Construction	2,976,000	for construction of some elements within the available funding was completed in the
	2006 Construction	3,588,750	2nd Qtr 2008. Phase 1A construction is scheduled to be completed 3rd Qtr FY2010.
	2008 Construction	1,869,819	Phase 1b construction award is scheduled for 4th Qtr FY2010.
	2009 Construction	2,505,000	
	2010 Construction	3,654,000	
	Total	15,935,604	
Louisiana, New Orleans	1998 Planning and Design	$1,100,000	The FY 2006 Supplemental funding was appropriated for the design and
Southern Regional	1999 Modernization	6,000,000	construction of the Long-Term Restoration (LTR) of facilities damaged by
Research Center	2000 Modernization	5,500,000	Hurricane Katrina. Design (100%) for the LTR of facilities was completed 4th
(Industrial Wing)	2006 Supplemental (design)	4,900,000	Quarter, FY 2008. Construction of the LTR was awarded 3rd Qtr, FY 2009.
	2006 Supplemental (construction)	20,000,000	
	Total	37,500,000	

Location and Purpose	Year	Amount of Funds Provided	Description
Maine, Orono/Franklin	2001 Planning and Design	$2,494,500	Construction of all facilities at Franklin (Pump House, Storage Tanks,
National Cold Water Marine	2002 Construction	3,000,000	Lab/Office/Tank Bldg.) is complete. POR of the laboratory facility located at the
Aquaculture Center	2003 Construction	9,090,525	University Campus in Orono, ME will begin in the 3rd Qtr, 2010.
	2004 Design & Construction	2,684,070	
	2005 Design & Construction	2,976,000	
	2006 Design & Construction	2,475,000	
	Total	22,720,095	
Maryland, Beltsville	1988 Design & Construction	$5,750,000	Study to evaluate boiler plants, steam lines, and electrical distribution was
Beltsville Agricultural Research	1989 Design & Construction	6,100,000	completed 4th Qtr, FY 2009. Construction contract award for repairs to boiler
Center, (BARC)	1990 Design & Construction	9,860,000	plants and steam disctribution system is scheduled for 4th Qtr FY2010.
	1991 Design & Construction	15,999,792	
	1992 Design & Construction	16,000,000	
	1993 Design & Construction	13,547,000	
	1994 Design & Construction	19,700,000 **	
	1995 Design & Construction	3,960,000	
	1996 Design & Construction	8,000,000	
	1997 Design & Construction	4,500,000	
	1998 Design & Construction	3,200,000	
	1999 Design & Construction	2,500,000	
	2000 Design & Construction	13,000,000	
	2001 Design & Construction	13,270,740	
	2002 Design & Construction	3,000,000	
	2003 Design & Construction	4,152,830	
	2004 Design & Construction	2,684,070	
	2005 Design & Construction	2,976,000	
	2006 Design & Construction	3,588,750	
	2009 Design & Construction	2,192,000	
	2009 ARRA	10,000,000	
	2010 Construction	3,000,000	
	Total	166,981,182	
**Appropriated under USDA Rental Payments Account			
Maryland, Beltsville	1998 Design & Construction	$2,500,000	Renovation of the NAL building continues. Completed projects include:
National Agricultural	1999 Design & Construction	1,200,000	replacement of the computer room HVAC and fire suppression systems; completion
Library	2001 Design & Construction	1,766,106	of chiller replacement and brick repairs of three building elevations; and 14th floor
	2002 Construction	1,800,000	window replacements. Construction for the deteriorated building envelope, repair of
	2003 Design & Construction	1,490,250	brick facade, and replacement of the plumbing system is scheduled for award 1st
	2004 Design & Construction	894,690	Qtr, FY 2010 using ARRA funding.
	2009 ARRA	7,400,000	
	Total	17,051,046	

Location and Purpose	Year	Amount of Funds Provided	Description
Michigan, East Lansing	1992 Planning	$250,000	Design (100%) for this multi-phased facility modernization is complete.
Avian Disease and	1993 Planning	212,000	
Oncology Laboratory	1998 Planning and Design	1,800,000	
	Total	2,262,000	
Mississippi, Lorman	2006 Planning and Design	$1,980,000	A lease agreement with Alcorn State University for the new facility is in progress.
Biotechnology Laboratory	2008 Planning and Design	1,390,200	POR was completed in 3rd Qtr FY 2008. Conceptual Design (35%) is scheduled
Alcorn State University	2009 Construction	1,176,000	to be completed the 4th Qtr 2010.
	2010 Construction	1,500,000	
	Total	6,046,200	
Mississippi, Poplarville	2002 Design	$800,000	Construction of the Headhouse/Greenhouse was awarded in the 4th Quarter,
Thad Cochran Southern	2003 Construction	9,140,200	FY 2007 and completed in the 1st Quarter, FY 2008.
Horticultural Laboratory	2006 Supplemental	4,300,000	
	Total	14,240,200	
Mississippi, Starkville	2005 Planning and Design	$2,976,000	Lease agreement is in place. Design (100%) was completed in the 1st Quarter, FY
Poultry Science	2006 Construction	4,950,000	2008. The Starkville facility is being downscoped to construct within funds
Research Facility	2008 Construction	1,390,200	currently available.
	2009 Construction	3,177,000	
	Total	12,493,200	
Mississippi, Stoneville	2004 Construction	$4,831,326	Design (100%) is complete. Construction of Phase 1 is complete. Construction of
Jamie Whitten Delta	2005 Construction	2,976,000	mechanical, electrical, and plumbing systems for phases 2 thru 4 (of 5 total), and
States Research Center	2008 Construction	2,780,400	repair of deteriorated building envelope, is scheduled for award 3rd Qtr, FY 2010.
	2009 ARRA	26,000,000	
	2010 Construction	4,000,000	
	Total	40,587,726	
Missouri, Columbia	2004 Planning and Design	$2,415,663	Design (100%) was completed in the 4th Qtr, FY 2008.
National Plant and Genetics	2005 Construction	4,960,000	
Security Center	2006 Construction	3,687,750	
	2008 Construction	2,085,300	
	2009 Construction	1,633,000	
	2010 Construction	3,500,000	
	Total	18,281,713	
Montana, Bozeman	2005 Planning and Design	$1,984,000	Lease agreement is in place. Conceptual Design (35%) was completed 3rd Qtr,
Animal Bioscience Facility	2006 Construction	3,960,000	FY 2008.
	2008 Construction	1,869,819	
	2009 Construction	2,192,000	
	2010 Construction	3,654,000	
	Total	13,659,819	

Location and Purpose	Year	Amount of Funds Provided	Description
Montana, Sidney	1998 Planning and Design	$606,000	Construction of Phase 1 (Lab/Office Building) was completed in 2003 and Phase 2
Northern Plains Agricultural	1999 Construction	7,300,000	(Quarantine Lab) was completed in the 4th Quarter, FY 2008.
Research Laboratory	2004 Design and Construction	2,505,132	
	Total	10,411,132	
Nebraska, Lincoln	2008 Planning and Design	$1,390,200	POR is scheduled for completion 4th Qtr, FY 2010. Conceptual Design (35%) is
Systems Biology Research Facility	2009 Planning and Design	1,088,000	scheduled for completion 3rd Qtr, FY 2011.
	2010 Construction	3,760,000	
	Total	6,238,200	
New York, Geneva	2004 Planning and Design	$2,415,663	Design (100%) was completed in the 4th Quarter, FY 2007.
Grape Genetics	2005 Construction	2,976,000	
	2006 Construction	3,588,750	
	2008 Construction	1,869,819	
	2009 Construction	2,192,000	
	2010 Construction	3,654,000	
	Total	16,696,232	
New York, Ithaca	2004 Planning and Design	$3,847,167	Design (100%)was completed in the 2nd Quarter, FY 2008.
Crop-based Health Genomics	2005 Construction	2,976,000	
	2006 Construction	3,588,750	
	Total	10,411,917	
Ohio, Toledo	2005 Planning and Design	$1,984,000	Design (100%) completed 1st Qtr FY 2010. Lease agreement is in place.
University of Toledo	2006 Construction	1,584,000	
	2008 Construction	1,869,819	
	2009 Construction	2,192,000	
	2010 Construction	3,654,000	
	Total	11,283,819	
Oklahoma, Woodward	2002 Planning and Design	$1,500,000	Phases 1 and 2 of the three-phased construction project are complete.
Southern Plains Range	2003 Construction	7,948,000	
Research Station	2005 Construction	2,976,000	
	Total	12,424,000	
Pennsylvania, Wyndmoor	1997 Construction	$4,000,000	Modernization of the Center is being accomplished in nine phases, with construction
Eastern Regional Research Center	1998 Construction	5,000,000	of Phases 1 through 7 completed. Construction award for Phases 8 and 9 is
	1999 Construction	3,300,000	scheduled for 4th Qtr. FY 2010 with ARRA funding.
	2000 Construction	4,400,000	
	2002 Design & Construction	5,000,000	
	2009 ARRA	20,100,000	
	Total	41,800,000	

Location and Purpose	Year	Amount of Funds Provided	Description
South Carolina, Charleston	1988 Feasibility Study	$50,000	Construction of Phase 1 (laboratory) and Phase 2A (Headhouse) is complete. Phase
U.S. Vegetable	1990 Planning and		2B (Greenhouse) construction was awarded in the 2nd Quarter, FY 2007 &
Laboratory	Construction	1,135,000	completed in the 4th Qtr FY 2008.
	1994 Construction	909,000	
	1995 Construction	5,544,000	
	1996 Construction	3,000,000	
	1997 Construction	3,000,000	
	1998 Construction	4,824,000	
	2000 Construction	1,000,000 ***	
	2002 Construction	4,500,000	
	2003 Design	1,390,900	
	2004 Construction	3,131,415	
	2005 Construction	2,976,000	
	2006 Construction	1,980,000	
	Total	33,440,315	
***Reprogrammed from Horticultural Crop and Water Management Research Laboratory, Parlier, CA			
Texas, Kerrville	2008 Planning and Design	$1,390,200	POR is scheduled for completion 2nd Qtr. FY 2010.
Knipling Bushland Lab	2009 Planning and Design	1,957,000	
	Total	3,347,200	
Utah, Logan	2008 Planning and Design	$5,560,800	POR is scheduled for completion 2nd Qtr. FY 2010.
Agricultural Research Center	2009 Design and Construction	4,351,000	
	2010 Construction	4,527,000	
	Total	14,438,800	
Washington, Pullman	2004 Planning and Design	$3,936,636	Lease agreement with University is in place. Conceptual Design (35%) is complete.
ARS Research Lab	2005 Construction	2,976,000	
	2006 Construction	3,588,750	
	2008 Construction	1,869,819	
	2009 Construction	2,192,000	
	2010 Construction	3,740,000	
	Total	18,303,205	
West Virginia, Kearneysville	2003 Planning and Design	$471,913	Construction of Phases 1 and 2 (immediate laboratory repairs and renovation) was
Appalachian Fruit Lab	2004 Construction	1,789,380	completed in the 3rd Quarter, FY 2007. The construction of the Greenhouse was
	2005 Construction	3,608,896	completed the 1st Quarter, FY 2008. POR for the new laboratory is scheduled for
	2006 Construction	2,024,550	completion 2nd Qtr FY2010.
	2008 Planning and Design	1,529,220	
	2009 Planning and Design	783,000	
	2010 Construction	2,000,000	
	Total	12,206,959	

Location and Purpose	Year	Amount of Funds Provided	Description
West Virginia, Leetown	2002 Design & Construction	$2,200,000	Construction was completed in the 3rd Quarter, FY 2008.
National Center for Cool	2006 Construction	891,000	
and Cold Water Aquaculture	Total	3,091,000	
(Broodstock Facility)			
Wisconsin, Marshfield	2003 Planning, Design		Design (100%) of Phase 1 and Phase 2 is complete. Phase 1 (Nutrient Lab)
Nutrient Management	and Construction	$2,980,500	construction was completed in the 4th Qtr, FY 2008. Phase 2 construction (Animal
Laboratory	2004 Construction	3,668,229	Holding Facility) was awarded in the 4th Qtr, FY 2007. Phase 2 construction was
	2005 Construction	4,860,800	completed 1st Qtr FY 2010.
	2006 Construction	7,920,000	
	Total	19,429,529	
Wisconsin, Prairie du Sac	2008 Planning and Design	$2,502,360	POR is scheduled for completion 3rd Qtr., FY 2010
Dairy Forage Agriculture Research	2009 Construction	2,002,000	
Center	2010 Construction	4,000,000	
	Total	8,504,360	

AGRICULTURAL RESEARCH SERVICE
Buildings and Facilities

SUMMARY OF RECOVERY ACT FUNDING

Program	2009	2010	2011
Improve Real Property Management……	$176,000,000	0	0
Total Available……	176,000,000	0	0

Project Statement - Recovery Act
(On basis of available funds)

	2009 Actual	2010 Estimated	Increase or Decrease	2011 Estimated
Improve Real Property Management……	$7,799,420	0	0	0
Carryover……		$168,200,580	-$168,200,580	0
Unobligated Balance……	168,200,580	0	0	0
Total Available or Estimate……	176,000,000	168,200,580	-168,200,580	0

Program Implementation Activities:

ARS has established a Coordination and Communication team and charged them with monitoring the implementation of the ARS Recovery Act program to ensure consistent and strict compliance with the intent of the Recovery Act, as well as the OMB Implementation Guidelines. The team is overseen by an ARS Associate Administrator and includes representation from the Research, Education and Economics Undersecretary's Office.

The goal of the ARS Recovery Act program is to reduce the backlog of critical deferred maintenance at ARS facilities. By completing $176 million of critical deferred maintenance work at ARS facilities throughout the country, the agency's Recovery Act program will create almost 1,900 jobs contributing directly to the principal objective of the Recovery Act. A second objective of the program is to ensure that ARS research programs can be effectively and efficiently conducted at facilities that currently have deferred maintenance needs. This work will reduce the backlog of deferred maintenance at ARS facilities by approximately 56 percent and slow the growth in deferred maintenance throughout ARS.

ARS' total deferred maintenance needs (other than normal minor maintenance) is about $316 million. As such, there are more ARS facilities with critical deferred maintenance needs than the $176 million that ARS was appropriated under the Recovery Act. Criteria were developed to determine which facilities would be included in the Recovery Act program. The first criterion was whether or not a facility already had a design in progress or on the shelf for addressing the deferred maintenance work. Having an existing design enables the construction phase of work to begin much earlier than for a facility without a design resulting in faster job creation. All facilities (15) with an existing design that met at least one of the program related criteria below were selected.

1. Unique national resources critical to meeting the needs of U.S. agriculture: germplasm repositories, containment facilities, and human nutrition clinical facilities;

2. High priority research programs: human nutrition/obesity prevention, climate change, and bioenergy feedstock production;

3. Essential research capacity: locations with a critical mass of scientists that resolve complex problems of agriculture through multidisciplinary research i.e., "utilization centers" and other large campuses; or

4. Research programs critical for ARS support of action and regulatory agencies: biocontrol laboratories, and research related to food safety, and watersheds.

The designs for all the facilities in the ARS Recovery Act program will meet current building codes, including those related to energy conservation.

Approval to proceed with ARRA projects was received June 19, 2009. ARS obligated $7.8 million through September 30, 2009; and an additional $5.3 million in the first quarter 2010. ARS' goal is to obligate $65 million in the second quarter 2010 and the balance of the funding by the end of July 2010.

AGRICULTURAL RESEARCH SERVICE
Summary of Budget and Performance
Statement of Goals and Objectives

ARS' strategic goals, management initiatives, and objectives that contribute to the Department's priority goals.

USDA Strategic Goal	Agency Strategic Goal	Agency Objective	Programs that Contribute	Key Outcome
USDA Strategic Goal: Assist Rural Communities to Create Prosperity So They Are Self-Sustaining, Repopulating, and Thriving Economically	**Agency Goal 2:** Enhance the Competitiveness and Sustainability of Rural and Farm Economies	Objective 2.1: Expand domestic market opportunities.	New Products/ Product Quality/ Value Added	Key Outcome 2: Technologies to enable dramatic increases in the sustainable production of bioenergy, increased energy security, and reduced energy costs for the agricultural sector. Technologies leading to new and improved foods, fibers, and biobased products that expand agricultural markets and provide new and improved products for consumers here and abroad.
	Management Initiative 7(1): Provide Agricultural Library and Information Services to USDA and the Nation	Objective 7.1: Ensure provision and permanent access of quality agricultural information for USDA, the Nation, and the global agricultural community via the National Agricultural Library.	Library and Information Services	Key Outcome 7(1): Agricultural information which meets the needs of customers.
	Management Initiative 7(2): Provide Adequate Federal Facilities Required to Support the Research Mission of ARS	Objective 7.2: Provide for the construction/modernization of new and/or replacement laboratories and facilities, built in a timely manner and within budget.	Buildings and Facilities	Key Outcome 7(2): Laboratories and facilities which meet the needs of ARS' scientists.

USDA Strategic Goal	Agency Strategic Goal	Agency Objective	Programs that Contribute	Key Outcome
USDA Strategic Goal: Ensure Our National Forests and Private Working Lands Are Conserved, Restored, and Made More Resilient to Climate Change, While Enhancing Our Water Resources	**Agency Goal 6:** Protect and Enhance the Nation's Natural Resource Base and Environment	Objective 6.1: Enhance watersheds' capacities to deliver safe and reliable fresh water.	Environmental Stewardship (Water Quality)	Key Outcome 6: Safe, abundant, and reliable water resources.
		Objective 6.2: Improve soil and air quality to enhance crop production and environmental quality.	Environmental Stewardship (Air/Soil Quality; Global Climate Change)	Key Outcome 6: Enhanced crop production and improved environmental quality.
		Objective 6.3: Conserve and use pasture and range lands efficiently.	Environmental Stewardship (Range/Grazing Lands; Agricultural Systems Integration)	Key Outcome 6: Pasture and range land management systems that enhance economic viability and environmental services.
USDA Strategic Goal: Help America Promote Agricultural Production and Biotechnology Exports as America Works to Increase Food Security	**Agency Goal 2:** Enhance the Competitiveness and Sustainability of Rural and Farm Economies	Objective 2.2: Increase the efficiency of domestic agricultural production and marketing systems.	Livestock/Crop Production	Key Outcome 2: Information and technology producers can use to compete more economically in the marketplace.
	Agency Goal 4: Enhance Protection and Safety of the Nation's Agriculture and Food Supply	Objective 4.2: Reduce the number, severity, and distribution of agricultural pest and disease outbreaks.	Livestock/Crop Protection	Key Outcome 4: The knowledge the Nation needs for a secure agricultural production system and healthy food supply.
		Objective 4.1: Provide the scientific knowledge to reduce the incidence of foodborne illnesses in the U.S.	Food Safety	Key Outcome 4: Reduction in foodborne illness associated with the consumption of meat, poultry, and egg products.
USDA Strategic Goal: Ensure that All of America's Children Have Access to Safe, Nutritious, and Balanced Meals	**Agency Goal 5:** Improve the Nation's Nutrition and Health	Objective 5.2: Promote healthier eating habits and lifestyles.	Human Nutrition	Key Outcome 5: Eating habits more consistent with *Dietary Guidelines for Americans.*

Key Outcome 2: (1) Technologies to enable dramatic increases in the sustainable production of bioenergy, increased energy security, and reduced energy costs for the agricultural sector. Technologies leading to new and improved foods, fibers, and biobased products that expand agricultural markets and provide new and improved products for consumers here and abroad. (2) Information and technology producers can use to compete more economically in the marketplace.

HPPG Measure: Increase the prosperity of rural communities by concentrating and strategically investing in 5 regions, resulting in the creation of strong local and regional economies with a particular emphasis on food systems, renewable energy, and broadband-based economies.

Long-Term Performance Measures

- Enhanced bioproducts and value-added products.
- Healthier/more efficient agricultural crops and animals.
- Important genetic resources which have been identified and preserved.
- New/expanded markets for improved agricultural products.

Product Quality/Value Added

Selected Past Accomplishments toward Achievement of the Key Outcome

- Worked under a Cooperative Research and Development Agreement (CRADA) with a local mushroom producer to scale up, implement, and optimize processing conditions to naturally produce Vitamin D in mushrooms by brief exposure to ultraviolet B light. Vitamin D deficiency is believed to affect 60 percent of the U.S. adult population.
- Worked with collaborators to systematically investigate the effects of rice milling mechanisms and parameters on rice milling quality. The adoption of the new rice sample milling procedure adds an estimated value of over $20 million each year to the rice industry in the United States.
- Developed high performance mulches for the green industry utilizing cotton gin byproducts under a CRADA with private industry. This could result in a revenue stream of $20 to $30 per ton to cotton gins within the region of the plant.
- Transferred the technology of the Seedcotton Moisture Measurement System (SMMS) to industry. SMMS is capable of being utilized in both seed cotton moisture sensing as well as cotton bale lint moisture sensing.

Additional accomplishments are included in the "Status of Program" section.

Selected Accomplishments Expected at the FY 2011 Proposed Resource Level

- Develop five Regional Biofuels Feedstocks Research and Demonstration Centers.
- Develop local food systems for the urban Eastern Seaboard Region.
- Conduct an evaluation of ARS' facilities and co-located other USDA facilities.
- Develop partnership with Cornell University's Sustainable Food Systems Futures Center to integrate supply chain economic analyses.
- Enable new germplasm, varieties, and hybrids of bioenergy with optimal traits.
- Enable new optimal practices and systems that maximize the sustainable yield of high quality bioenergy feedstocks.
- Enable new, commercially preferred biorefining technologies.
- Develop technologies leading to new value-added products from crops and crop residues.
- Develop new value-added products from animal byproducts.
- Develop new biobased products.
- Genetically modify cereal seed components for novel/enhanced uses.

Livestock Production

Selected Past Accomplishments toward Achievement of the Key Outcome

ARS enhanced the genetic security of animal germplasm through increases in the cryopreserved National Germplasm collection at Fort Collins, Colorado, and through improvements in fertilization success when using cryopreserved semen samples. Semen extenders for turkey and artificial insemination procedures for swine have improved the recovery of animals from stored genetic resources. Important genomic discoveries include identification of regions of the cattle genome which affect the amount and type of fat, and meat tenderness in beef. ARS scientists developed a panel of markers for determination of parentage and animal identification for swine. Work by ARS scientists was crucial to the determination that genome diversity has been seriously eroded in commercial poultry, with loss of over 70 percent of the genetic diversity once present. ARS research also contributed key quantitative genetic progress, such as enabling the first genetic evaluations of U.S. cattle including crossbreds. Inclusion of crossbreds increased accuracy of evaluation for all animals, and particularly improved breed comparisons. Other research discovered that there are genetic differences in the resistance to bovine respiratory disease that would be amenable to improvement through selective breeding. Research on rainbow trout demonstrated that growth and resistance to bacterial coldwater disease could be improved simultaneously by selection on both traits.

Additional accomplishments are included in the "Status of Program" section.

Selected Accomplishments Expected at FY 2011 Proposed Resource Level

- Improve beef cattle and swine germplasm.
- Provide dairy cattle and trout improvement.
- Increase stored germplasm resources and increase use of National Animal Germplasm Program.
- Increase the number of populations with adequate germplasm stores to enable reconstitution if necessary.
- Develop improved semen extenders and artificial insemination methodologies.
- Use the completed chicken, cattle, and swine genome sequences to identify genes impacting efficiency of nutrient utilization and adaptation to the production environment.
- Develop reduced SNP chips to target specific livestock breeds and a particular suite of traits.
- Increase depth of sequence coverage in key genomic regions to identify causative mutations.
- Use metagenomics to identify microbial genes and microbial pathways affecting feed efficiency, animal health, and odor emissions in animal production.
- Develop genome sequence resources for catfish, rainbow trout, sheep, and turkey.
- Collect phenotypic data and use genome sequence derived markers to characterize germplasm for traits of importance in food animals.
- Use genetics and production systems approaches to improve health, feed efficiency, and productivity in food animals.

Crop Production

Selected Past Accomplishments toward Achievement of the Key Outcome

ARS researchers developed several strategies for plant disease control. These include: planting new resistant crop varieties, providing crop cultural control practices or storage conditions to those less favorable for disease development, and employing biological control through integrated disease management. ARS researchers developed several rapid detection and diagnostic tests which provide producers and scientists with tools to quickly detect and identify new and emerging pathogens before a disease outbreak advances. ARS researchers advanced our understanding about the genetic, biochemical, and physiological processes that operate in the host and pathogen as infection and disease progress. In addition, ARS researchers identified new strains of plant pathogens that threaten U.S. crops and then identified new sources of genetic resistance to these emerging crop threats.

Additional accomplishments are included in the "Status of Program" section.

Selected Accomplishments Expected at the FY 2011 Proposed Resource Level

- Determine causes of Colony Collapse Disorder and develop means of mitigating its impact.
- Finance administrative costs associated with the World Food Prize activities.
- Expand knowledge and tools needed for classical plant breeding.
- Enhance plant breeding for sustainable production and climate change protection.
- Apply a computer decision support system for crop production that reduces production risks/losses.
- Apply biocontrol technologies to crop plants to enhance disease resistance.
- Apply new genomic tools to accelerate genetic improvement of 'specialty crops' for superior product quality.
- Deploy new breeding strategies or genetic engineering methods based on knowledge of gene function and expression to enhance the effectiveness of crop improvement programs.
- Maintain USDA germplasm collections in a healthy, secure, and easily accessible form.
- Distribute germplasm for research purposes.
- Expand collections of crop genetic stocks key to genomic research.
- Increase crop genetic resource regeneration, and safeguard collection.
- Secure more wild relatives of crops in gene banks.
- Strengthen high priority grain disease research to protect the world grain supply.

Efficiency Measures

- Additional research funds leveraged from external sources.
- Relative increase in peer reviewed publications.

Key Outcome 4: (1) Reduction in foodborne illness associated with the consumption of meat, poultry, and egg products. (2) The knowledge the Nation needs for a secure agricultural production system and healthy food supply.

HPPG Measure: USDA will reduce the number of Salmonella illnesses and reduce associated health care costs.

Long-Term Performance Measures

- Intervention strategies which reduce pathogens in animals used for food.
- New methodologies for detecting microorganisms/chemicals affecting food safety.
- Genetic lines of plants/animals which are more disease resistant.
- New vaccines for priority animal diseases.
- New diagnostic tests for economically important plant and animal diseases.
- Improved management/control of emerging plant and animal diseases.

Food Safety

Selected Past Accomplishments toward Achievement of the Key Outcome

- Developed a rapid, nondestructive detection/identification method for melamine and its derivatives.
- Developed an imaging system to detect cracks in shell egg shells.
- Determined that cattle fed wet distiller grain had greater prevalence of E. coli O157:H7.
- Developed a laser system to identify bacteria from colonies on a plate, without the need for expensive and time consuming biochemical or microbiological tests.

- Developed and validated a new liquid chromatographic-tandem mass spectrometric (LC-MS/MS) multi-residue method for the simultaneous quantification and identification of the most widely used anthelmintic veterinary drugs.
- Determined that mechanical blade tenderization transfers E. coli O157:H7 into the interior of steaks.
- Demonstrated that a dose of 1 kGy radiation can achieve at least 99.999% reduction of E. coli O157:H7 inoculated onto the surface of fresh produce.
- Determined that Salmonella *enteritidis* were able to penetrate from the exterior of the yolk to the yolk contents during as little as 12 hours of incubation at room temperature.
- Determined that hydrogen peroxide may be useful in removing natural and synthetic estrogens from agricultural and municipal waste streams.

Additional accomplishments are included in the "Status of Program" section.

Selected Accomplishments Expected at the FY 2011 Proposed Resource Level

- Develop improved sampling systems and protocols for various food systems.
- Develop and validate lab based multi-platform detection technologies for pathogens, bacterial and fungal toxins and chemical residues.
- Develop and validate multi-platform field inspection technologies that detect contaminants and changes in pathophysiological attributes.
- Make significant improvements to previously developed food animal surveillance and epidemiology programs.
- Develop science-based management practices to prevent preharvest contamination of produce.
- Develop intervention strategies to eliminate postharvest contamination of produce.
- Determine the behavior of microorganisms in foods, and develop models that can be an integral part of microbial risk assessment used to support food safety measures.
- Develop improved programs to address the development and transfer of antibiotic resistance.
- Initiate the concept of systems biology to understand the basic genetic components of pathogens, their expression, and directly relate this information to the microorganism's biology.

Livestock Protection

Selected Past Accomplishments toward Achievement of the Key Outcome

ARS researchers performed research on priority diseases of livestock (i.e., cattle, sheep, swine, and poultry). Researchers also worked to solve problems associated with integrated pest management of arthropods that affect humans and animals. Among the problems addressed were the ticks that transmit pathogens causing bovine babesiosis, Lyme disease, and rickettsial diseases; flies that mechanically carry enteric pathogens; mosquitoes that transmit dengue virus, malaria, and West Nile Virus; biting midges that transmit bluetongue virus and vesicular stomatitis virus; screwworm flies that infest wounds; blood-sucking flies that attack cattle; fire ants that create a public health threat and that disrupt pastures; and termites that destroy structures and trees. Animal health results included identification of a new anti-infective protein secreted by activated avian lymphocytes; identification of H2N3 influenza, a virus from swine in the United States; demonstration that domestic pigs have low susceptibility to H5N1 highly pathogenic avian influenza viruses; determination that reducing the dose of avian influenza vaccines results in a product that is insufficiently immunogenic; characterization of H5N1 pathogenic avian influenza viruses from North America; development of avian influenza viruses rapid diagnostic tests; discovery that wildlife present a potential source of bovine viral diarrhea virus (BVDV) for cattle; development of a new protective vaccine for brucellosis in bison; documentation and diagnosis of a unique *Leptospira* pathogen in California sea lions; identification of novel antigens in Johne's disease; and stable transfection of a foreign gene into *Babesia bovis*. The entomological results included new devices for treating ticks on wild deer, selection of better fly traps; invention of new insecticides; demonstration of the interaction of pathogens and insect

saliva; genetic sequencing of the screwworm fly; distribution of new biological control agents of fire ants; and demonstration of areawide termite control.

Additional accomplishments are included in the "Status of Program" section.

Selected Accomplishments Expected at the FY 2011 Proposed Resource Level

- Develop new tools to control Bovine Tuberculosis.
- Develop new tools to control Bovine Respiratory Diseases.
- Develop rapid responses to issues/emergencies relating to animal health, and food safety and security.
- Identify functional genes that convey specific disease resistance traits.
- Identify and characterize gene functions/mechanisms responsible for disease resistance traits.
- Implement an integrated emerging zoonotic research program (BSE) in pathogenesis, diagnostics, and intervention.
- Implement a technology driven vaccinology research program for control and eradication of biological threat agents.
- Discover genetic profiles that convey protective immunity against infectious diseases/parasites.
- Develop control programs for invasive drug resistant nematodes, protozoa, and pests of livestock and poultry.
- Model the distribution of white-tailed deer and exotic ungulates in Southern Texas in order to be able to target measures to re-eradicate the cattle fever tick.
- Refine medicated baits and self treatment devices as tools for treatment of ticks on white-tailed deer with the objective of providing practical tools for those charged with the responsibility of eradicating the cattle fever tick.
- Transform experimental screwworm flies in Panama using technology developed to create a male-only strain.
- Develop waterproof fire and ant baits and characterize new biological control agents for fire ants.

Crop Protection

Selected Past Accomplishments toward Achievement of the Key Outcome

- Identified risk factors for produce contamination.
- Found that naval orange worm is a major contributor to promoting infection of almonds by *Aspergillus* strains that produce aflatoxin. This finding has an immediate impact on the almond industry through the use of host-plant volatiles which trap, confuse, or distract the insects from locating the host plant.
- The glassy-winged sharpshooter insect has resulted in destructive epidemics of Pierce's disease on California's grapes. ARS scientists have identified how to control the glassy-winged sharpshooter and Pierce's disease.
- Discovered a novel insecticidal toxin from the genomic sequence of *Pseudomonas fluorescens* Pf-5.
- Characterized, patented, and licensed a novel bacterial insecticidal isolate which is effective against a wide range of agricultural insect pests.
- Implemented four new 5-year areawide pest management projects that include management of weedy annual grasses on rangelands; the Asian tiger mosquito, a vector of West Nile Virus; naval orangeworm on nut trees; and honeybee parasites and diseases.
- Discovered a natural enemy (a leafmining, aquatic fly) of the Brazilian Water Weed, a significant threat to biodiversity and water use in Florida and elsewhere.

Additional accomplishments are included in the "Status of Program" section.

Selected Accomplishments Expected at the FY 2011 Proposed Resource Level

- Develop rapid response to issues and emergencies relating to plant health, and food safety and security.
- Enhance capacity to conserve insect germplasm.
- Enhance insect systematics capacity.
- Enhance microbial germplasm and systematics collections capacity.
- Enhance plant breeding for disease and insect protection.
- Develop new genomic approaches to control crop diseases, such as soybean rust, cereal pests, and rusts, and rice blast.
- Provide information on emerging diseases and invasive species that will enhance identification, detection, and control.
- Characterize pathogens and invasive species, and determine key events in disease development and infection processes.
- Develop systems which will increase knowledge of the ecology, physiology, epidemiology, and molecular biology of emerging diseases, invasive insects, and invasive weeds, which will be incorporated into pest risk assessments.

Efficiency Measures

- Additional research funds leveraged from external sources.
- Relative increase in peer reviewed publications.

Key Outcome 5: Eating habits more consistent with *Dietary Guidelines for Americans*.

HPPG Measure: Reduce the number of households with children who experience very low food security.

Long-Term Performance Measures

- New information on the benefits of consuming healthy diets and on effective intervention strategies.
- Better understanding of nutrients and their role in promoting health and preventing obesity and related diseases.
- Revised dietary guidelines.

Human Nutrition

Selected Past Accomplishments toward Achievement of the Key Outcome

- Reported that soy-based infant formula as the sole food for six months did not impair brain development. These findings should reduce parental and food industry concerns regarding the use of soy infant formula.
- Found that low vitamin D levels in the blood were associated with a doubling of the risk for cardiovascular disease. This is important as the National Academy of Sciences is currently revising the Dietary Reference Intake for vitamin D, the national standards for the U.S. and Canada.
- Expanded the Porcine Immunology and Nutrition Database that is used by researchers around the world. Information in the database demonstrates that the intestine of pigs share far more genes with humans than do the rodents commonly used as models in nutrition research.
- Released a new MyPyramid for Older Adults. This food guide developed by scientists at the USDA Human Nutrition Research Center on Aging adapts the USDA food pyramid and the 2005 Dietary Guidelines for Americans for older adults. This simple education tool enables older Americans to make healthier dietary choices.

Additional accomplishments are included in the "Status of Program" section.

Selected Accomplishments Expected at the FY 2011 Proposed Resource Level

- Discover barriers and facilitators to follow the *Dietary Guidelines for Americans*.
- Provide enhanced nutritional information to consumers through Nutrition.gov.
- Provide updates of the National Nutrient Database.
- Provide reports from the "What We Eat in America" survey.
- Publish findings on requirements/ bioavailability of nutrients and their role in promoting health/ preventing obesity.
- Publish findings on individual nutrition intervention strategies.
- Evaluate dietary patterns useful for preventing obesity.
- Conduct research on requirements/ bioavailability of nutrients to define their role in promoting health/preventing obesity.
- Examine interaction of dietary intake with genetic predisposition for promoting health.
- Release data from dietary supplement database.
- Identify genes or genetic markers among ethnic groups that respond to diet and physical activity.

Efficiency Measures

- Additional research funds leveraged from external sources.
- Relative increase in peer reviewed publications.

Key Outcome 6: (1) Safe, abundant, and reliable water resources. (2) Enhanced crop production and improved environmental quality. (3) Pasture and range land management systems that enhance economic viability and environmental services.

HPPG Measure: Accelerate the protection of clean, abundant water resources by implementing high impact practices on 3 million acres of National Forest and private working lands in priority landscapes. ARS research targets for FY 2011 include developing management tools for producers and land managers on how to use water more efficiently, and on crops with increased resilience to drought.

Long-Term Performance Measures

- Tools/technologies which improve the quality of the Nation's surface waters.
- Improved management/conservation practices that conserve soil resources and reduce dust emissions from agricultural operations.
- Management practices/technologies which reduce gaseous emissions for agricultural operations.
- Scientific information for planning and managing carbon storage in soil.
- Improved management practices/technologies for managing pasture and range lands.

Environmental Stewardship

Selected Past Accomplishments toward Achievement of the Key Outcome

- Developed an improved technique to apply satellite sensor information for monitoring of agricultural drought and improved crop yield.
- Provided methods to better assess conservation practices through the use of satellite imagery to measure annual variations in land cover in agricultural landscapes and to identify wetlands. Also, a process-based model (HYDRUS-1D) to predict fate and transport of contaminants in soils and ground waters was developed. The model allows management decisions to be made when using degraded waters in both agricultural and industrial applications.

- Developed a model (BSTEM) for land managers and decision-makers as an aid in the design of stream bank vegetation to reduce erosion and sediment.
- Provided an extensive database of current and historic (50 year) watershed data, making it assessable for model development of erosion, sediment transport, and climate change.
- Evaluated and identified industrial waste products that can be used in designed bioreactors to remove nutrient and pesticide contamination from agricultural drainage waters.
- Designed a process to denitrify drainage waters using immobilized sludge.
- Made a quantitative assessment of the value of in-stream grade stabilization structures to control erosion.
- Evaluated and quantified the value of enrolling land in the Conservation Reserve Program (CRP) to control erosion in highly erodible lands.
- Evaluated fertilizer recommendations based on a new soil test for rice production resulting in reduced costs (from $2,000 to $40,000) with no reduction in yield.
- Invented a sensor for unmanned airborne vehicles that predicts crop nutrient status and weed populations.
- Developed a prototype machine to imbed and incorporate poultry litter below the surface of pastures thereby improving nutrient use efficiency and reducing odors and water contamination.
- Developed a condensed tannin product to reduce odors and greenhouse gas emissions from stored swine manure.
- Isolated a bacterium that increases the ability of swine and poultry to better digest fiber resulting in improved feed efficiency and decreased fecal output.
- Developed technology for the subsoil injection of liquid diary manure resulting in a 50 percent reduction in ammonia losses, improved nutrient utilization, and improved air quality.
- Released an improved wheatgrass variety ('Vavilov II') that is adapted to harsh dry sandy soils on rangelands and is more competitive with invasive weeds.
- Evaluated and released a new cultivar of intermediate wheatgrass, ('Manifest'), with exceptional yield and enhanced grazing persistence.
- Released three new warm-season cultivars of Indiangrass ('Chief', 'Scout', and 'Warrior') with higher yield and digestibility potential, each tailored to different grazing land hardiness zones.
- Granted licenses for seed production and sales for an improved low-input bahiagrass variety ('TifQuik'). The variety is adapted to southern pastures, more competitive, and earlier maturing.

Additional accomplishments are included in the "Status of Program" section.

Selected Accomplishments Expected at the FY 2011 Proposed Resource Level

- Enhance agricultural sustainability and resource management in the Mississippi River Basin.
- Improve environmental quality and production efficiency by managing microorganisms in agricultural systems.
- Develop or evaluate a method or technology to assess and conserve water availability through more efficient sensing, supply, delivery, and reuse systems.
- Develop or evaluate a method or technology to reduce or prevent nutrient contamination of surface and ground water.
- Develop or evaluate a method or technology that reduces sediment loads to waterways, improves farm land sustainability, and improves or restores stream corridors and riparian ecosystems.
- Develop or assess a system or practice that ameliorates offsets or mitigates the impact of agricultural production and processing on water resources.
- Develop one technology or decision tool to predict carbon sequestration in the soil.
- Develop one management practice or control technology to reduce emissions from agricultural operations.
- Develop one cost effective practice or strategy to restore degraded rangelands.
- Develop one method or strategy to measure and monitor pasture and rangeland health.

Efficiency Measures

- Additional research funds leveraged from external sources.
- Relative increase in peer reviewed publications.

Key Outcome 7 (1): Agricultural information which meets the needs of customers.

Long-Term Performance Measures

- National Digital Library for Agriculture (NDLA) is developed.
- AGRICOLA is fully integrated into NDLA.
- Valuable USDA publications are digitally reformatted for preservation.

Library and Information Services

Selected Past Accomplishments toward Achievement of the Key Outcome

NAL: (1) delivered more than 93 million direct customer service transactions/hits, including for the first time 1,248,182 articles downloaded by USDA staff via NAL's Digitop desktop library for USDA; (2) implemented a variety of new information services, including Web 2.0 services such as InfoFarm, NAL's critically acclaimed blog; (3) continued to lead the www.science.gov, www.worldwidescience.org, www.nutrition.gov, and www.invasivespeciesinfo.gov national and international 'open government' initiatives; (4) continued to digitize printed materials and add other digital content to NAL's digital repository; and (5) continued to adapt NAL's operations and services in moving toward the Library's "Digital NAL" goals.

Additional accomplishments are included in the "Status of Program" section.

Selected Accomplishments Expected at the FY 2011 Proposed Resource Level

- Provide additional resources for NAL's digital information services.

Key Outcome 7 (2): Laboratories and facilities which meet the needs of ARS' scientists.

Long-Term Performance Measures

- Laboratories and facilities are constructed/modernized in accordance with ARS' mission and are completed on schedule and within budget.

Buildings and Facilities

Selected Past Accomplishments toward Achievement of the Key Outcome

Funding was provided to continue modernization/renovation projects and construction of new facilities at a number of locations. Construction projects included laboratories/facilities at the following locations: Davis, California (Grape Genomics Research Center); Salinas, California (U.S. Agricultural Research Station); Hilo, Hawaii (U.S. Pacific Basin Agricultural Research Center); Hagerman, Idaho (National Trout Production & Evaluation Facility); Peoria, Illinois (National Center for Agricultural Utilization Research); Bowling Green, Kentucky (Animal Waste Management Research Laboratory); Lexington, Kentucky (Forage Animal Research Laboratory); Houma, Louisiana (ARS Sugarcane Research Laboratory); Starkville, Mississippi (Poultry Science Research Facility); Stoneville, Mississippi (Jamie Whitten Delta States Research Center); Columbia, Missouri (National Plant and Genetics Security Center); Bozeman, Montana (Animal Bioscience Facility); Geneva, New York (Center for Grape Genetics); Toledo, Ohio

(University of Toledo); Pullman, Washington (ARS Research Laboratory); Washington, DC (U.S. National Arboretum); Kearneysville, West Virginia (Appalachian Fruit Laboratory); Prairie du Sac, Wisconsin (Dairy Forage Research Center).

Design projects included laboratories/facilities at the following locations: Storrs, Connecticut (Center of Excellence for Vaccine Research); Athens, Georgia (Southeast Poultry Research Laboratory); Canal Point, Florida (Agricultural Research Laboratory); Lincoln, Nebraska (Systems Biology Research Facility); Kerrville, Texas (Knipling –Bushland Laboratory), and Logan, Utah (Agricultural Research Center).

Selected Accomplishments Expected at the FY 2011 Proposed Resource Level

- Repair/maintenance of selected ARS buildings/facilities.

AGRICULTURAL RESEARCH SERVICE

Summary of Budget and Performance
Key Performance Outcomes and Measures

USDA STRATEGIC GOAL: ASSIST RURAL COMMUNITIES TO CREATE WEALTH SO THEY ARE SELF-SUSTAINING, REPOPULATING, AND ECONOMICALLY THRIVING.

Goal 2: Enhance the Competitiveness and Sustainability of Rural and Farm Economies.

Objective 2.1: Expand Domestic Market Opportunities.

- Outcome: Technologies to enable dramatic increases in the sustainable production of bioenergy, increased energy security, and reduced energy costs for the agricultural sector. Technologies leading to new and improved foods, fibers, and biobased products that expand agricultural markets and provide new and improved products for consumers here and abroad.

- Perf. Measure #1: Create new scientific knowledge and innovative technologies that represent scientific and technological advancements or breakthroughs applicable to bioenergy.

- Perf. Measure #2: Develop cost effective, functional industrial and consumer products, including higher quality, healthy foods, that satisfy consumer demand in the United States and abroad.

- HPPG Measure: Increase the prosperity of rural communities by concentrating and strategically investing in 5 regions, resulting in the creation of strong local and regional economies with a particular emphasis on food systems, renewable energy, and broadband-based economies.

Key Performance Targets:

Performance Measure	2007 Actual	2008 Actual	2009 Actual	2010 Target	2011 Target
Measure #1					
a. Units	• Developed new technologies that integrate feedstock refining or preprocessing, conversion, and product recovery processes. •Generated higher value coproducts from current low value production byproducts.	•Developed new crop varieties and agronomic systems that enable the sustainable, high yield production of cellulosic biomass for biorefining to energy and co-products. •Developed new technologies that integrate feedstock refining or preprocessing,	•Enabled new varieties and hybrids of bioenergy feedstocks with optimal traits. •Enabled new optimal practices and systems that maximized the sustainable yield of high quality bioenergy feedstocks.	•Enable new varieties and hybrids of bioenergy feedstocks with optimal traits. •Enable new optimal practices and systems that maximize the sustainable yield of high quality bioenergy feedstocks.	•Enable new germplasm, varieties, and hybrids of bioenergy with optimal traits. •Enable new optimal practices and systems that maximize the sustainable yield of high quality bioenergy feedstocks.

Performance Measure	2007 Actual	2008 Actual	2009 Actual	2010 Target	2011 Target
		conversion, and product recovery processes. •Generated higher value coproducts from current low value production byproducts.	•Enabled new, commercially preferred biorefining technologies.	•Enable new, commercially preferred biorefining tech.	•Enable new, commercially preferred biorefining technologies. •Develop five Regional Biofuels Feedstocks Research and Demonstration Centers.
Measure #2					
a. Units	•Developed technologies leading to new value-added products from crops and crop residues. •Developed new value-added products from animal byproducts. •Developed new biobased products. •Genetically modified cereal seed components for novel/enhanced uses.	•Developed technologies leading to new value-added products from crops and crop residues. •Developed new value-added products from animal byproducts. •Developed new biobased products. •Genetically modified cereal seed components for novel/enhanced uses.	•Developed technologies leading to new value-added products from crops and crop residues. •Developed new value-added products from animal byproducts. •Developed new biobased products. •Genetically modified cereal seed components for novel/enhanced uses.	•Develop technologies leading to new value-added products from crops and crop residues. •Develop new value-added products from animal byproducts. •Develop new biobased products. •Genetically modify cereal seed components for novel/enhanced uses. •Hire post doc for specialty crop modeling and hire a food systems engineer.	•Develop technologies leading to new value-added products from crops and crop residues. •Develop new value-added products from animal byproducts. •Develop new biobased products. •Genetically modify cereal seed components for novel/enhanced uses. •Develop partnership with Cornell University's Sustainable Food Systems Futures Center to integrate supply chain economic analyses.

Performance Measure	2007 Actual	2008 Actual	2009 Actual	2010 Target	2011 Target
					•Develop local food systems for the urban Eastern Seaboard Region. •Conduct an evaluation of ARS' facilities and co-located other USDA facilities, using the agency's Salaries and Expenses funds.

Management Initiative 7(1): Provide Agricultural Library and Information Services to USDA and the Nation.

Objective 7.1: Ensure Provision and Permanent Access of Quality Agricultural Information for USDA, the Nation, and the Global Agricultural Community via the National Agricultural Library.

- Outcome: Agricultural information which meets the needs of customers.
- Perf. Measure #1: The services and collections of the National Agricultural Library continue to meet the needs of its customers.
- Perf. Measure #2: The National Agricultural Library and partners implement the National Digital Library for Agriculture.

Key Performance Targets:

Performance Measure	2007 Actual	2008 Actual	2009 Actual	2010 Target	2011 Target
Measure #1					
a. Units	•Upgraded/enhanced software for accessing, navigating, evaluating, and delivering AGRICOLA database services. •Digitized 15,000 document images for web access. •Continued to collaborate with the U.S. Agricultural Information Network libraries and AgNIC partners to preserve digital agricultural information.	•Funding reduction impacted NAL's ability to expand and improve services, affecting document delivery services, print material acquisition, and filling vacant NAL positions.	•Funding level impacted NAL's ability to expand and improve services, affecting document delivery services, print material acquisition, and filling vacant NAL positions.	•Funding level will reduce NAL's ability to improve services, affecting reference services, document delivery services, material acquisition, and ability to fill vacant NAL positions.	•Provide additional resources for NAL's digital information services.

Performance Measure	2007 Actual	2008 Actual	2009 Actual	2010 Target	2011 Target
Measure #2					
a. Units	•Increased DigiTop access and availability by at least 25%. •Added at least 3 new AgNIC partners. •Increased overall NAL service delivery by at least 15.	•Funding reduction impacted NAL's ability to develop partnerships and content for the NDLA.	•Funding level impacted NAL's ability to develop partnerships and content for the NDLA.	• Funding level will reduce NAL's ability to develop partnerships and content for the NDLA.	• Funding level will determine NAL's ability to improve services, i.e., reference services, material acquisition, as well as ability to fill vacant NAL positions.

Management Initiative 7(2): Provide Adequate Federal Facilities Required to Support the Research Mission of ARS.

Objective 7.2: Provide for the Construction/Modernization of New and/or Replacement Laboratories and Facilities, Built in a Timely Manner and within Budget.

- Outcome: Laboratories and facilities which meet the needs of ARS' scientists.
- Perf. Measure #1: Priority buildings/facilities projects are completed on schedule and within budget.

Key Performance Targets:

Performance Measure	2007 Actual	2008 Actual	2009 Actual	2010 Target	2011 Target
Measure #1					
a. Units	•Repaired/maintained selected ARS buildings/facilities using Repair and Maintenance funds.	•Modernized/constructed selected ARS buildings/facilities.	•Modernized/constructed selected ARS buildings/facilities.	•Repair/maintain ARS buildings/facilities using Repair and Maintenance funds.	•Repair/maintain ARS buildings/facilities using Repair and Maintenance funds.

USDA STRATEGIC GOAL: ENSURE OUR NATIONAL FORESTS AND PRIVATE WORKING LANDS ARE CONSERVED, RESTORED, AND MADE MORE RESILIENT TO CLIMATE CHANGE, WHILE ENHANCING OUR WATER RESOURCES.

Goal 6: Protect and Enhance the Nation's Natural Resource Base and Environment.

Objective 6.1: Enhance Watersheds' Capacities to Deliver Safe and Reliable Fresh Water.

- Outcome: Safe, abundant, and reliable water resources.
- Perf. Measure #1: Develop technology and practices to reduce the delivery of agricultural pollutants by water on farms and ranches and quantify the environmental benefit of conservation practices in watersheds.
- HPPG Measure: Accelerate the protection of clean, abundant water resources by implementing high impact practices on 3 million acres of National Forest and private working lands in priority landscapes.

Key Performance Targets:

Performance Measure	2007 Actual	2008 Actual	2009 Actual	2010 Target	2011 Target
Measure #1					
a. Units	•Developed a tool that uses remote sensing to assess changes in land use and its impact on water resources. •Developed a tool to evaluate environmental risks and cost effectiveness associated with the selection and placement of conservation practices. •Developed integrated technology for producing watershed scale water use maps. •Developed a cropping system that uses limited water supplies for	•Developed a tool that uses remote sensing to assess changes in land use and its impact on water resources. •Developed a tool to evaluate environmental risks and cost effectiveness associated with the selection and placement of conservation practices. •Developed integrated technology for producing watershed scale water use maps. •Developed a cropping system that uses limited water supplies for	•Developed and evaluated methods and technologies to assess and conserve water availability through more efficient sensing, supply, delivery, and reuse systems. •Developed and evaluated methods and technologies that reduced or prevented nutrient contamination of surface and ground waters. •Developed and evaluated methods and techniques that reduced sediment loads to waterways, improved farm land sustainability,	•Develop and evaluate methods and technologies to assess and conserve water availability through more efficient sensing, supply, delivery, and reuse systems. •Develop and evaluate methods and technologies that reduce or prevent nutrient contamination of surface and ground waters. •Develop and evaluate methods and techniques that reduce sediment loads to waterways, improve farm land	•Develop or evaluate a method or technology to assess and conserve water availability through more efficient sensing, supply, delivery, and reuse systems. •Develop or evaluate a method or technology to reduce or prevent nutrient contamination of surface and ground waters. •Develop or evaluate a method or technology that reduces sediment loads to waterways, improves farm land sustainability, and

Performance Measure	2007 Actual	2008 Actual	2009 Actual	2010 Target	2011 Target
	drought and salt tolerance.	drought and salt tolerance.	and improved or restored stream corridors and riparian ecosystems. •Developed and assessed systems and practices that ameliorated, offset, or mitigated the impact of agricultural production and processing on water resources.	sustainability, and improve or restore stream corridors and riparian ecosystems. •Develop and assess systems and practices that ameliorate, offset, or mitigate the impact of agricultural production and processing on water resources. •Develop recommendations for land management practices based on the ARS GRACEnet project and carbon sequestration models to reduce net greenhouse gas emissions in agricultural production systems by 15 to 25%. •Provide a management tool for farmers, ranchers, and communities to avoid water shortages based on predictive capabilities developed from decades of ARS watershed research and NASS cropland data.	improves or restores stream corridors and riparian ecosystems. •Develop or assess a system or practice that ameliorates, offsets, or mitigates the impact of agricultural production and processing on water resources. •Expand the ARS GRACEnet project into U.S. biomass and specialty crops, and into farming systems in one sub-Saharan or Asian country. •Provide a web-accessible management tool based on geospatial information on crop condition, soil moisture, drought monitoring, and hydrologic models for producers, land managers, and communities needing to use water efficiently and cost-effectively. •Enhance agricultural sustainability and resource management in the Mississippi River Basin.

6.2: Improve Soil and Air Quality to Enhance Crop Production and Environmental Quality.

- Outcome: Enhanced crop production and improved environmental quality.
- Perf. Measure #1: Develop practices and technologies to enhance soil resources and reduce emissions of particulate matter and gases from crop production lands, agricultural processing operations, and animal production systems.

Key Performance Targets:

Performance Measure	2007 Actual	2008 Actual	2009 Actual	2010 Target	2011 Target
Measure #1					
a. Units	•Developed at least one management practice and/or control technology that reduce ammonia emissions from animal feeding operations. •Developed at least one decision tool to predict the impact of agricultural management practices on soil quality.	•Developed one management practice and/or control technology that reduce ammonia emissions from animal feeding operations. •Developed one management practice to overcome soil physical property limitations to crop production.	•Developed one decision tool to predict carbon sequestration in soil. •Developed one management practice and/or control technology to help reduce emissions from agricultural operations.	•Develop one decision tool to predict carbon sequestration in soil. •Develop one management practice and/or control technology to help reduce emissions from agricultural operations. •Project the best deployment of agronomically desirable crop varieties in their optimal environments based on genetic and physiological information.	•Develop one technology or decision tool to predict carbon sequestration in the soil. •Develop one management practice or control technology to reduce emissions from agricultural operations. •Develop methods to genotypically and phenotypically characterize large numbers of crop species and varieties in collections to develop high yielding and profitable crops. •Improve environmental quality and production efficiency by managing microorganisms in agricultural systems.

Objective 6.3: Protect Forests and Grasslands.

- Outcome: Pasture and range land management systems that enhance economic viability and environmental services.
- Perf. Measure #1: Improved management practices and technologies for managing pasture and range lands to improve economic profitability and enhance environmental values.

Key Performance Targets:

Performance Measure	2007 Actual	2008 Actual	2009 Actual	2010 Target	2011 Target
Measure #1					
a. Units	•Developed at least one cost effective practice and/or strategy to restore degraded range lands. •Developed at least one methodology and/or technology to measure and monitor pasture and range land health. •Developed at least one environmentally acceptable practice or technology to control invasive weeds.	•Developed one cost effective practice and/or strategy to restore degraded range lands. •Developed one methodology and/or technology to measure and monitor pasture and range land health. •Developed one environmentally acceptable practice or technology to control invasive weeds.	•Developed one cost effective practice and/or strategy to restore degraded range lands. •Developed one methodology and/or technology to measure and monitor pasture and range land health. •Developed one environmentally acceptable practice or technology to control invasive weeds.	•Develop one cost effective practice and/or strategy to restore degraded range lands. •Develop one methodology and/or technology to measure and monitor pasture and range land health. •Develop one environmentally acceptable practice or technology to control invasive weeds.	•Develop one cost effective practice or strategy to restore degraded range lands. •Develop one method or strategy to measure and monitor pasture and range land health.

USDA STRATEGIC GOAL: HELP AMERICA PROMOTE AGRICULTURAL PRODUCTION AND BIOTECHNOLOGY EXPORTS AS AMERICA WORKS TO INCREASE FOOD SECURITY.

Goal 2: Enhance the Competitiveness and Sustainability of Rural and Farm Economies.

Objective 2.2: Increase the Efficiency of Domestic Agricultural Production and Marketing Systems.

- Outcome: Information and technology producers can use to compete more economically in the marketplace.
- Perf. Measure #1: Develop systems and technologies to reduce production costs and risks while enhancing natural resource quality.
- Perf. Measure #2: Develop new technologies, tools, and information contributing to improved precision animal production systems to meet current and future food animal production needs of diversified consumers, while simultaneously minimizing the environmental footprint of production systems and enhancing animal well-being.
- Perf. Measure #3: Expand, maintain, and protect our genetic resource base, increase our knowledge of genes, genomes, and biological processes, and provide economically and environmentally sound technologies that will improve the production efficiency, health, and value of the Nation's crops.

Key Performance Targets:

Performance Measure	2007 Actual	2008 Actual	2009 Actual	2010 Target	2011 Target
Measure #1					
a. Units	•Developed a computer decision support system for crop and animal production that reduces production risks/losses. •Applied novel genomics information to crop plants to enhance disease resistance, product quality, and other important traits.	•Applied a computer decision support system for crop and animal production that reduces production risks/losses. •Applied biocontrol technologies to crop plants to enhance disease resistance.	•Applied a computer decision support system for crop and animal production that reduces production risks/losses. •Applied biocontrol technologies to crop plants to enhance disease resistance.	•Apply a computer decision support system for crop and animal production that reduces production risks/losses. •Apply biocontrol technologies to crop plants to enhance disease resistance.	•Apply a computer decision support system for crop and animal production that reduces production risks/losses. •Apply biocontrol technologies to crop plants to enhance disease resistance.

Performance Measure	2007 Actual	2008 Actual	2009 Actual	2010 Target	2011 Target
Measure #2					
a. Units	•Reached targeted levels of stored germplasm in the Animal National Germplasm Program to declare goat and aquaculture populations secure. •Characterized cattle germplasm for efficiency of nutrient utilization. •Achieved significant progress in demonstrating economically important traits in improved lines of rainbow trout and North Atlantic salmon. •Used the completed chicken, cattle, swine, and catfish genome sequences to identify novel genes impacting efficiency of nutrient utilization and adaptation to the production environment, including rumen and gut microorganisms. •Completed haplotype maps of the cattle and chicken genomes.	•Continued to build populations stored in the National Animal Germplasm Program. •Used the completed chicken, cattle, swine, and catfish genome sequences to identify novel genes impacting efficiency of nutrient utilization and adaptation to the production environment. •Completed haplotype maps of the cattle and chicken genomes. •Transferred improved catfish germplasm to the U.S. catfish industry.	•Continued to build stored populations and improve utilization of the National Animal Germplasm Program. •Used the completed chicken, cattle, and swine genome sequences to identify novel genes impacting efficiency of nutrient utilization and adaptation to the production environment. •Used the chicken and cattle haplotype maps to evaluate the efficacy of whole genome selection to facilitate genome enabled improvement while developing the haplotype map for swine. •Used metagenomics to initially screen the rumen micrflora in cattle. •Developed genome sequence resources for sheep, rainbow trout, and catfish species.	•Continue to build stored populations and improve utilization of the National Animal Germplasm Program. •Use the completed chicken, cattle, and swine genome sequences to identify novel genes impacting efficiency of nutrient utilization and adaptation to the production environment. •Use the chicken and cattle haplotype maps to evaluate the efficacy of whole genome selection to facilitate genome enabled improvement while developing the haplotype map for swine. •Use metagenomics to initially screen the rumen micrflora in cattle. •Develop genome sequence resources for sheep, rainbow trout, and catfish species.	•Continue to increase stored germplasm resources and increase use of National Animal Germplasm Program. •Increase the number of populations with adequate germplasm stores to enable reconstitution if necessary. •Develop improved semen extenders and artificial insemination methodologies. • Use the completed chicken, cattle, and swine genome sequences to identify genes impacting efficiency of nutrient utilization and adaptation to the production environment. • Develop reduced SNP chips to target specific livestock breeds and a particular suite of traits. • Increase depth of sequence coverage in key genomic regions to

Performance Measure	2007 Actual	2008 Actual	2009 Actual	2010 Target	2011 Target
	•Incorporated traits in trout that improve their ability to use feed that contains a higher proportion of grain. •Identified and characterized genes that affect disease resistance, stress, and other important characteristics affecting the biosecurity of food animal populations. •Increased number of cryopreserved specimens by 10%.				identify causative mutations. • Use metagenomics to identify microbial genes and microbial pathways affecting feed efficiency, animal health, and odor emissions in animal production. • Collect phenotypic data and use genome sequence markers to characterize germplasm for traits of importance in food animals. • Use genetics and production systems approaches to improve health, feed, efficiency, and productivity in food animals. • Develop genome sequence resources for catfish, rainbow trout, sheep, and turkey. •Improve beef cattle and swine germplasm. •Provide dairy cattle and trout improvement.

Performance Measure	2007 Actual	2008 Actual	2009 Actual	2010 Target	2011 Target
Measure #3					
a. Units	•Tested whether genetic tools/genomic data/ bioinformatics systems developed for major crop plants and model plants are applicable to "specialty crops." •Initiated research to devise methods for more precisely manipulating (traditional breeding and/or genetic engineering) the function and expression of genes of major crops which are key to determining product quality and resistance to abiotic and biotic stresses. •Maintained USDA germplasm collections in a healthy, secure, and easily accessible form. •Distributed germplasm for research purposes. •Expanded collections of crop genetic stocks key to genomic research. •Increased crop genetic resource regeneration, and maintenance capacity and activity.	•Applied new genomic tools to accelerate the genetic improvement of "specialty crops" for superior product quality. •Tested whether new breeding strategies or genetic engineering methods based on knowledge of gene function and expression enhance the effectiveness of crop improvement programs. •Maintained USDA germplasm collections in a healthy, secure, and easily accessible form. •Distributed germplasm for research purposes. •Expanded collections of crop genetic stocks key to genomic research. •Increased crop genetic resource regeneration, and maintenance capacity and activity. •Secured more wild relatives of crops in gene banks.	•Applied new genomic tools to accelerate genetic improvement of 'specialty crops' for superior product quality. •Tested whether new breeding strategies or genetic engineering methods based on knowledge of gene function and expression enhance the effectiveness of crop improvement programs. •Maintained USDA germplasm collections in a healthy, secure, and easily accessible form. • Distributed germplasm for research purposes. •Expanded collections of crop genetic stocks key to genomic research. •Increased crop genetic resource regeneration, and maintenance capacity and activity. •Secured more wild relatives of crops in gene banks.	•Apply new genomic tools to accelerate genetic improvement of 'specialty crops' for superior product quality. •Test whether new breeding strategies or genetic engineering methods based on knowledge of gene function and expression enhance the effectiveness of crop improvement programs. •Maintain USDA germplasm collections in a healthy, secure, and easily accessible form. • Distribute germplasm for research purposes. •Expand collections of crop genetic stocks key to genomic research. •Increase crop genetic resource regeneration, and maintenance capacity and activity. •Secure more wild relatives of crops in gene banks.	•Apply new genomic tools to accelerate genetic improvement of 'specialty crops' for superior product quality. •Deploy new breeding strategies or genetic engineering methods based on knowledge of gene function and expression enhance the effectiveness of crop improvement programs. •Maintain USDA germplasm collections in a healthy, secure, and easily accessible form. • Distribute germplasm for research purposes. •Expand collections of crop genetic stocks key to genomic research. •Increase crop genetic resource regeneration, and safeguard collection. •Secure more wild relatives of crops in gene banks.

Performance Measure	2007 Actual	2008 Actual	2009 Actual	2010 Target	2011 Target
	•Secured more wild relatives of crops in gene banks. •Enhanced capacity to manage key crop digital images.				•Determine causes of Colony Collapse Disorder and develop means for mitigating its impact. •Finance administrative costs associated with the World Food Prize activities. •Expand knowledge and tools needed for classical plant breeding. •Enhance plant breeding for sustainable production and climate change protection. •Enhance capacity to conserve a broad diversity of National Plant Germplasm System resources. • Strengthen high priority grain disease research to protect the world grain supply.

Objective 4.2: Reduce the Number, Severity, and Distribution of Agricultural Pest and Disease Outbreaks.

- Outcome: The knowledge the Nation needs for a secure agricultural production system and healthy food supply.
- Perf. Measure #1: Provide scientific information to protect animals, humans, and property from the negative effects of pests, infectious diseases, and other disease-causing entities.
- Perf. Measure #2: 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.
- Perf. Measure #3: Develop control strategies based on fundamental and applied research to reduce losses caused by plant diseases, nematodes, arthropods, and weeds that are effective and affordable while maintaining environmental quality. Develop technically and economically feasible alternatives to preplant and postharvest use of methyl bromide.
- Perf. Measure #4: Provide needed scientific information and technology that is environmentally acceptable to producers of agriculturally important plants in support of exclusion, early detection and eradication, control, and monitoring of invasive arthropods, weeds, nematodes, and pathogens; enhanced sustainability; and restoration of affected areas. Conduct biologically-based integrated and areawide management key invasive species.
- Perf. Measure #5: Provide environmentally sound fundamental and applied scientific information and technologies to action agencies, producers, exporters, and importers of commercially important plant and animal products in support of exclusion, early detection, and eradication of quarantine pests and pathogens that can impede foreign trade.

Key Performance Targets:

Performance Measure	2007 Actual	2008 Actual	2009 Actual	2010 Target	2011 Target
Measure #1					
a. Units	•Implemented an integrated emerging zoonotic research program (BSE) in pathogenesis, diagnostics, and intervention. •Implemented a technology driven vaccinology research program for control and eradication of biological threat agents.	•Identified genes that convey specific disease-resistance traits. •Characterized gene functions/mechanisms responsible for disease-resistance traits. •Implemented an integrated emerging zoonotic research program (BSE) in pathogenesis, diagnostics, and intervention.	•Identified genes that convey specific disease-resistance traits. •Characterized gene functions/mechanisms responsible for disease-resistance traits. •Implemented an integrated emerging zoonotic research program (BSE) in pathogenesis, diagnostics, and intervention.	•Identify genes that convey specific disease-resistance traits. •Characterize gene functions/mechanisms responsible for disease resistance traits.	•Identify functional genes that convey specific disease-resistance traits. •Identify and characterize gene functions/mechanisms responsible for disease-resistance traits. •Implement an integrated emerging zoonotic research program (BSE) in

Performance Measure	2007 Actual	2008 Actual	2009 Actual	2010 Target	2011 Target
	•Discovered genetic profiles that convey protective immunity against infectious diseases/ parasites. •Developed control programs for invasive drug-resistant nematodes and protozoa of livestock and poultry. •Identified genes that are markers for individual cattle and their progeny who are poor hosts for ticks and the horn fly. •Identified and released new pathogens and predators of imported fire ants based on biological and genetic studies. •Developed antigenic and genetic targets of cattle ticks for development of anti-tick vaccines in cattle.	•Implemented a technology driven vaccinology research program for control and eradication of biological threat agents. •Discovered genetic profiles that convey protective immunity against infectious diseases/parasites. •Developed control programs for invasive drug-resistant nematodes and protozoa of livestock and poultry. •Identified genes that are markers for individual cattle and their progeny who are poor hosts for ticks and the horn fly. •Identified and released new pathogens and predators of imported fire ants based on biological and genetic studies. •Developed antigenic and genetic targets of cattle ticks for development of anti-tick vaccines in cattle.	•Implemented a technology driven vaccinology research program for control and eradication of biological threat agents. •Discovered genetic profiles that convey protective immunity against infectious diseases/parasites. •Developed control programs for invasive drug-resistant nematodes, protozoa, and pests of livestock and poultry. •Developed methods for treating wild ungulates to suppress tick vectors of Lyme disease and Texas cattle fever. •Combined newly discovered attractants into fire ant bait. •Identified genetic location for insertion of genes to make male screwworm flies.	•Implement an integrated emerging zoonotic research program (BSE) in pathogenesis, diagnostics, and intervention. •Implement a technology driven vaccinology research program for control and eradication of biological threat agents. •Discover genetic profiles that convey protective immunity against infectious diseases/parasites. •Develop control programs for invasive drug resistant nematodes, protozoa, and pests of livestock and poultry. •Develop methods for treating wild ungulates to suppress tick vectors of Lyme disease and Texas Cattle Fever. •Combine newly discovered attractants into fire ant bait.	pathogenesis, diagnostics, and intervention. •Implement a technology driven vaccinology research program for control and eradication of biological threat agents. •Discover genetic profiles that convey protective immunity against infectious diseases/parasites. •Develop control programs for invasive drug resistant nematodes, protozoa, and pests of livestock and poultry. •Model the distribution of white-tailed deer and exotic ungulates in Southern Texas in order to be able to target measures to re-eradicate the cattle fever tick. •Refine medicated baits and self treatment devices as tools for treatment of ticks on white-tailed deer with the objective of providing practical tools for those charged with the responsibility

Performance Measure	2007 Actual	2008 Actual	2009 Actual	2010 Target	2011 Target
				•Identify the genetic location for insertion of genes to make male screwworm flies.	of eradicating the cattle fever tick. •Transform experimental screwworm flies in Panama using technology developed to create a male-only strain. •Develop water-proof fire and ant baits and characterize new biological control agents for fire ants. •Provide genetic improvement for animal health traits. •Develop rapid response to issues and emergencies relating to animal health, and food safety and security.
Measure #2					
a. Units	•Completed the bench validation of four new diagnostic tests.	•Discovered and developed new diagnostic platforms for priority animal diseases. •Discovered and transferred new technologies for protection of animals and humans from biting arthropods.	•Discovered and developed new diagnostic platforms for priority animal diseases. • Discovered and transferred new technologies for protection of animals and humans from biting arthropods.	•Discover and develop new diagnostic platforms for priority animal diseases. • Discover and transfer new technologies for protection of animals and humans from biting arthropods.	•Discover and develop new diagnostic platforms for priority animal diseases. • Discover and transfer new technologies for protection of animals and humans from biting arthropods.

Performance Measure	2007 Actual	2008 Actual	2009 Actual	2010 Target	2011 Target
		•Discovered and transferred new technologies for protection of animals from priority diseases. •Discovered and transferred new technologies for protection of property from structural pests.	•Discovered and transferred new technologies for protection of animals from priority diseases. •Discovered and transferred new technologies for protection of property from structural pests.	•Discover and transfer new technologies for protection of animals from priority diseases. •Discover and transfer new technologies for protection of property from structural pests.	•Discover and transfer new technologies for protection of animals from priority diseases. •Discover and transfer new technologies for protection of property from structural pests. •Develop new tools to control Bovine Tuberculosis. •Develop new tools to control Bovine Respiratory Diseases.
Measure #3					
a. Units	•Developed genomic approaches to control crop diseases, such as soybean rust and wheat striped rust.	•Developed genomic approaches to control crop diseases, such as soybean rust.	•Developed genomic approaches to control crop diseases, such as soybean rust.	•Develop genomic approaches to control crop diseases, such as soybean rust.	•Develop new genomic approaches to control crop diseases, such as soybean rust, cereal pests, and rusts, and rice blast. •Develop rapid response to issues and emergencies relating to plant health, and food safety and security.
Measure #4					
a. Units	•Provided information on emerging diseases and invasive species that will enhance identification and detection and control.	•Provided information on emerging diseases and invasive species that will enhance identification and detection.	•Provided information on emerging diseases and invasive species that will enhance identification and detection.	•Provide information on emerging diseases and invasive species that will enhance identification, detection, and control.	•Provide information on emerging diseases and invasive species that will enhance identification, detection, and control.

Performance Measure	2007 Actual	2008 Actual	2009 Actual	2010 Target	2011 Target
	•Characterized pathogens and invasive species, and determined key events in disease development and infection processes and determine possible control measures.	•Characterized pathogens and invasive species, and determined key events in disease development and infection processes.	•Characterized pathogens and invasive species, and determined key events in disease development and infection processes.	•Characterize pathogens and invasive species, and determine key events in disease development and infection processes.	•Characterize pathogens and invasive species, and determine key events in disease development and infection processes. •Enhance capacity to conserve insect germplasm. •Enhance insect systematic capacity. •Enhance microbial germplasm and systematics collections capacity. •Enhance plant breeding for disease and insect protection.

Performance Measure	2007 Actual	2008 Actual	2009 Actual	2010 Target	2011 Target
Measure #5					
a. Units.	•Developed systems which increased knowledge of the ecology, physiology, epidemiology, and molecular biology of emerging diseases, invasive insects, and invasive weeds, which will be incorporated into pest risk assessments.	•Developed systems which increased knowledge of the ecology, physiology, epidemiology, and molecular biology of emerging diseases, invasive insects, and invasive weeds, which will be incorporated into pest risk assessments.	•Developed systems which will increase knowledge of the ecology, physiology, epidemiology, and molecular biology of emerging diseases, invasive insects, and invasive weeds, which will be incorporated into pest risk assessments.	•Develop systems which will increase knowledge of the ecology, physiology, epidemiology, and molecular biology of emerging diseases, invasive insects, and invasive weeds, which will be incorporated into pest risk assessments.	•Develop systems which will increase knowledge of the ecology, physiology, epidemiology, and molecular biology of emerging diseases, invasive insects, and invasive weeds, which will be incorporated into pest risk assessments.

USDA STRATEGIC GOAL: ENSURE THAT ALL OF AMERICA'S CHILDREN HAVE ACCESS TO SAFE, NUTRITIOUS, AND BALANCED MEALS.

Goal 4: Enhance Protection and Safety of the Nation's Agriculture and Food Supply.

Objective 4.1: Provide the Scientific Knowledge to Reduce the Incidence of Foodborne Illnesses in the U.S.

- Outcome: Reduction in foodborne illness associated with the consumption of meat, poultry, and egg products.
- Perf. Measure #1: Develop new technologies that assist ARS customers in detecting, identifying, and controlling foodborne diseases that affect human health.
- HPPG Measure: USDA will reduce the number of Salmonella illnesses and reduce associated health care costs.

Key Performance Targets:

Performance Measure	2007 Actual	2008 Actual	2009 Actual	2010 Target	2011 Target
Measure #1					
a. Units	•Made significant improvements to previously developed food animal surveillance and epidemiology programs. •Used microarrays to elucidate two ways to improve control of food pathogens in the preharvest stage. •Worked with industry to initiate implementation of control strategies for mycotoxins based on fungal genomic information. •Worked with a livestock producing group to implement a program to decrease the incidence of	•Made significant improvements to previously developed food animal surveillance/ epidemiology programs. •Used microarrays to elucidate two additional ways to improve control of food pathogens in the preharvest stage. •Worked with industry to initiate implementation of control strategies for mycotoxins based on fungal genomic data. •Fine tuned the program to lower the costs of reducing antibiotic resistance.	•Made significant improvements to previously developed food animal surveillance/ epidemiology programs. •Used molecular technologies to elucidate two additional ways to improve control of food pathogens in the preharvest stage. •Worked with industry to initiate implementation of control strategies for mycotoxins based on fungal genomic data. •Fine tuned the program to lower the costs of reducing antibiotic resistance.	•Use molecular technologies to elucidate two additional ways to improve control of food pathogens in the preharvest stage. •Work with industry to initiate implementation of control strategies for mycotoxins based on fungal genomic information. •Identify a fungal crop interaction that drives mycotoxin formation which can be adapted to strategies to limit mycotoxin formation. •Develop sampling systems/protocols for	•Use population systems to understand the interrelationships of microorganisms in food environments, and the interrelationships among host, pathogen, and environment. •Use systems biology to understand the basic genetic components of pathogens, their expression, and directly relate this information to the microorganisms's biology and its potential effect on food safety. •Develop rapid systems to detect food pathogens that may enter through raw

Performance Measure	2007 Actual	2008 Actual	2009 Actual	2010 Target	2011 Target
	antibiotic resistance. •Transferred a previously identified mycotoxin control strategy to private industry. •Developed strategies to control toxins of plant origin in food products. •Developed sampling systems and protocols for various food systems to detect intentional contamination. •Developed rapid systems for target amplification to detect pathogens in foods. •Developed detection and processing intervention systems for chemical or biological contamination of liquid egg products. •Developed models to provide simulations of the distribution of biosecurity agents in foods.	•Identified a fungal crop interaction that drives mycotoxin formation which can be adapted to strategies to limit mycotoxin formation. •Developed strategies to control toxins of plant origin in food products. •Developed sampling systems/protocols for various food systems to detect intentional contamination. •Developed rapid systems for target amplification to detect pathogens in foods. •Developed detection and processing intervention systems for chemical or biological contamination of liquid egg products. •Developed models to provide simulations of the distribution of biosecurity agents in foods. •Developed an innovative low cost, opto-electronic portable imaging device for food safety and food biosecurity use.	•Identified a fungal crop interaction that drives mycotoxin formation which can be adapted to strategies to limit mycotoxin formation. •Developed sampling systems/protocols for food systems to detect intentional contamination. •Developed rapid systems for target amplification to detect food pathogens. •Developed detection and processing intervention systems for chemical or biological contamination of liquid egg products. •Developed models to provide simulations of the distribution of bio-security agents in foods. •Developed an innovative low cost, opto-electronic portable imaging device for food safety and food biosecurity use.	food systems to detect intentional contamination. •Develop rapid systems for target amplification to detect food pathogens. •Develop detection and processing intervention systems for chemical or biological contamination of liquid egg products. •Develop an innovative low cost, opto-electronic portable imaging device for food safety and food biosecurity use. • Develop an automated/rapid sensing technology for discriminating bacterial species on petri plates for public health and industry use; pan microarrays for major foodborne pathogens and toxins; develop new discriminatory methods for toxigenic E. coli non-0157:H7 serotypes that are emerging as potential foodborne risks.	materials, contamination during processing, or retail to protect public health. •Develop production and processing intervention systems that may control, mitigate, or reduce biological and chemical contaminants in foods. •Develop methods and models to predict the behavior of microorganisms in foods and may be use to support food safety measures and risk assessment. •Develop rapid systems to detect toxins and chemical contaminants to protect human health and the environment. • Develop and validate: two lab-based multi-platform contaminant detection technologies for the highest priority pathogens, toxins, and chemical residues; two multi-task on/in-line (in field) inspection technologies (for all size processors) that detect contaminants and

Performance Measure	2007 Actual	2008 Actual	2009 Actual	2010 Target	2011 Target
				• Identify five major risk factors that lead to pathogen contamination of produce in the field, from both the environment and farm practices: role of biofilms on plants; role of wildlife; role of source and type of water used; role of proximity of animal production facilities; and role of protozoa. • Establish baseline data on costs of current food safety management practices at processor level and make available to the public. Identify five risk factors and critical control points where pathogens are introduced. Measure the effect/outcome of interventions implemented during processing on the reduction of contamination of foodborne pathogens, toxins, and chemicals.	changes in attributes at required line speeds; three detection methods for mycotoxins in foods to be used by CDC for public health outbreaks and for use in developing countries. • Develop five science-based management practices to prevent preharvest contamination of produce, by enteric pathogens, and implement three intervention strategies to eliminate pathogen contamination: the control and prediction of the fate and transport of pathogens will be determined by specific tools developed; the role of the environment and animals in the prevalence, diversity, and quantity, and survival of pathogens in crops will be determined by specific analytic and field approaches; the specific pathogens in the food systems and the effect of reduction strategies will be measured.

Performance Measure	2007 Actual	2008 Actual	2009 Actual	2010 Target	2011 Target
					• Develop five innovative processing intervention strategies to assure and maintain postharvest safety and quality. The effect of food processing technologies on overall reduction of pathogens at the end of production is estimated through various studies/ approaches.

Goal 5: Improve the Nation's Nutrition and Health.

Objective 5.2: Promote Healthier Eating Habits and Lifestyles.

- Outcome: Eating habits more consistent with the *Dietary Guidelines for Americans.*
- Perf. Measure #1: Monitor food consumption/intake patterns of Americans, including those of different ages, ethnicity, regions, and income levels, and measure nutrients and other beneficial components in the food supply. Provide the information in databases to enable ARS customers to evaluate the healthfulness of the American food supply and the nutrient content of the American diet.
- Perf. Measure #2: Define the role of nutrients, foods, and dietary patterns in growth, maintenance of health, and prevention of obesity and other chronic diseases. Assess bioavailability and health benefits of food components. Conduct research that forms the basis for and evaluates nutrition standards and Federal dietary recommendations.
- Perf. Measure #3: Publish research findings not encompassed under the other performance measures for this objective likely to significantly advance the knowledge of human nutrition, extensively influence other researchers in the same or related field, or yield important new directions for research.
- HPPG Measure: Reduce the number of households with children who experience very low food security.

Key Performance Targets:

Performance Measure	2007 Actual	2008 Actual	2009 Actual	2010 Target	2011 Target
Measure #1					
a. Units.	•Provided updates of the National Nutrient Database. •Provided reports from the "What We Eat in America" survey. •Published findings on requirements/ bioavailability of nutrients and their role in promoting health/ preventing obesity.	•Provided updates of the National Nutrient Database. •Provided reports from the "What We Eat in America" survey. •Published findings on requirements/ bioavailability of nutrients and their role in promoting health/ preventing obesity.	•Provided updates of the National Nutrient Database. •Provided reports from the "What We Eat in America" survey. •Published findings on requirements/ bioavailability of nutrients and their role in promoting health/ preventing obesity.	•Provide updates of the National Nutrient Database. •Provide reports from the "What We Eat in America" survey. •Publish findings on requirements/ bioavailability of nutrients and their role in promoting health/ preventing obesity.	•Provide updates of the National Nutrient Database. •Provide reports from the "What We Eat in America" survey. •Publish findings on requirements/ bioavailability of nutrients and their role in promoting health/ preventing obesity. •Publish findings on individual nutrition intervention strategies.

Performance Measure	2007 Actual	2008 Actual	2009 Actual	2010 Target	2011 Target
	•Published findings on community/individual nutrition intervention strategies.	•Published findings on community/individual nutrition intervention strategies.	•Published findings on individual nutrition intervention strategies.	•Publish findings on individual nutrition intervention strategies.	•Discover barriers and facilitators to follow the *Dietary Guidelines for Americans*.
Measure #2					
a. Units.	•Evaluated dietary patterns useful for preventing obesity. •Conducted research on requirements/ bioavailability of nutrients to define their role in promoting health/preventing obesity. •Examined interaction of dietary intake with genetic predisposition for promoting health. •Released data from dietary supplement database.	•Evaluated dietary patterns useful for preventing obesity. •Conducted research on requirements/ bioavailability of nutrients to define their role in promoting health/preventing obesity. •Examined interaction of dietary intake with genetic predisposition for promoting health. •Released data from dietary supplement database.	•Evaluated dietary patterns useful for preventing obesity. •Conducted research on requirements/ bioavailability of nutrients to define their role in promoting health/preventing obesity. •Examined interaction of dietary intake with genetic predisposition for promoting health. •Released data from dietary supplement database.	•Evaluate dietary patterns useful for preventing obesity. •Conduct research on requirements/ bioavailability of nutrients to define their role in promoting health/preventing obesity. •Examine interaction of dietary intake with genetic predisposition for promoting health. •Release data from dietary supplement database.	•Evaluate dietary patterns useful for preventing obesity. •Conduct research on requirements/ bioavailability of nutrients to define their role in promoting health/preventing obesity. •Examine interaction of dietary intake with genetic predisposition for promoting health. •Release data from dietary supplement database. • Identify genes or genetic markers among ethnic groups that respond to diet and physical activity. •Provide enhanced nutritional information to consumers through Nutrition.gov.

Performance Measure	2007 Actual	2008 Actual	2009 Actual	2010 Target	2011 Target
Measure #3					
a. Units.	•Published research on normal growth and aging processes that affect nutrient requirements. •Conducted research on metabolism that impacts nutritional status. •Conducted research on immunology that interacts with nutritional status. •Published research on development of analytical methods for food composition and metabolism of nutrients.	•Published research on normal growth and aging processes that affect nutrient requirements. •Conducted research on metabolism that impacts nutritional status. •Conducted research on immunology that interacts with nutritional status. •Published research on development of analytical methods for food composition and metabolism of nutrients.	•Published research on normal growth and aging processes that affect nutrient requirements. •Conducted research on metabolism that impacts nutritional status. •Conducted research on immunology that interacts with nutritional status. •Published research on development of analytical methods for food composition and metabolism of nutrients.	•Publish research on normal growth and aging processes that affect nutrient requirements. •Conduct research on metabolism that impacts nutritional status. •Conduct research on immunology that interacts with nutritional status. •Publish research on development of analytical methods for food composition and metabolism of nutrients.	•Publish research on normal growth and aging processes that affect nutrient requirements. •Conduct research on metabolism that impacts nutritional status. •Conduct research on immunology that interacts with nutritional status. •Publish research on development of analytical methods for food composition and metabolism of nutrients.

AGRICULTURAL RESEARCH SERVICE
Department Strategic Goal Funding Matrix
Salaries & Expenses

Department Strategic Goal: Assist Rural Communities To Create Prosperity So They Are Self-Sustaining, Repopulating and Economically Thriving.

PROGRAM	PROGRAM ITEMS	Dollars in thousands FY 2009	FY 2010	FY 2011
	Direct Costs:			
	Research and Development	117,759	119,960	125,582
	Indirect Costs:			
	Program and Administrative/Financial Management	9,932	10,118	10,593
	USDA Central Charges	2,973	3,028	3,170
	Task Force, Advisory Committees, and Other Support Costs	179	183	191
	Total Indirect Cost	13,084	13,329	13,954
	Total Costs	**130,843**	**133,289**	**139,536**
	FTEs	1,023	1,041	1,066
	Performance Measures:			
	Create new scientific knowledge and innovative technologies that represent scientific/technological advancements or breakthroughs applicable to bioenergy.			
	Develop cost effective, functional industrial and consumer products, including higher quality, healthy foods, that satisfy consumer demand in the United States and abroad.			
	The services and collections of the National Agricultural Library continue to meet the needs of its customers.			
	The National Agricultural Library and partners implement the National Digital Library for Agriculture.			
	Priority buildings/facilities projects are completed on schedule and within budget.			
Repair and Maintenance		17,491	17,503	17,503
	FTEs	0	0	0
Collaborative Resesarch Program		2,913	0	0
	FTEs	0	0	0
Construction/Miscellaneous Fees		120	0	0
	FTEs	0	0	0
Research Facilities Assessment		0	0	1,750
	FTEs	0	0	0
	Total Costs for Department Strategic Goal (program, direct, indirect)	**151,367**	**150,792**	**158,789**
	FTEs	**1,023**	**1,041**	**1,066**

Department Strategic Goal: Ensure Our National Forests & Private Working Lands Are Conserved, Restored and Made More Resilient to Climate Change, While Managing Our Water Resources.

PROGRAM	PROGRAM ITEMS	Dollars in thousands FY 2009	FY 2010	FY 2011
	Direct Costs:			
	Research and Development	202,625	210,239	212,348
	Indirect Costs:			
	Program and Administrative/Financial Management	17,090	17,733	17,910
	USDA Central Charges	5,115	5,307	5,361
	Task Force, Advisory Committees, and Other Support Costs	309	320	323
	Total Indirect Cost	22,514	23,360	23,594
	Total Costs for Department Strategic Goal (program, direct, indirect)	**225,139**	**233,599**	**235,942**
	FTEs	1,935	1,950	1,973

Performance Measures:

Develop technology and practices to reduce the delivery of agricultural pollutants by water on farms and ranches and quantify the environmental benefit of conservation practices in watersheds.

Develop practices and technologies to enhance soil resources and reduce emissions of particulate matter and gases from crop production lands, agricultural processing operations, and animal production systems.

Improved management practices and technologies for managing pasture and range lands to improve economic profitability and enhance environmental values.

Department Strategic Goal: Help America Promote Agricultural Production and Biotechnology Exports As America Works To Increase Food Security.

PROGRAM	PROGRAM ITEMS	Dollars in thousands FY 2009	FY 2010	FY 2011
	Direct Costs:			
	Research and Development	516,362	538,125	539,113
	Indirect Costs:			
	Program and Administrative/Financial Management	43,552	45,388	45,470
	USDA Central Charges	13,035	13,585	13,610
	Task Force, Advisory Committees, and Other Support Costs	786	819	821
	Total Indirect Cost	57,373	59,792	59,901
	Total Costs for Department Strategic Goal (program, direct, indirect)	**573,735**	**597,917**	**599,014**
	FTEs	3,889	3,938	3,966

Performance Measures:

Develop systems and technologies to reduce production costs and risks while enhancing natural resource quality.

Develop new technologies, tools, and information contributing to improved precision animal production systems to meet current and future food animal production needs of diversified consumers, while simultaneously minimizing the environmental footprint of production systems and enhancing animal well-being.

Expand, maintain, and protect our genetic resource base, increase our knowledge of genes, genomes, and biological processes, and provide economically and environmentally sound technologies that will improve the production efficiency, health, and value of the Nation's crops.

Provide scientific information to protect animals, humans, and property from the negative effects of pests, infectious diseases, and other disease-causing entities.

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.

Develop control strategies based on fundamental and applied research to reduce losses caused by plant diseases, nematodes, arthropods, and weeds that are effective and affordable while maintaining environmental quality. Develop technically and economically feasible alternatives to preplant and postharvest use of methyl bromide.

Provide needed scientific information and technology that is environmentally acceptable to producers of agriculturally important plants in support of exclusion, early detection and eradication, control, and monitoring of invasive arthropods, weeds, nematodes, and pathogens; enhanced sustainability; and restoration of affected areas. Conduct biologically-based integrated and area-wide management of key invasive species.

Provide environmentally sound fundamental and applied scientific information and technologies to action agencies, producers, exporters, and importers of commercially important plant and animal products in support of exclusion, early detection, and eradication of quarantine pests and pathogens that can impede foreign trade.

Department Strategic Goal: Ensure That All Of America's Children Have Access to Safe, Nutritious, and Balanced Meals.

PROGRAM	PROGRAM ITEMS	Dollars in thousands FY 2009	FY 2010	FY 2011
	Direct Costs:			
	Research and Development	171,904	177,599	185,332
	Indirect Costs:			
	Program and Administrative/Financial Management	14,499	14,979	15,631
	USDA Central Charges	4,339	4,483	4,679
	Task Force, Advisory Committees, and Other Support Costs	262	270	282
	Total Indirect Cost	19,100	19,732	20,592
	Total Costs for Department Strategic Goal (program, direct, indirect)	**191,004**	**197,331**	**205,924**
	FTEs	1,065	1,066	1,072

Performance Measures:

Develop new technologies that assist ARS customers in detecting, identifying, and controlling foodborne diseases that affect human health.

Monitor food consumption/intake patterns of Americans, including those of different ages, ethnicity, regions, and income levels, and measure nutrients and other beneficial components in the food supply. Provide the information in databases to enable ARS customers to evaluate the healthfulness of the American food supply and the nutrient content of the American diet.

Define the role of nutrients, foods, and dietary patterns in growth, maintenance of health, and prevention of obesity and other chronic diseases. Assess bioavailability and health benefits of food components. Conduct research that forms the basis for and evaluates nutrition standards and Federal dietary recommendations.

Publish research findings not encompassed under the other performance measures for this objective likely to significantly advance the knowledge of human nutrition, extensively influence other researchers in the same or related field, or yield important new directions for research.

Total Costs for all Department Strategic Goals (program, direct, indirect)		**1,141,245**	**1,179,639**	**1,199,669**
	FTEs	7,912	7,995	8,077
Total Costs for Buildings and Facilities		**46,752**	**70,873**	**-75,500**
	FTEs	0	0	0
Total Costs for American Reinvestment and Recovery Act		**176,000**	**0**	**0**
	FTEs	0	0	0
Grand Total Costs for all Department Strategic Goals		**1,363,997**	**1,250,512**	**1,124,169**
	FTEs	**7,912**	**7,995**	**8,077**