FY 2008 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 in part "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 the Federal Agricultural Improvement and Reform Act of 1996.

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' major research programs address the following USDA Strategic Goals:

- Goal 2: Enhance the Competitiveness and Sustainability of Rural and Farm Economies -- ARS programs include New Products/Product Quality/Value Added; Livestock Production; and Crop Production.

- Goal 4: Enhance Protection and Safety of the Nation's Agriculture and Food Supply -- ARS programs include Food Safety; Livestock Protection; and Crop Protection.

- Goal 5: Improve the Nation's Nutrition and Health -- ARS programs include Human Nutrition.

- Goal 6: Protect and Enhance the Nation's Natural Resource Base and Environment -- ARS programs include Environmental Stewardship.

- Management Initiative: Electronic Government -- ARS programs include Library and Information Services under the National Agricultural Library.

In addition, ARS has Management Initiatives which apply to providing and maintaining laboratories and facilities for its scientists and staff.

ARS' programs are more fully described under the "Status of Program" section on page 10g-1.

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 22 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, 2006, there were 7,140 full-time employees and 2,133 other than full-time employees. Of the total, 517 full-time employees and 28 other than full-time employees worked in offices located in the Washington, D.C. metropolitan area.

OIG Reports (Completed)

#02001-02-Hy, 8/10/06, ARS Accountability Over the Former Soviet Union Scientific Cooperation Program.

#50601-2-Hy, 9/12/05, Review of USDA Agencies Management of Workers Compensation Costs.

OIG Reports (In Progress)

OIG/EPA Chesapeake Bay Restoration Agricultural Impact on Water Quality.

GAO Reports (Completed)

#06-15, 10/21/05, Results Oriented Government: Practices that Can Help Enhance and Sustain Collaboration Among Federal Agencies.

#06-96, 10/28/05, Chesapeake Bay Programs: Improved Strategies Are Needed to Better Assess, Report, and Manage Restoration Progress.

#06-127R, 10/7/05, Childhood Obesity: Most Experts Identified Physical Activity and the Use of Best Practices as Key to Successful Programs.

#06-132, 12/19/05, Plum Island Animal Disease Center: DHS and USDA are Successfully Coordinating Current Work, but Long-Term Plans Are Being Assessed.

#06-161, 1/17/06, Combating Terrorism: Methods for Determining Federal Funding Related to Combating Terrorism Activities.

#06-324, 3/31/06, Human Capital: Agencies Are Using Buyouts and Early Outs with Increasing Frequency to Help Reshape their Workforces.

#06-353, 4/21/06, Invasive Forest Pests: Lessons Learned from Three Recent Infestations May Aid in Managing Future Efforts.

#06-624, 6/15/06, Wood Utilization: Federal Research and Development.

#06-713, 5/11/06, Continuity of Operations, Alternate Facilities, and Telework.

#06-831, 8/14/06, Enterprise Architecture: Leadership Remains Key to Establishing and Leveraging Architectures for Organizational Transformation.

#06-832, 8/17/06, The Federal Workforce: Additional Insights Could Enhance Agency Efforts Related to Hispanic Representation.

#05-869, 9/30/05, Livestock Grazing: Federal Expenditures and Receipts Vary, Depending on the Agency and the Purpose of the Fee Charged.

GAO Reports (In Progress)

#320396, Pandemic Influenza.

#320406, Department of State/Bureau of International Narcotics and Law Enforcement Aviation Programs.

#360601, Peak Oil Production.

#360700, USDA Pandemic Flu Preparedness.

#360751, Availability of Federally Funded Climate Change Data.

#460579, Issues Associated With the Expansion of Biosafety Level 3 and 4 Laboratories.

AGRICULTURAL RESEARCH SERVICE

Available Funds and Staff Years
2006 Actual and Estimated 2007 and 2008

Item	Actual 2006		Estimated 2007		Estimated 2008	
	Amount	Staff Years	Amount	Staff Years	Amount	Staff Years
Salaries and Expenses	1,135,004,000	8,390	1,057,603,000	8,273	1,021,517,000	8,023
Transfer from Office of the Secretary, (World Hunger Organization Support)	350,000	--	--	--	--	--
Rescission	-11,353,540	--	--	--	--	--
Miscellaneous Fees	2,904,619	--	--	--	--	--
Hurricane Katrina Emergency Appropriations	10,000,000	--	--	--	--	--
Pathogenic Avian Influenza Emergency Appropriation	7,000,000	--	--	--	--	--
Transfer from Office of Congressional Relations	128,000	--	--	--	--	--
Transfer from United States Department of State	6,000,000	--	--	--	--	--
Total, Salaries and Expenses	1,150,033,079	8,390	1,057,603,000	8,273	1,021,517,000	8,023
Buildings & Facilities	131,195,000	--	140,000,000	--	16,000,000	--
Rescission	-1,311,950	--	--	--	--	--
Hurricane Katrina Emergency Appropriations	29,200,000	--	--	--	--	--
Unobligated Balance Permanently Reduced	--	--	--	--	-16,000,000	--
Total, Buildings & Facilities	159,083,050	--	140,000,000	--	0	--
Total, Agricultural Research Service	1,309,116,129	8,390	1,197,603,000	8,273	1,021,517,000	8,023
Obligations under other USDA appropriations:						
Agricultural Marketing Service	289,946	1	292,000	1	292,000	1
Animal & Plant Health Inspection Service	19,569,619	41	19,684,000	41	19,684,000	41
Cooperative State Research, Education, & Extension Service	9,934,034	21	9,992,000	21	9,992,000	21
Departmental Administration	308,162	1	310,000	1	310,000	1
Economic Research Service	2,866,658	6	2,883,000	6	2,883,000	6
Farm Service Agency	598,099	1	602,000	1	602,000	1
Food & Nutrition Service	1,209,104	3	1,216,000	3	1,216,000	3
Food Safety & Inspection Service	2,292,444	5	2,306,000	5	2,306,000	5
Foreign Agricultural Service	454,390	1	457,000	1	457,000	1

Available Funds and Staff Years
2006 Actual and Estimated 2007 and 2008

Item	Actual 2006		Estimated 2007		Estimated 2008	
	Amount	Staff Years	Amount	Staff Years	Amount	Staff Years
Obligations under other USDA appropriations: (continued)						
Forest Service	1,907,241	4	1,918,000	4	1,918,000	4
Hazardous Waste	3,770,000	8	3,792,000	8	3,792,000	8
National Agricultural Statistics Service	3,908,517	8	3,931,000	8	3,931,000	8
Natural Resources Conservation Service	2,785,495	6	2,802,000	6	2,802,000	6
Office of Inspector General	114,095	--	115,000	--	115,000	--
Organization for Economic Risk Management Agency	390,637	1	393,000	1	393,000	1
Misc., Other USDA Funds	294,613	--	296,000	--	296,000	--
Total, Other USDA Appropriations	50,693,054	107	50,989,000	107	50,989,000	107
Total, Agriculture Appropriations	1,359,809,183	8,497	1,248,592,000	8,380	1,072,506,000	8,130
Other Federal Funds:						
Agency for International Development	1,698,992	4	1,709,000	4	1,709,000	4
Department of Defense	3,895,120	8	3,918,000	8	3,918,000	8
Department of Energy	888,430	2	894,000	2	894,000	2
Department of Health & Human Services	4,493,426	9	4,520,000	9	4,520,000	9
Department of Homeland Security	5,000,539	11	5,030,000	11	5,030,000	11
Department of the Interior	1,066,007	2	1,072,000	2	1,072,000	2
Department of Treasury	300,000	1	302,000	1	302,000	1
Environmental Protection Agency	1,106,504	2	1,113,000	2	1,113,000	2
National Aeronautics & Space Administration	919,769	2	925,000	2	925,000	2
National Oceanic & Atmospheric Administration	175,156	1	176,000	1	176,000	1
Misc., Other Federal Funds	237,082	--	238,000	--	238,000	--
Total, Other Federal Funds	19,781,025	42	19,897,000	42	19,897,000	42

Available Funds and Staff Years
2006 Actual and Estimated 2007 and 2008

Item	Actual 2006		Estimated 2007		Estimated 2008	
	Amount	Staff Years	Amount	Staff Years	Amount	Staff Years
Non-Federal Funds:						
Arkansas, State of	164,044	1	165,000	1	165,000	1
Binational Agricultural Research & Development (BARD)	505,076	2	508,000	2	508,000	2
California, State of	742,191	2	747,000	2	747,000	2
California, University of	876,063	2	881,000	2	881,000	2
Cotton Incorporated	1,055,585	2	1,062,000	2	1,062,000	2
Florida, State of	473,425	2	476,000	2	476,000	2
Georgia, University of	255,359	1	257,001	1	257,001	1
Hispanic Serving Institutions Nation Program (HSINP)	1,396,320	3	1,404,000	3	1,404,000	3
Illinois, University of	159,088	1	160,000	1	160,000	1
Institute for Technological International Food Policy Research Institute	599,862	2	603,000	2	603,000	2
International Institute of Iowa State University	554,954	2	558,000	2	558,000	2
Maryland, University of	145,655	--	147,000	--	147,000	--
Michigan State University	205,850	1	207,000	1	207,000	1
Minnesota, University of	298,197	1	300,000	1	300,000	1
Mississippi, State of	139,584	--	140,000	--	140,000	--
North Central Soybean Research Program	154,710	1	156,000	1	156,000	1
Ohio State University	140,231	--	141,000	--	141,000	--
Oklahoma State University	132,604	--	133,000	--	133,000	--
Pennington Biomedical Research Center	100,728	--	101,000	--	101,000	--
Sale of Animals & Personal Property (Proceeds)	1,029,976	2	1,036,000	2	1,036,000	2
Southern Florida Water Management District	240,935	1	242,000	1	242,000	1
Texas A&M University	225,571	1	227,000	1	227,000	1
Texas, State of	145,738	1	147,000	1	147,000	1
United Soybean Board	3,434,731	7	3,455,000	7	3,455,000	7
Misc., Non-Federal Funds	3,143,662	--	3,161,000	--	3,161,000	--
Total, Non-Federal Funds	16,320,139	35	16,414,001	35	16,414,001	35
Miscellaneous Contributed Funds:	16,369,237	93	16,500,000	93	16,500,000	93
Total, Agricultural Research Service	1,412,279,584	8,667	1,301,403,001	8,550	1,125,317,001	8,300

AGRICULTURAL RESEARCH SERVICE

Permanent Positions by Grade and Staff Year Summary
2006 Actual and Estimated 2007 and 2008

	2006			2007			2008		
Grade	Head-quarters	Field	Total	Head-quarters	Field	Total	Head-quarters	Field	Total
ES-00	13	25	38	11	26	37	11	26	37
GS/GM-15	45	539	584	36	548	584	36	548	584
GS/GM-14	51	606	657	49	574	623	49	574	623
GS/GM-13	130	717	847	145	711	856	145	711	856
GS-12	99	585	684	103	715	818	103	715	818
GS-11	31	631	662	25	621	646	25	621	646
GS-10	2	6	8	0	4	4	0	4	4
GS-9	38	1,044	1,082	40	987	1,027	40	987	1,027
GS-8	14	414	428	17	487	504	17	487	504
GS-7	50	760	810	61	732	793	61	732	793
GS-6	29	496	525	33	509	542	33	509	542
GS-5	23	298	321	16	298	314	16	298	314
GS-4	6	59	65	12	56	68	12	56	68
GS-3	0	19	19	0	11	11	0	11	11
GS-2	1	13	14	0	5	5	0	5	5
GS-1	0	1	1	0	0	0	0	0	0
Other Graded Positions.....	9	42	51	8	41	49	8	41	49
Ungraded Positions.....	0	523	523	0	480	480	0	480	480
Total Permanent Positions.....	541	6,778	7,319	556	6,805	7,361	556	6,805	7,361
Unfilled Positions end-of-year..	-24	-155	-179	-39	-182	-221	-39	-182	-221
Total Permanent Full-Time Employment, end-of-year..	517	6,623	7,140	517	6,623	7,140	517	6,623	7,140
Staff Year Estimate.....	521	8,146	8,667	514	8,036	8,550	499	7,801	8,300

AGRICULTURAL RESEARCH SERVICE

Size, Composition and Cost of Motor Vehicle Fleet

The 2008 Budget Estimates proposes the purchase of 46 replacement passenger motor vehicles. The vehicle acquisition will replace existing vehicles, without additions to the fleet. Due to the timing of vehicle sales due to the exchange/sale process, the agency hopes to decrease the overall fleet number.

Agricultural Research Service' (ARS) passenger motor vehicle fleet is used primarily by professional research investigators and technical personnel. When conducting daily work, research personnel travel to individual farms, ranches, commercial firms, State agricultural experiment stations, research fields, etc. Most are in geographically rural locations. Since a high degree of mobility is vital for this type of work, using common carriers is not feasible. Comparative studies of cost requirements when using private and Government vehicles show that it is more economical to use Government vehicles than it is to reimburse employees for using their privately-owned vehicles.

It is ARS' policy to pool motor vehicle use for different types of use to keep the number of vehicles to a minimum and reduce overall operation and maintenance costs. ARS requires quarterly vehicle operational reports and makes periodic surveys to determine the extent that vehicles are being used and their condition.

The ARS fleet is assigned throughout our locations nation-wide and is used in conjunction with research studies and technical assistance. Vehicle replacement is based on funding priority, program management, vehicle mileage and age. Federal regulations establish the minimum replacement standards that allow replacing passenger vehicles when the vehicle is 3 years of age or 60,000 miles. ARS retains vehicles that meet the minimum replacement standards if the vehicle can be operated without excessive maintenance costs or substantial reduction in resale value. All vehicles proposed for replacement have mileage greater than 60,000 and are more than 6 years in age.

ARS has decreased the number of passenger vehicles (sedans and station wagons), because of the need for multi-purpose vehicles that are available to transport passengers as well as move research equipment. ARS primary fleet consists of light duty trucks which are not classified as passenger vehicles. The apparent increase in the number for trucks is due to the different classifications standards used by the General Services Administration (GSA) and the reporting criteria used by the Federal Asset Statistical Tool (FAST). Agencies use GSA standards when requesting replacement vehicles. These are the same as industry standards for classifying vehicles. These standards include: passenger vehicles (sedans and station wagons), light duty trucks 4x2 and 4x4 (gross vehicle weight of 4,000 to 19,999 lbs), medium duty trucks (21,000 to 35,000 lbs) and heavy duty vehicles (over 35,000 lbs.) FAST classifies light duty trucks as trucks 8,500 and under; medium duty trucks with a weigh of 8,501 to 16,000 lbs; and heavy duty trucks are 16,001 and over. The difference in the classification reflects changes in the composition of these trucks, and not of the overall numbers.

To ensure consistency with the FAST inventory, the FAST standards were used for this report. In the past inventory numbers were based on GSA standards. ARS expects to maintain a fleet of approximately 3,600 operational vehicles. The report also includes approximately 49 GSA leased vehicles, consisting of primarily light duty trucks.

Due to a significant departmental system failure between the Purchase Card Management System-Fleet Module and PMIS/PROP, fleet data was estimated based on prior history and a 6% inflation rate. The PCMS-Fleet system did not accurately feed fleet operational costs during FY2006 for charges incurred using the Voyager fleet card. This card electronically captures 80% of all of the Agency's fleet costs.

Size, compositions and cost of agency motor vehicle fleet as of September 30, 2006 are as follows:

AGENCY MOTOR VEHICLE FLEET REPORT

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

Agency: Agricultural Research Service

Fiscal Year	Number of Vehicles by Type *							Total Vehicles	Annual Operating Costs
	Sedans & Station Wagons	Light Trucks 4X2	Light Trucks 4X4	Medium Trucks	Heavy Trucks	Am-bulances	Buses		
FY 2005	326	1,873	755	460	105	0	2	3,521	$3,399
Change **	-17	-364	98	391	7	0	-1	114	$204
FY 2006	309	1,509	853	851	112	0	1	3,635	$3,603
Change**	-10	-37	-8	131	-72	1	1	6	$216
FY2007	299	1472	845	982	40	1	2	3641	$3,819
Change**	-2	-10	-13	-8	2	0	0	-31	-$244
FY2008	297	1462	832	974	42	1	2	3610	$3,575

NOTES:
* These numbers include vehicles that are owned by the agency and leased from GSA.
** All significant year-to-year changes should be discussed in a narrative provided separately.

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 to enable the Agricultural Research Service to perform agricultural research and demonstration relating to production, utilization, marketing, and distribution (not otherwise provided for); home economics or nutrition and consumer use including the acquisition, preservation, and dissemination of agricultural information; 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, $1,021,517,000: *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: *Provided further*, That the Secretary, through the Agricultural Research Service, or successor, is authorized to lease approximately 40 acres of land at the Central Plains Experiment Station, Nunn, Colorado, to the Board of Governors of the Colorado State University System, for its Shortgrass Steppe Biological Field Station, on such terms and conditions as the Secretary deems in the public interest: *Provided further*, That the Secretary understands that it is the intent of the University to construct research and educational buildings on the subject acreage and to conduct agricultural research and educational activities in these buildings: *Provided further*, That as consideration for a lease, the Secretary may accept the benefits of mutual cooperative research to be conducted by the Colorado State University and the Government at the Shortgrass Steppe Biological Field Station: *Provided further*, That the term of any lease shall be for no more than 20 years, but a lease may be renewed at the option of the Secretary on such terms and conditions as the Secretary deems in the public interest: *Provided further*, That the Agricultural Research Service may convey all rights and title of the United States, to a parcel of land comprising 19 acres, more or less, located in Section 2, Township 18 North, Range 14 East in Oktibbeha County, Mississippi, originally conveyed by the Board of Trustees of the Institution of Higher Learning of the State of Mississippi, and described in instruments recorded in Deed Book 306 at pages 553-554, Deed Book 319 at page 219, and Deed Book 33 at page 115, of the public land records of Oktibbeha County, Mississippi, including facilities, and fixed equipment, to the Mississippi State University, Starkville, Mississippi, in their "as is" condition, when vacated by the Agricultural Research Service: *Provided further*, That none of the funds appropriated under this heading shall be available to carry out research related to the production, processing, or marketing of tobacco or tobacco products.

AGRICULTURAL RESEARCH SERVICE

SALARIES AND EXPENSES - CURRENT LAW

Estimate, 2007	$1,057,603,000
Budget Estimate, 2008	1,021,517,000
Decrease in Appropriations	-36,086,000

Summary of Increases and Deceases - Current Law
(On basis of appropriation)

SUMMARY OF INCREASES AND DECREASES - CURRENT LAW
(On basis of appropriation)

Item of Change	2007 Estimated	Pay Costs	Program Increases	Program Decreases	2008 Estimated
Product Quality/Value Added	$99,249,000	+$2,195,000	+$10,954,000	-$7,808,000	$104,590,000
Livestock Production	80,139,000	+1,172,000	+3,811,000	-14,396,000	70,726,000
Crop Production	189,545,000	+4,011,000	+13,500,000	-38,154,000	168,902,000
Food Safety	98,482,000	+1,948,000	+3,491,000	-723,000	103,198,000
Livestock Protection	77,819,000	+1,300,000	+33,240,000	-4,088,000	108,271,000
Crop Protection	185,239,000	+3,529,000	+12,204,000	-27,248,000	173,724,000
Human Nutrition	79,794,000	+689,000	+6,950,000	-3,297,000	84,136,000
Environmental Stewardship	210,198,000	+4,781,000	--	-43,971,000	171,008,000
National Agricultural Library	20,531,000	+353,000	+500,000	-1,029,000	20,355,000
Funds Included for Homeland Sec	[33,495,000]	--	[+57,229,000]	--	[90,724,000]
Repair and Maintenance	16,607,000	--	--	--	16,607,000
Total Available	1,057,603,000	+19,978,000	+84,650,000	-140,714,000	1,021,517,000

NOTE: 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)

	2006 Actual		2007 Estimated		Increase	2008 Estimated	
	Amount	Staff Years	Amount	Staff Years	or Decrease	Amount	Staff Years
Product Quality/Value Added....	$105,261,440	953	$99,249,000	939	+5,341,000	$104,590,000	953
Livestock Production.....	84,994,348	508	80,139,000	501	-9,413,000	70,726,000	458
Crop Production.....	201,065,382	1,738	189,545,000	1,714	-20,643,000	168,902,000	1,610
Food Safety.....	104,449,720	845	98,482,000	833	+4,716,000	103,198,000	845
Livestock Protection.....	82,533,258	564	77,819,000	557	+30,452,000	108,271,000	674
Crop Protection.....	196,808,389	1,533	185,239,000	1,512	-11,515,000	173,724,000	1,447
Human Nutrition.....	84,629,372	299	79,794,000	294	+4,342,000	84,136,000	301
Environmental Stewardship.....	222,936,026	2,076	210,198,000	2,049	-39,190,000	171,008,000	1,863
National Agricultural Library.....	23,771,106	151	20,531,000	151	-176,000	20,355,000	149
Repair and Maintenance.....	17,643,170	--	16,607,000	--	--	16,607,000	--
Collaborative Research Program (AID).....	6,000,000	--	--	--	--	--	--
Miscellaneous Fees.....	4,847,002	--	--	--	--	--	--
Funds Included for Homeland Security.....	[35,587,000]	--	[33,495,000]	--	[57,229,000]	[90,724,000]	--
Unobligated Balance.....	15,093,866 a/	--	--	--	--	--	--
Total Available or Estimated..	1,150,033,079	8,667	1,057,603,000	8,550	-36,086,000	1,021,517,000	8,300
Miscellaneous Fees.....	-2,904,619	--	--	--			
Emergency Supplemental for Avian Influenza.....	-7,000,000	--	--	--			
Emergency Supplemental for Hurricane Relief.....	-10,000,000	--	--	--			
Transfer from Office of the Secretary.....	-350,000	--	--	--			
Transfer from Office of Congressional Relations	-128,000	--	--	--			
Transfer from Agency for International Development (AID).....	-6,000,000	--	--	--			
Rescission/Across the Board Reduction.....	11,353,540	--	--	--			
Total Appropriated.....	1,135,004,000	8,667	1,057,603,000	8,550			

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

a/ Includes the unobligated balances of $2,906,837 for S&E funds and $12,187,029 for Avian Influenza/Hurricane Relief Supplementals.

Justification for Increases and Decreases

Note: The FY 2008 Budget includes the termination/reduction of more than 200 research projects totaling over $140 million. These terminations/reductions will impact approximately 600 employees, and will severely reduce the operational capability of various locations and laboratories to carry out their research. An estimated $24 million will also be required to finance either employee relocations or severance pay costs should the termination/reduction of these projects occur.

As of October 1, 2007, the funding associated with those programs to be terminated/reduced in FY 2008 will no longer exist. To cover the employee costs (relocation or severance) and real property disposition associated with these terminated/reduced programs, will require reprogramming authorities from continuing or new programs, and/or supplemental appropriations in FY 2008.

New Products/Product Quality/Value Added

ARS is recommending under this program area a net increase of $5,341,000. This includes pay costs, and new expanded research initiatives totaling $13,149,000, and proposed terminations/reductions totaling $7,808,000.

a) An increase of $2,195,000 for FY 2008 Pay Costs.

Need for Change

Funding for pay costs is critical to support an effective and responsive USDA in-house research capability. Absorption of these legally mandated increases reduces funds available for maintaining and conducting viable research programs.

b) An increase of $10,954,000 for Renewable Energy Resources.

Need for Change

America's dependence on foreign oil for energy and chemical substances is a threat to the Nation's security and adversely affects the country's economy. Imports account for 64 percent of the Nation's oil consumption, forcing consumers to spend nearly $900 million a day, or more than $300 billion annually, on oil from foreign sources. The war on terrorism has renewed interest in reducing energy imports and diversifying the energy sector. Moreover, unlike fuel from fossil feedstocks, plant-based bioenergy does not contribute to the net production of carbon dioxide, a major greenhouse gas.

A viable biofuel industry based upon grain feedstocks exists today in the United States. However, conversion of grain to liquid fuel can only offset a very small percentage of our energy demands. To significantly offset petroleum, the biofuel industry requires new and expanded feedstocks. Cellulose, the major component of plant cell walls, is the most abundant biological material, and is an attractive feedstock source. Sources of cellulose include agricultural residues (i.e., corn stover, wheat straw, sugarcane bagasse), herbaceous energy crops (i.e., switch grass, Bermuda grass, miscanthus), animal wastes, and wood and forest residues.

Though plant cell walls are an abundant renewable resource, their use for biofuels is constrained by technical barriers. A major barrier is that cell walls are difficult to decompose and to convert into fermentable sugars. Overcoming that constraint requires a better understanding of plant cell walls, how they are formed, and how their components can be separated. The major components of plant cell walls are cellulosics and lignin. Lignin, a polymer that provides rigidity to the cell wall, is an effective physical barrier that inhibits cell wall decomposition and its usefulness as an energy feedstock. Additionally, the inherent microcrystalline nature of cellulosic materials makes their conversion to biofuels inefficient. Biotechnology provides the potential to overcome these challenges through manipulation of plant cell wall characteristics and through development of more effective conversion organisms.

For the potential of bioenergy to be realized, large quantities of renewable biomass feedstock, with the appropriate quality, must be sustainably produced and delivered to biorefineries for conversion to energy and coproducts. Energy crop production must preserve natural resources, ecological systems, and the environment. A key element is efficient and effective use and management of water. Because energy crop and plant residue biomass tends to be widely distributed and to be of low density, harvesting and delivery of biomass presents technological challenges. Technology must be developed for energy efficient and environmentally sustainable harvest, handling, storage, and delivery of very large quantities of cellulosic biomass.

Outcomes

The proposed research will enable the production of new, large volume commodities from agricultural materials, increase farm income, and create significant opportunities for business and employment growth in rural America. The research will reduce U.S. dependence on foreign sources of energy; reduce pollution emissions; maintain sustainable, agricultural production systems; and make the U.S. economy more sustainable by replacing non-renewable fossil based raw materials with renewable biobased raw materials.

The proposed research supports Performance Measure: 2.1.1--Develop cost effective and functional industrial and consumer products from agricultural and forestry resources; and Performance Measure 2.1.3--Improve efficiency and reduce cost for conversion of biomass to energy.

Means to Achieve Change

- Modification of Plant Cell Walls in Energy Crops and Crop Residues for Efficient Conversion to Biofuels ($5,399,000). ARS will:
  - -- Identify all genes involved in plant cell wall synthesis and structure that can be exploited to enhance the efficiency of renewable energy crop production.
  - -- Determine the genetic characteristics of grains and grass cell walls that maximize ethanol production.
  - -- Develop transformation systems for dedicated energy crops and crop residues.
  - -- Identify and cultivate developmental trigger mechanisms, i.e., promoters to control cell wall manipulations in the plant life cycle.
  - -- Modify lignin content and structure in cell walls of targeted plants.
  - -- Enhance conversion processes of cellulosic cell wall components through biotechnological approaches.
  - -- Identify and develop strategies to overcome in situ inhibitors of cellulosic conversions.

- Sustainable Energy Crop Production ($3,333,000). ARS will:
  - -- Identify plants with energy crop potential, determine regions in which these plants are adapted, and develop water efficient, sustainable practices for their production.
  - -- Identify and develop energy crop production, harvest, and residue removal systems that maintain or enhance soil, water, and air quality.

- Conversion of Biomass to Fuel ($2,222,000). ARS will:
  - -- Use biotechnological approaches to enhance processes for converting cellulosic components of plant cell walls to liquid fuels.
  - -- Develop energy efficient, economical, and scalable gasification and pyrolysis technology suitable for on-farm and local community conversion of agricultural materials into fuel.

c) A decrease of $7,808,000 from ongoing research projects to support higher priority food and agriculture research initiatives.

Need for Change

The FY 2008 Budget for new products, product quality, and value added research will address such important national goals as reducing our reliance on foreign oil and improving energy stocks. To finance this higher priority research and support the Administration's ongoing efforts to reduce the Federal deficit, the Department is proposing to discontinue funding for a number of projects added by Congress that, while important, do not have the same nationwide impact.

Means to Achieve Change

FL, Winter Haven, Citrus Waste Utilization/Grapefruit Juice/Drug Interaction
GA, Dawson, Peanut Production
IL, Peoria, Biotechnology Research and Development Corporation/Crop Production and Food Processing
KS, Manhattan, Grain Research
MD, Beltsville, Foundry Sand By-Products
MS, Stoneville, Cotton Ginning
NC, Raleigh, Food Fermentation Research
ND, Fargo, Wheat Quality Research
NM, Las Cruces, Cotton Ginning Research
OH, Wooster, Wheat Quality Research
PA, Wyndmoor, Hides and Leather Research
SC, Clemson, Cotton Quality
TX, Lubbock, Cotton Production and Processing
WA, Pullman, Western Wheat Quality Laboratory/Wheat Quality Research

Livestock Production

ARS is recommending under this program area a net decrease of $9,413,000. This includes pay costs, and new expanded research initiatives totaling $4,983,000, and proposed terminations/reductions totaling $14,396,000.

a) An increase of $1,172,000 for FY 2008 Pay Costs.

Need for Change

Funding for pay costs is critical to support an effective and responsive USDA in-house research capability. Absorption of these legally mandated increases reduces funds available for maintaining and conducting viable research programs.

b) An increase of $3,811,000 in support of Functional Genomics to Improve Nutrient Utilization in Beef Cattle Production.

Need for Change

One of today's major industry challenges is to increase competitiveness in international markets for beef through improved animal efficiency while simultaneously reducing the negative environmental impacts of production. Provision of feed nutrients makes up 65 to 75 percent of the total cost of beef production with less than 20 percent of the consumed nutrients converted into desired products. The incomplete and inefficient utilization of nutrients has adverse effects on both the efficiency of production and degradation of environmental resources. Long term sustainability of livestock production systems requires minimizing the impact of production on the environment (i.e., minimizing the "environmental footprint" of livestock production). Additionally, with an increased demand for

alternative uses of feed energy inputs traditionally used for livestock feeding, primarily from the rapidly growing biofuels sector of the U.S. economy, it is imperative that solutions be developed to address these inefficiencies for the continued economic competitiveness of America's livestock industry.

The productivity of the American beef industry is largely the result of long term genetic improvement research conducted over the past 75 years coupled with the successful application of quantitative genetic theory to commercial populations of cattle. While significant genetic changes have been achieved in beef output measures such as rate of growth and meat yield and quality, virtually no change has been achieved in traits directly impacting the cost of production such as efficiency of energy utilization and reproductive rate. Information needed to facilitate direct selection to modify feed consumption, feed efficiency, and nutrient requirements in all classes of cattle is either severely limited or non-existent.

Until the past decade it was almost impossible to study the underlying genes responsible for variations in economically important traits contributing to the efficiency of nutrient use. The relatively new field of molecular genetics and genomics has opened up expanded horizons to meet this challenge. The field of genomics has developed rapidly over the past 20 years, largely in response to the perceived potential of improving human health envisioned by the National Institutes of Health's Human Genome Project. Animal genomics efforts have closely paralleled the developments of the human genome project. In the past three years, USDA-ARS has successfully worked with other Federal partners through an Interagency Working Group on Domestic Animal Genomics to facilitate the development of a public domain high resolution DNA sequence of the bovine (cattle) genome. This sequence assembly, complemented with a host of other new genetic tools being developed from it, has finally placed the cattle research community into a position to begin to fully understand important genes, their biological functions and regulation in the animal's biological system, and how they interact with changes in the production environment.

It is imperative that U.S. research efforts in bovine genomics be expanded to capitalize upon the significant investment that has resulted in today's availability of the genome sequence and associated tools and reagents. The future of the U.S. livestock industries are directly dependent on the ability to be competitive in evolving global markets, which is in turn directly dependent on continued enhancement of the efficiency and quality of production, reduced environmental impact, and safety of production systems.

Outcomes

An initial application of the bovine genome sequence and related research tools and reagents will focus on the identification of genes influencing feed efficiency, and the determination of their physiological roles in the utilization of various nutrients through "functional genomics" approaches. This information will be used to enhance the efficiency of nutrient utilization in cattle. In addition to direct study of the cattle genome, the microorganisms present in the ruminant digestive system will be evaluated to identify microbes with the genetic ability to digest the degradable portion of the cell walls of forage and grain inputs.

The proposed research will result in new systems for obtaining animal phenotype (physical characteristic) information on the complex traits contributing to efficiency of nutrient use, under both intensively and extensively managed production systems. The long term approach taken to these problems will be in a "systems biology" context, i.e., understanding the function of important cattle and gut microbial genes and their regulation in the animal. By exploring the expression of genes underlying efficiency of nutrient use under differing environments and stages of the animal life cycle, precise matching of optimal animal genotypes to differing production environments will be made possible.

While the primary outcome of this research will be cattle germplasm that is more nutritionally efficient and environmentally friendly, a number of other outcomes are expected that will allow for improved

precision of animal management and well-being. Examples include various pharmaceutical agents, feed additives, and probiotics for improving utilization of specific feedstuffs across the different stages of beef production. Collectively, the outcomes of this work will lead to a reduction in production and environmental costs for all sectors of the beef industry from cow-calf to stocker and feedlot cattle finishing.

The proposed research supports Performance Measure 2.2.3 -- Identify genes responsible for economically important traits, including animal product quality, efficiency of nutrient utilization, and environmental adaptability.

Means to Achieve Change

- Identify and Characterize the Function of Genes that Affect the Efficiency of Nutrient Use in Cattle ($2,690,000). ARS will:
  - -- Develop novel and efficient methods for measuring phenotypes for maintenance energy requirements, efficiency of nutrient use, nutrient partitioning (i.e., for maintenance, growth, and reproduction), and environmental footprints.
  - -- Identify genes influencing efficiency of nutrient use and related traits.
  - -- Elucidate interactions among genes influencing these traits across differing production systems and environments using proteomic and metabolomic approaches.

- Use Meta-Genomics to Improve the Efficiency of Nutrient Use and Environmental Sustainability of Cattle ($750,000). ARS will:
  - -- Initiate genome sequencing of pooled DNA from the microbes of the gastrointestinal tract of cattle (i.e., meta-genomics).
  - -- Assess species diversity and identify novel genes in order to more fully understand the dynamics of the rumen and other gut microbial environments.
  - -- Use genomic information to identify interventions for controlling metabolic disorders and harmful food safety pathogens, and improve the digestive efficiency thereby reducing the environmental impacts.

- Identify and Characterize Genes that Affect Disease Resistance, Reproduction, Animal Well-Being and Other Economically Important Production Traits in Food Animals ($371,000). ARS will:
  - -- Identify genes and gene products that influence disease resistance, reproduction, animal well-being, and other economically important traits.

c) A decrease of $14,396,000 from ongoing research projects to support higher priority food and agriculture research initiatives.

Need for Change

The FY 2008 Budget for livestock production research will address such important national goals as reducing beef cattle production and environmental costs, and increasing the competitiveness of U.S. beef in international markets. To finance this higher priority research and support the Administration's ongoing efforts to reduce the Federal deficit, the Department is proposing to discontinue funding for a number of projects added by Congress that, while important, do not have the same nationwide impact.

Means to Achieve Change

AK, Fairbanks, Seafood Waste
AR, Pine Buff, Aquaculture Fisheries Center
AR, Stuttgart, Aquaculture Init, Harbor Branch Oceanographic Institute/Harry Dupree National Aquaculture Research Center
HI, Hilo, Tropical Aquaculture Feeds (Oceanic Institute)
ID, Aberdeen, Aquaculture Research/Rainbow Trout

MD, Beltsville, Bovine Genetics
ME, Orono, National Cold Water Marine Aquaculture
MS, Mississippi State, Broiler Production in the Mid-South
WV, Leetown, Aquaculture Init for Mid-Atlantic Highlands/National Center for Cool & Cold Water Aquaculture/ National Center for Cool & Cold Water Aquaculture – (Freshwater Inst) Aquaculture Systems/Trout Genome Mapping

Crop Production

ARS is recommending under the program area a net decrease of $20,643,000. This includes pay costs, and new and expanded research initiatives totaling $17,511,000, and proposed terminations/reductions totaling $38,154,000.

a) An increase of $4,011,000 for FY 2008 Pay Costs.

Need for Change

Funding for pay costs is critical to support an effective and responsive USDA in-house research capability. Absorption of these legally mandated increases reduces funds available for maintaining and conducting viable research programs.

b) An increase of $3,000,000 for research in support of the Plant Introduction Stations and the National Plant Germplasm System.

Need for Change

To ensure that genes are available for research and breeding, ARS must continue to acquire and conserve germplasm, develop new methods for documenting favorable traits in the collections, ensure that the germplasm is distributed where and when it is needed, and safeguard these collections for future generations. Four regional Plant Introduction Stations and more than 20 active germplasm conservation sites make up the United States' National Plant Germplasm System (NPGS). The NPGS, managed and jointly funded by ARS in partnership with agricultural experiment stations and land-grant universities, conserves the plants and seeds of nearly 10,000 species that are needed to develop new and improved varieties that support national and global food security. The NPGS exists to preserve germplasm of plants that might otherwise be lost or unavailable to breeders and other researchers. NPGS sites maintain more than 450,000 accessions (i.e., strains, varieties, etc.) that include seeds and microbes. These collections contain sources of resistance to pests, diseases, and weather damage along with valuable genes to improve the quantity and quality of food, feed, fiber, and ornamental crops.

Outcomes

The proposed increase will enable ARS to expand activities to identify, acquire, and secure unprotected genetic resources. 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. Crop improvement for pest protection, 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 breeders and other users.

The proposed research supports Performance Measure 2.2.8--Maintain, characterize, and use genetic resources to optimize, safeguard, and enhance genetic diversity and promote viable and vigorous plant production systems.

Means to Achieve Change

- Enhance the Capacity to Conserve a Broad Diversity of Genetic Resources ($2,500,000). ARS will:
  - -- Expand the collection of agriculturally important accessions, and fill critical gaps in collection coverage especially for under represented crops and genetic/genomic stocks.
  - -- Conduct timely infrastructure maintenance and upgrades at the Plant Introduction Stations to ensure secure, long term genetic resource conservation.
  - -- Develop new regeneration protocols and techniques to increase collection quality and ensure genetic integrity.

- Make Germplasm and Associated Information More Readily Available ($500,000). ARS will:
  - -- Expand documentation of the genetic variations within the collection.
  - -- Develop new tools and information resources to enable users to better access and leverage emerging information for breeding and genetic selection.
  - -- Facilitate linkages and interoperability among databases that store divergent types of data.

c) An increase of $8,000,000 for Applied Crop Genomics.

Need for Change

Genetic resources are the foundation of our Nation's agricultural future. The NPGS, managed by ARS, contains the country's seed and germplasm collections -- invaluable sources of genes for new and improved traits. There is an essential need to enhance the accessibility and usefulness of the collections for crop improvement.

The United States is making major investments in sequencing crop genomes (i.e., rice, corn, soybean). The power of all this new DNA information can now be harnessed to benefit U.S. producers, processors, seed companies, retailers, and consumers. Priority agricultural traits, such as drought tolerance, nutritional value, and productivity involve variations and combinations of many genes. To accelerate progress in crop improvement, more effective means for identifying these gene combinations in the collections are needed. Development of an interface between DNA sequence information and observable traits in the plant collections is required. Just as an index to a book serves as a rapid means for locating and using specific text, an index is needed for the national plant collections to enable rapid identification of accessions with genes for important traits. The technology exists to create such an index, through the use of SNP (single nucleotide polymorphisms) molecular markers.

There are three aspects to creating an index for the national germplasm collections. The first is to develop a comprehensive phenotypic (trait) evaluation of the germplasm in the collections (i.e., to categorize economically important traits, such as disease or pest resistance, productivity, weather tolerance, and product quality). The second is to develop a set of DNA-based markers sufficient to define the genetic uniqueness of the entries in the collections. The third step, which is the critical one that makes the information useful, is to use bioinformatics and computational tools to associate the markers with the phenotypes. This information will enable plant breeders to use the markers like the index of a book, that is, to identify what germplasm to include in a breeding program without having to identify it by trial and error. Once the index is functional, new technologies and methods are needed to accelerate breeding and biotechnology to make the process as effective and precise as possible.

Outcomes

The proposed research will provide tools to identify germplasm samples with important traits, such as resistance to emerging diseases. It will provide definitive knowledge on the range of crop genetic variability and what improvements are possible using these traits. In addition, the research will enhance biosecurity for U.S. agriculture by enabling accelerated responses to pathogen introductions, whether deliberate or inadvertent. The research will also enable ARS to develop and thoroughly

characterize "next-generation" technologies for the genetic improvement of crops, without selectable marker traits such as antibiotic resistance, using only natural constituents of plants. Benefits of the genetic resource index and the new "enabling technologies" will include new crop varieties with enhanced pest and disease resistance, improved product quality, reduced use of pesticides and fertilizers, and greater productivity in unfavorable environments.

The proposed research supports Performance Measure 2.2.7 -- Identify genes responsible for plant product quality and resistance to disease, pests, and weather losses and; Performance Measure 2.2.8 -- Maintain, characterize, and use genetic resources to optimize, safeguard, and enhance genetic diversity and promote viable and vigorous plant productions systems.

Means to Achieve Change

- Conduct Comprehensive Trait ("Phenotype") Evaluation of the National Plant Germplasm Collection ($3,000,000). ARS will:
  - -- Develop the initial components for an integrated, high volume phenotyping pipeline to mine the invaluable, underutilized diversity in the NPGS.
  - -- Develop a pilot project that will facilitate the phenotyping 60 crop collections (with 500 or more accessions available in each collection).
  - -- Grow out germplasm collections in large scale field or greenhouse trials.
  - -- Evaluate for diverse traits in collaboration with crop breeders, pathologists, agronomists, chemists, nutritionists, and agricultural engineers.

- DNA Profile ("Genotype") the National Plant Germplasm Collection ($3,000,000). ARS will:
  - -- Develop the initial components for an integrated, high volume genotyping pipeline focused on identifying SNPs.
  - -- Develop a framework for obtaining the DNA fingerprints of 60 crop collections.

- Construct New Visualization and Bioinformatic Tools to Facilitate Access and Use of the Germplasm Collections ($1,000,000). ARS will:
  - -- Provide high efficiency molecular data retrieval service for the Germplasm Resources Information Network (GRIN).

- Develop Technologies for Genomic Modification ($1,000,000). ARS will:
  - -- Develop and evaluate: methods that modify gene activities within crop species (including novel gene silencing methods to prevent their expression); methods to rearrange existing (native) DNA sequences within plant cells; and plant derived promoters and selectable markers.

d) An increase of $2,000,000 for research in support of Specialty Crop Genetic Resources.

Need for Change

Production of specialty and organic crops, among the fastest growing sectors of U.S. retail food sales, is closely linked to the future profitability of U.S. agriculture. These crops--generally fruits, vegetables, and ornamentals--are also vital for the optimal diet, health and well-being of U.S. consumers. Today, U.S. specialty crop producers and processors need more genetic resources and new varieties to face challenges from foreign competition, rapidly shifting market factors, environmental regulations, consumer concerns about health and product quality, and escalating production costs. The production cost increases result from more expensive labor (this sector employs most of the Nation's agricultural labor), inputs (i.e., energy, fertilizer, growth media, water), transportation, land, and from losses due to biotic (i.e., diseases, pests, weeds) and abiotic (i.e., drought, floods, temperature extremes) stresses. Consumers need more nutrient dense and convenient fruits and vegetables as an alternative to unbalanced meals and unhealthy diets which often lead to obesity and/or nutritional deficiencies.

Meeting these challenges demands new, more efficient, specialty and organic crop production systems, and superior crop varieties. The demands placed on the national specialty and organic crop production system can only be met by genetic improvement technologies that optimally harness the inherent genetic potential of plants. To do so, more rapid and efficient methods for identifying useful properties of genes and genomes, and for manipulating genetic and genomic material and information are required. These new methods will include more effective breeding and propagation strategies and more comprehensive knowledge of specialty crop genomic structures.

As compared to some major field crops, most specialty crops have not benefited from new technologies developed in genetic improvement and genomics. Research is needed for: developing powerful new genetic/genomic tools and approaches for establishing and expanding specialty crop genebank collections; expanding publicly available information about the valuable traits in the genebank collections (including materials attractive for organic production); "mining" new genetic diversity from underexploited genetic resources; incorporating those new genes into breeding stock; and breeding superior new specialty crop cultivars more rapidly for conventional and organic producers. ARS is uniquely suited for leading this research because of its integrated combination of unrivalled specialty crop germplasm collections; its strong highly productive, long established specialty crop breeding programs; its high quality specialty crop genetics and genomic research; and its national role in conducting food composition and human nutrition research.

Outcomes

The proposed increase will expand ARS' capacity to manage, analyze, and improve genetic resources and cultivars of specialty and organic crops for the benefit of U.S. seed companies, producers, processors, and consumers. As a result, ARS will breed highly diverse ornamentals; more "nutrient-dense" fruits and vegetables for the fresh, organic, and lightly processed food markets; and specialty crops that are more water efficient, higher quality, and which will constitute key elements of new agricultural production systems. These advances will increase specialty and organic crop production efficiency, protect the environment and the natural resource base, meet increasing consumer demands for healthier food and novel ornamentals, and enhance producer and processor profitability. From a scientific standpoint, the genetic control for host-plant resistance to biotic and abiotic stresses will be elucidated; novel genetic sources of that resistance will be incorporated from genebank accessions into commercially competitive varieties; and new cultivars with greater consumer appeal, increased digestibility, enhanced phytonutrient content, and overall superior health benefits will be bred. Methods to deploy and accelerate delivery of new technologies via root stocks and grafting will be expanded. New genomics technologies will result in reduced dependence on synthetic pesticides by improving biological resistance, and greater stability in production levels due to an enhanced ability to better tolerate climatic changes such as drought, heat, cold, flooding, and salinity. There will also be reduced inputs of energy, fertilizers, and irrigation water; and improved competitiveness of the U.S. specialty and organic crop industry through increased crop productivity, production efficiency, and product quality.

The proposed research supports Performance Measure 2.2.7 -- Identify genes responsible for plant product quality and resistance to disease, pests, and weather losses; and Performance Measure 2.2.8 -- Maintain, characterize, and use genetic resources to optimize, safeguard, and enhance genetic diversity and promote viable and vigorous plant production systems.

Means to Achieve Change

- Expand Specialty Crop Genetic Resources ($1,000,000).
  - -- Identify genetic variations in specialty crop germplasm collections that can be exploited for genetic enhancement and development of new products. ARS will:
    - o Conduct systematic trait analyses to discover genes for product quality, nutritional value, and resistance to diseases, pests, and weather damage.
    - o Employ molecular marker analysis to genetically profile specialty crop germplasm collections.

- Construct new bioinformatic tools and genome database resources for the Germplasm Resources Information Network that provide easy-to-use public interfaces to specialty crop information.

- Improve Specialty Crop Genetic Resources ($1,000,000).
  -- Develop a more comprehensive understanding of the genes and gene networks that control fruit rootstock-scion interaction. Apply that knowledge to develop new rootstocks for improved specialty fruit production. ARS will:
    - Enlist genomics, proteomics, and other new technologies to discover the physiological genetic mechanisms whereby rootstocks impart desirable characteristics to fruit varieties.
    - Strengthen ARS rootstock breeding programs in pomes, stone fruits, nuts, citrus, and grapes by developing and implementing new genomic tools, such as molecular markers, which accelerate the selection of horticulturally superior rootstocks.
    - Evaluate the utility of rootstocks as vehicles for economic and rapid new propagation research technologies for fruit tree scions (i.e., branches, buds).

  -- Initiate or expand applied genetic/genomics and breeding programs that enhance nutrient quality in specialty vegetable and fruit crops. ARS will:
    - Characterize beneficial compounds in fruits that confer human health benefits, and apply that knowledge to breed specialty fruits with enhanced nutritional value that can be more readily digested and assimilated by infants, children, and elderly Americans.
    - Breed vegetable varieties which are more appealing to consumers because they contain fewer bitter flavors and seeds, enhanced color and shape, and are adapted for easy consumer preparation and convenient consumption.

e) An increase of $500,000 for research on Organic Production Systems.

Need for Change

American consumer demand for certified organic products has driven annual sales growth by more than 20 percent since 1990, with sales reaching $12.4 billion in 2003. Annual growth through 2010 is estimated at 9 to 16 percent. Farmers in 49 States have 2.2 million acres of cropland and pasture in organic production. However, the United States imports ten times the amount of organic products it produces.

Government efforts to support organics have focused on developing national organic certification standards to assure consistent product quality and streamline commerce. Some States have begun subsidizing conversion to organic production as a way to preserve natural resources.

As prices for conventional products fall, an increasing number of U.S. producers are entering organic farming to capture high value markets, boost farm income, lower production costs, and conserve natural resources. Organic production systems rely on practices that replace the use of synthetic pesticides and fertilizers.

More basic and applied research is required to increase the productivity and profitability of existing organic production systems, and to address growing consumer preferences. A well planned research strategy must be implemented to realize the full potential of organic farming systems. ARS has an established a nationwide network of research facilities that are addressing different aspects of organic food, feed, and fiber production that reach across all U.S. production regions and consumer markets.

Outcomes

As a result of the research, producers of organic products will be able to reduce their costs, and increase their productivity, profitability, and market share. Conventional producers will also be able to apply the research results in reducing their production costs.

The proposed research supports Performance Measure 2.2.5 -- Provide producers with scientific information and technology that increase production efficiency, safeguard the environment, and reduce production risks and product losses.

Means to Achieve Change

- Develop Whole System Strategies for Highly Productive Organic Crops that Meet Consumer Preferences ($500,000). ARS will:
  - -- Develop market driven production strategies for Northeastern organic producers to satisfy urban population center demand for specialty organic products.
  - -- Develop efficient soil fertility management strategies for Western cool season vegetable production so organic producers can compete with conventional farms for leased land.
  - -- Identify mechanisms that can be used to increase organic crop productivity in diverse U.S. production systems through improved plant growth efficiency.

f) A decrease of $38,154,000 from ongoing research projects to support higher priority food and agriculture research initiatives.

Need for Change

The FY 2008 Budget for crop production research will address such important national goals as the development of new and improved crop varieties with enhanced pest and disease resistance. To finance this higher priority research and support the Administration's ongoing efforts to reduce the Federal deficit, the Department is proposing to discontinue funding for a number of projects added by Congress that, while important, do not have the same nationwide impact.

Means to Achieve Change

AK, Palmer (Fairbanks Worksite), Arctic Germplasm
AR, Little Rock, Sorghum Research
AR, Stuttgart, Rice Research
CA, Salinas, Greenhouse Lettuce Germplasm
CA, Shafter, Cotton Pathology Research
DC, Washington, U.S. National Arboretum (Germplasm/Ornamental Horticulture)
FL, Canal Point, Sugarcane Variety Research
GA, Byron, Pecan Scab Research
GA, Dawson, Peanut Production/Peanut Research
HI, Hilo, /U.S. Pacific Basin Agriculture Research Center
IA, Ames, Corn Germplasm/Michael Fields Agricultural Institute
ID, Aberdeen, Potato Breeding Research
IL, Urbana, Chloroplast Genetic Engineering Research
IN, West Lafayette, Genomics of Pest Resistance in Wheat
KS, Manhattan, Karnal Bunt/Sorghum Research
LA, Baton Rouge, Honey Bee Research (Varroa Mites)
MN, St. Paul, Wild Rice
MO, Columbia, Soybean Genetics
MS, Mississippi State, Corn Germplasm
MS, Oxford, Natural Products
MS, Poplarville, Appalachian Horticulture Research (Univ. of Tennessee/Tennessee State)/Small Fruits Research/Ornamental/Horticulture Research/Woody Genomics and Breeding for the Southeast
MS, Stoneville, Alternative Crops and Value Added Products/Biotechnology Research to Improve Crops and Livestock/Cropping Systems Research (Univ. of Tennessee/West Tennessee Ag. Experiment Station)/Soybean Research in the South
NC, Raleigh, Soybean and Nitrogen Fixation
ND, Fargo, Cereal Crops
NY, Geneva, Grape Genetics/Grape Rootstock

NY, Ithaca, Ornamental and Horticulture Research (Pear Thrips, Univ. of Vermont)
OH, Wooster, Greenhouse Hydroponics Research
OK, Lane, South Central Agricultural Research Laboratory
OK, Stillwater, Sorghum Research
OR, Corvallis, Hops Research/Viticulture
SC, Florence, Cotton Genetics Research
TX, Bushland, Sorghum Research
TX, College Station, Aerial Application Research/Southwest Pecan Research
TX, Lubbock, Sorghum Research/Sorghum Cold Tolerance/U.S. Plant Stress & Water Conservation Lab
TX, Weslaco, Bee Research
UT, Logan, Bee Research
WA, Prosser, Potato Research Enhancement
WA, Wenatchee, Tree Fruit Quality Research
WI, Madison, Cereal Crops Research/Vegetable Crops Research
WV, Kearneysville, Appalachian Fruit Research Station
Various Locations, National Germplasm Resources Program
Headquarters, Viticulture

Food Safety

ARS is recommending under this program area a net increase of $4,716,000. This includes pay costs, and new expanded research initiatives totaling $5,439,000, and proposed terminations/reductions totaling $723,000.

a) An increase of $1,948,000 for FY 2008 Pay Costs.

Need for Change

Funding for pay costs is critical to support an effective and responsive USDA in-house research capability. Absorption of these legally mandated increases reduces funds available for maintaining and conducting viable research programs.

b) An increase of $1,683,000 for Food Safety Research.

Need for Change

USDA has recently begun to implement strategic action plans to further ensure the safety of the Nation's food supply. Even the intentional introduction of a small number of contaminants into some part of the food chain could seriously affect public confidence. Apart from the impact on health and safety, bioterrorism against the food supply would also directly harm the Nation's economy, since U.S. agriculture employs nearly one quarter of the Nation's workforce and annually contributes over one trillion dollars to the gross domestic product. The food production industry annually exceeds $200 billion, with exports exceeding $55 billion.

In order to implement a comprehensive food security strategy, regulatory agencies have highlighted several areas of critical importance broadly encompassing detection, prevention, response, and recovery. These areas include: assessing the vulnerability of the food supply to attack; establishing methods to protect food that has been identified at-risk; strengthening and expanding laboratory preparedness; and increasing research to develop rapid and confirmatory laboratory methods to analyze suspected foods for select agents and toxins.

Consumption of contaminated foods, including those containing antibiotic resistant microorganisms, can lead to serious illnesses and death, as well as threaten the competitiveness of U.S. agriculture. The food supply is particularly vulnerable to contamination that could lead to a loss of public confidence. Exposure of animals, seafood, and produce (via animal manure) to pathogens during production and

transportation can be a significant source of contamination, as well as during slaughter and processing. Pathogens may develop resistance to antimicrobials from traditional methods used for pathogen control. Early recognition of changes in the microbiological flora, particularly the epizootic pathogens in food producing animals, will help assure that the food supply remains safe and secure.

Slaughter and processing, post processing and particularly inspection technology are key links in the food safety chain. Improved understanding of foodborne pathogen transmission, and control steps in prevention, sanitation, and processing technology are necessary elements to prevent direct contamination, cross contamination, and widespread foodborne illnesses. Postharvest operations provide an opportunity to remove or inactivate pathogens and their toxins previously acquired during the preharvest stage. Improved methods for sampling, detection, and quantitation of pathogens must be developed. Successful technologies and strategies to eliminate, reduce, or suppress human pathogens are needed for commodities associated with foodborne illnesses, or those at risk of becoming vehicles for human pathogens. Developing novel technologies for minimal processing must be based on understanding the effects on the microbial ecology of a food product, since inadequate suppression of spoilage can create an opportunity for human pathogen growth and toxin production. The factors must be identified and those that contribute to the spread and cross contamination of pathogens must be eliminated. Rapid and accurate methods of detection and quantitative measurement of pathogens are needed to provide the necessary data to carry out risk assessment, develop and validate predictive microbial models, and identify where interventions are most critically needed. This information will assist in the implementation of HACCP programs by the Food Safety and Inspection Service (FSIS) for regulated industries. Two ARS proposed research areas -- validation of tests in food matrices and PCR-based tests for pathogens -- directly support and address the needs of FSIS. The validation of these tests will enable quick identification of pathogens and contaminants.

Outcomes

The proposed research supports Performance Measure 4.1.1--Develop new on-farm preharvest systems, practices, and products to reduce pathogen and toxin contamination of animal- and plant-derived foods; and Performance Measure 4.1.2--Develop and transfer to Federal agencies and the private sector systems that rapidly and accurately detect, identify, and differentiate the most critical and economically important foodborne microbial pathogens.

Means to Achieve Change

- Use Genomics to Analyze Microbial Communities and Better Understand the Dynamics of the Gut Environment of Food Producing Animals in Order to Elucidate the Means for Improved Control of Food Pathogens in the Preharvest Stage ($900,000). ARS will:
  - -- Initiate whole genome sequencing of pooled DNA gut contents of specific segments of the gastrointestinal tract of cattle, swine, and poultry.
  - -- Assess species diversity and identify novel genes (recently termed "meta-genomics") in order to more fully understand the dynamics of the rumen and other gut microbial environments.
  - -- Use genomic information to identify interventions for controlling pathogens.

- Develop Detection and Processing Intervention Systems for Chemical or Biological Contamination of Liquid Egg Products ($433,000). ARS will:
  - -- Develop systems to detect potential chemical or biological contamination of liquid egg products.
  - -- Develop innovative processing intervention strategies to assure safety and maintain quality.

- Identify Toxic Chemical Residues and Heavy Metals that Are A Security Risk ($350,000). ARS will:
  - -- Develop methods that can be used in foods that will enable the rapid detection of chemical contamination.

c) An increase of $1,808,000 in support of Collaboration for Animal Health and Food Safety Epidemiology (CAHFSE).

Need for Change

Reducing the incidence of foodborne illnesses and deaths, and the occurrence of antimicrobial resistant bacteria associated with animal- based food products is critically important. The production of safe foods necessitates the reduction/elimination of harmful bacteria all along the food chain starting on the farm with food animal and poultry production. These harmful bacteria (pathogens) may be zoonotic, i.e., have the ability to cause morbidity and mortality in animals and humans, and they may possess genetic characteristics which can be transferred to other bacteria which may transform their antibiotic resistance and/ or virulence.

The CAHFSE brings together ARS with FSIS and the Animal and Plant Health Inspection Service (APHIS) to examine the relationship of on-farm practices and on-farm levels of contamination of poultry and food animals to that found later following slaughter and processing. ARS is the lead USDA coordinator for CAHFSE. APHIS has responsibility for the on-farm components of CAHFSE. They are responsible for identifying participating farms, for collecting samples for laboratory analysis, and for correlating laboratory findings with on farm production practices. ARS coordinates the receipt and data base maintenance of samples from APHIS from the farm environment. The samples are cultured and analyzed to determine the prevalence of selected pathogens and their antimicrobial resistance. FSIS has responsibility for the slaughter plant components of CAHFSE. They sample the appropriate animals/birds representing the participating farms as well as the environment in the slaughter establishments. The research findings of CAHFSE will help us better understand the epidemiology of Salmonella, particularly in the preharvest phase, and the antibiotic resistance, including multidrug resistance, which is associated with this pathogen.

Outcomes

The proposed increase will enable the current CAHFSE program to expand to poultry with an emphasis on the epidemiology and control of Salmonella in the broiler breeder, multiplier, and grower flock environments. Data from these CAHFSE epidemiology studies will identify critical areas for further focused studies that will answer questions such as: what are the relationships between pre- and post-harvest microbes/microbial levels and can they be used for developing risk-based inspection; what is the effectiveness of on-farm and in-plant mitigations in limiting the transmission of Salmonella (including multi-drug resistant strains) and other pathogens; do particular Salmonella serotypes or multi-drug resistant organisms carry traits that assist them is surviving and persisting in the production or processing environment; and how does the USDA decide the appropriate course of action to reduce human exposure to antimicrobial resistant bacteria (including multiple drug resistance) while protecting the health and growth of food production animals? The information provided by CAHFSE will both assist the agencies in setting risk-based policies and formulating guidelines for producers and processors, which will mitigate pathogen contamination of animal and poultry-based food products. These data can also be used to guide national policies and trade issues.

The proposed research supports Performance Measure 4.1.1. -- Develop new on-farm preharvest systems, practices, and products to reduce pathogen and toxin contamination of animal- and plant-derived foods.

Means to Achieve Change

- Develop Food Animal Surveillance and Epidemiology Programs, Particularly the CAHFSE, together with Other USDA Agencies to Assure Early Detection of Epizootic Pathogens and Antibiotic Resistance ($1,808,000).

  Poultry.
  ARS will:

- -- Develop coordinated food animal surveillance and epidemiology programs for poultry which will recognize early warning signs of pathogen infection and antibiotic resistance.
- -- Initiate pilot studies in the first year to determine the appropriate type and statistically valid number of samples from various locations which will be needed to understand the ecology and epidemiology of these pathogens in the integrated poultry industry.
- -- Use the sampling protocols established in the pilot studies to carry out epidemiological studies in several locations around the U.S.
- -- Sample and analyze appropriate biological samples to identify relevant pathogens, antibiotic resistance, and virulence capacity.
- -- Establish the prevalence and genetic characterization of Salmonella and Campylobacter at various points during production and processing of broiler chickens, and identify the antimicrobial resistance profile of these human pathogens and the indicator organisms E. coli and *Enterococci.*
- -- Identify and establish the relation between isolates of specific bacterial strains which will enable recognition of clones particularly dangerous to humans which are circulating among the bacterial populations of poultry or other livestock.
- -- Correlate laboratory data with flock information and relevant poultry production practices.

Dairy Animals

ARS will:

- -- Add a fourth herd to the coordinated dairy food animal surveillance and epidemiology program for dairy animals to permit more reliable recognition of early warning systems of pathogen infection.
- -- Obtain, sample, and analyze appropriate biological samples, particularly those of fecal, milk, and environmental origin associated with dairy herds.
- -- Correlate laboratory data with herd information and relevant dairy production practices.

d) A redirection of $11,245,000 from current research projects to support higher priority food safety initiatives.

Need for Change

The agency is recommending a redirection of selected, ongoing research projects and resources to support higher priority research to further ensure the protection and safety of the Nation's food and agriculture system. The following research projects will be reallocated to enhance and strengthen the Department's overall homeland security programs.

Means to Achieve Change

AZ, Phoenix, Aflatoxin in Cotton
IL, Peoria, Crop Production and Food Processing
LA, New Orleans, Phytoestrogen Research
MD, Beltsville, Food Safety for Listeria, E.coli and Other Food Pathogens
MS, Mississippi State, Corn Resistant to Aflatoxin
NE, Clay Center, Food Safety for Listeria, E.coli, and Other Food Pathogens
PA, Wyndmoor, Food Safety and Engineering/Food Safety for Listeria, E.coli and Other Food Pathogens/Salmonella, Listeria, E.coli and Other Food Pathogens
TX, College Station, Food Safety for Listeria, E.coli, and Other Food Pathogens
UT, Logan, Poisonous Plant Research
Headquarters, Center for Food Safety and Post Harvest Technology/Food Safety for Listeria, E.coli and Other Food Pathogens/ Preharvest Control of Aflatoxin

e) A decrease of $723,000 from ongoing research projects to support higher priority food and agriculture research initiatives.

Need for Change

The FY 2008 Budget for food safety research will address such important national goals as protecting the safety of the Nation's food supply, by developing food animal surveillance and epidemiology programs with CAHFSE and other USDA agencies. To finance this higher priority research and support the Administration's ongoing efforts to reduce the Federal deficit, the Department is proposing to discontinue funding for a number of projects added by Congress that, while important, do not have the same nationwide impact.

Means to Achieve Change

CA, Albany, Food Safety for Listeria, Salmonella, and E. coli
LA, New Orleans, Hyperspectral Imaging

Livestock Protection

ARS is recommending under this program area a net increase of $30,452,000. This includes pay costs, and new expanded research initiatives totaling $34,540,000, and proposed terminations/reductions totaling $4,088,000.

a) An increase of $1,300,000 for FY 2008 Pay Costs.

Need for Change

Funding for pay costs is critical to support an effective and responsive USDA in-house research capability. Absorption of these legally mandated increases reduces funds available for maintaining and conducting viable research programs.

b) An increase of $6,148,000 for research on Avian Influenza and Foot-and-Mouth Disease.

Need for Change

Animal health officials define an exotic or foreign animal disease as a transmissible livestock or poultry disease, such as Foot-and-Mouth Disease (FMD) or Avian Influenza (AI), that has a potentially significant health or economic impact. Foreign animal diseases are considered a threat to the United States when they significantly affect human health or animal production, and when there is an appreciable cost associated with disease control and eradication efforts. To protect the long-term health and profitability of U.S. animal agriculture, incursions of a foreign animal disease must be rapidly controlled. In the United States, control usually means animal slaughter and disposal. This option is becoming socially unacceptable. A better understanding of disease epidemiology and control strategies is needed.

There have been ongoing efforts in diagnostic development, and in basic and applied research on FMD and AI. However, much remains to be done in order for the U.S. to reach 2015 surveillance/detection and response/recovery goals, as outlined in a January 2005 Department of Homeland Security report: "A Comprehensive Strategy to Combat Agro-terrorism." ARS plans to increase its efforts in providing diagnostic detection tools that can be more widely used in field situations, increasing its understanding of disease epidemiology (i.e., persistence of infection, spread of virus, routes of transmission), and providing more effective, rapidly deployed countermeasures in the form of vaccines and antivirals.

Outcomes

The proposed increase will enable ARS to better understand and control exotic animal diseases, specifically FMD and AI.

The proposed research supports Performance Measure 4.2.1--Provide scientific information to protect animals from pests, infectious diseases, and other disease-causing entities that affect animal and human health; and Performance Measure 4.2.3 – Develop and transfer tools to the agricultural community, commercial partners, and Federal agencies to control or eradicate domestic and exotic diseases that affect animal and human health.

Means to Achieve Change

Avian Influenza

- Validate Diagnostic Technologies for Both Nucleic Acids and Antibodies ($615,000). ARS will:
  - -- Begin development of improved ELISA-based serological tests.
  - -- Begin development of rapid "pen side" screening tests for routine surveillance.
  - -- Establish methods for rapid identification and characterization of emerging serotypes.
  - -- Sequence viruses and develop specialized bioinformatics technologies.

- Understand Virus Persistence and Transmission in Host Reservoirs ($615,000). ARS will:
  - -- Determine host range, disease transmissibility, and ecological impact (e.g., susceptibility and role of wild waterfowl).

- Develop and Characterize Effective Countermeasures ($1,844,000). ARS will:
  - -- Evaluate methods of mass immunization delivery systems with existing or experimental vaccines.
  - -- Continue development of "ideal" vaccines that are differentiable for diagnosis of infected versus vaccinated animals and which: provide rapid onset of immunity and cross-serotype protection; prevent viral spreading and shedding; minimize need for re-application (i.e., protective after one application); and are compatible with a vaccinate-to-live strategy, economical, easy to manufacture in U.S., deployable within 24 hours, and shelf stable.
  - -- Develop vaccines with cross protection profiles.

Foot-and-Mouth Disease

- Develop Diagnostic Technologies for Both Nucleic Acids and Antibodies ($369,000). ARS will:
  - -- Develop screening tests that can be deployed for routine surveillance (Ag Watch).

- Understand Virus Persistence and Transmission in Host Reservoirs ($861,000). ARS will:
  - -- Determine mechanisms of virus persistence in the host.
  - -- Discover means to break viral persistence through immunological manipulation.

- Develop and Characterize Effective Countermeasures ($1,844,000). ARS will:
  - -- Begin development of mass immunization delivery systems.
  - -- Continue development of "ideal" vaccines that are differentiable for diagnosis of infected versus vaccinated animals and which: provide rapid onset of immunity and cross-serotype protection; prevent viral spreading and shedding; minimize need for re-application (i.e., protective after one application); and are compatible with a vaccinate-to-live strategy, economical, easy to manufacture in the U.S., deployable within 24 hours, and shelf stable.
  - -- Develop immunomodulators that can prevent infection during the window of susceptibility following vaccination.
  - -- Develop vaccines with cross protection profiles.

c) An increase of $9,541,000 for research on Bovine Spongiform Encephalopathy (BSE) and Chronic Wasting Disease (CWD).

Need for Change

Unconventional zoonotic agents, such as BSE, which is the cause of variant Creutzfeldt Jakob Disease (vCJD), results in a severe neurological disease leading to death in humans. BSE is an aberrant prion protein that converts the normal homolog protein in cattle and humans into an abnormal form. No microbiological agent has been identified or determined to be associated with this disease to date. The disease, which is not infectious, is acquired by cattle through the ingestion of prion-contaminated feed. Humans acquire the disease through the ingestion of prion-contaminated specified risk materials (SRMs) from cattle.

The first case of BSE, identified in the U.S. on December 23, 2003, has brought to the forefront the significant gaps in scientific knowledge that will be critical to control and eradicate this animal and human health threat. Although a significant amount of research has been conducted in the last decade in laboratories worldwide, we do not totally understand pathogenesis, tissue distribution, and host range specificity. Also, we have not developed the tools to make a definitive diagnosis in a live animal. These gaps underscore the need for USDA to accelerate its research to protect the U.S. food animal industry and human health, and the Nation's domestic and export trade.

CWD is also caused by an aberrant prion protein; it results in spongiform encephalopathies in deer and elk. Unlike BSE, CWD does not appear to be transmissible to humans, but it is worrisome because it is "infectious" and can be laterally transmitted. The Food and Drug Administration (FDA), the Environmental Protection Agency (EPA), and the Animal and Plant Health Inspection Service (APHIS) have established guidelines and regulations to prevent further infections in deer and elk (farm and/or hunt-killed for food) and contamination of the environment.

The concern over zoonotic diseases has never been greater. Over 75 percent of the serious infectious diseases that have affected humans in the last decade are zoonoses (e.g., BSE and SARS). New emerging animal diseases appear every year, and the impact of these diseases on American agriculture cannot be underestimated. A recent study by Kansas State University has estimated that one BSE case in Washington State cost the Nation's beef export market $3.2 to $4.7 billion.

One of the greatest concerns with BSE and CWD is the inability to predict if, or when, these unconventional pathogens might jump species barriers (so called host-range restrictions), and become more virulent or infectious. With each breach of natural species barrier comes the danger of acquiring new virulence mechanisms, infectivity and transmission, and the ability to evade the host defense mechanisms. The most effective method for protecting people from zoonoses is to control the zoonotic agent directly in the target domestic animal and wildlife populations. ARS plans to align its expertise in prion science, animal infectious diseases, animal immunology, animal genetics, epidemiology, and pathogenesis to develop highly effective tools to detect and prevent future threats from BSE or CWD. A critical step will involve establishing collaborations with European scientists that already have ongoing BSE research programs in order to prevent duplication of efforts, maximize the efficiency of the U.S. research program, and look for opportunities to accelerate the research where feasible.

ARS will conduct controlled animal challenge research and study genetic variations associated with disease susceptibility in cattle, sheep, and wildlife. Also, ARS will develop countermeasures to control and eradicate transmissible spongiform encephalopathy (TSE) agents and genetic-based diagnostic tests to identify TSE susceptible animals.

Outcomes

The goal of the proposed research is to be able to identify and characterize prion strains and understand disease outcomes based on genetic variations. Emphasis will be given to understanding gene function, disease mechanisms, and their associated biological markers, and characterizing pathways that confer tissue tropism and host-range restrictions. Significant effort will be directed to the discovery of sensitive detection methods. The outcomes of the proposed research will include: molecular tools for understanding the ecology of TSE agents; the ability to identify and characterize TSE agents with the potential to jump species barriers; and the discovery of effective countermeasures to control and prevent future TSEs in animals and humans.

A key goal for ARS will be to provide scientific information that will enable action and allow regulatory agencies to develop policies and control programs based on the best available science. ARS will deliver scientific information on infectivity and tissue tropism, determinants of host specificity, mechanisms of prion replication, and strain characterization and associated virulence characteristics. ARS will also discover post- and ante-mortem diagnostics and cost-effective methods of prion inactivation.

The proposed research supports Performance Measure 4.2.1--Provide scientific information to protect animals from pests, infectious diseases, and other disease-causing entities that impact animal and human health; Performance Measure 4.2.2 --Identify, develop, and release to the U.S. agricultural community genetic markers, genetic lines, breeds, or germplasm that result in food animals with improved (either through traditional breeding or biotechnology) pest- and disease-resistance traits; and Performance Measure 4.2.3--Develop and transfer tools to the agricultural community, commercial partners, and Federal agencies to control or eradicate domestic and exotic diseases that affect animal and human health.

Means to Achieve Change

- Implement an Integrated Emerging Zoonotic Research Program (BSE) in Pathogenesis, Diagnostics, and Intervention ($4,841,000). ARS will:
  - -- Provide data for science-based risk assessment of BSE specific risk material categorization.
  - -- Define species susceptibility, host range, and phenotype of BSE and the potential risks of cross-species transmissions.
  - -- Characterize the molecular mechanism of prion replication to provide fundamental biological information on the pathophysiology of BSE and support the development of diagnostic platforms.
  - -- Develop and evaluate processes for prion destruction in meat and bone meal and evaluate the properties of the treated material and its potential for value added applications.
  - -- Evaluate natural products to find a method that can inactivate BSE in the carcass, rendered products, and the environment without the use of harsh chemicals.

- Conduct Controlled Animal Challenge Studies and Identify Genetic Variations Associated with Disease Susceptibility in Cattle, Sheep, and Wildlife ($3,290,000). ARS will:
  - -- Conduct genetic analyses to identify polymorphisms in the coding and non-coding region of targeted animal species associated with phenotypic variances in pathogenesis, tissue tropism, disease transmission, host-range specificity, and clinical disease outcomes.
  - -- In collaboration with the livestock industries, conduct "real world" animal population field trials to identify the genetic variations associated with susceptibility to TSE agents.
  - -- Assess interspecies transmission of TSE agents among livestock and wildlife species to determine parameters associated with the induction of disease.

- Develop Countermeasures to Control and Eradicate TSE Agents ($1,410,000). ARS will:
  - -- Develop detection methods to detect TSE agents at critical points, including all SRMs, the environment, feeds, and susceptible hosts.
  - -- Develop effective and safe inactivation methods to treat SRMs destined for rendering and alternative uses such as biofuels.
  - -- Develop effective inactivation methods to decontaminate the environment.
  - -- Develop genetic-based diagnostic tests to identify TSE susceptible animals.
  - -- Assess the effectiveness of vaccines and drugs in preventing clinical disease in livestock.

d) An increase of $4,987,000 for research on Livestock Immunology and Microbial Genomics to Improve Animal Health.

Need for Change

Diseases of livestock pose the single greatest threat to our Nation's agricultural economy. The animals that are the most susceptible to livestock diseases, and paradoxically for which few effective countermeasures exist, are newborn young animals. Examples include endemic diseases such as Bovine Viral Diarrhea that infect susceptible pregnant cows, resulting in the birth of persistently infected calves that are the source of new infections for our cattle herds nationwide. Porcine Reproductive and Respiratory Syndrome and Post-Weaning Multisystemic Wasting Syndrome are examples of diseases that pose a significant threat to our Nation's pork production. Livestock diseases continue to emerge and expand their host range to adapt to ever changing environmental and management conditions. Zoonotic diseases (diseases that people acquire from animals) are of particular concern to the agricultural sector. Globalization of trade, movement of masses of people and agricultural products, intensive agriculture, limited genetic diversity in farm animals, and changes in farm practices are creating new opportunities for the re-emergence and spread of infectious diseases.

A coordinated national animal health research program integrating core competencies in immunology, infectious diseases, microbial genomics, and epidemiology is needed to discover effective measures to control and eradicate diseases of livestock. Priority diseases include zoonoses that are especially difficult to diagnose and cause substantial morbidity and mortality in neonates, resulting in significant economic costs to producers when they persist or reemerge. Over the years, the USDA has invested significant resources to eradicate endemic diseases such as tuberculosis and brucellosis from livestock populations. The persistence of these zoonotic diseases in wildlife reservoirs poses new challenges. Moreover, some animal pathogens have been identified as having the potential to be used for bioterrorism. Effective countermeasures are therefore needed to eliminate livestock diseases at the most vulnerable points and protect our Nation from these important agricultural and public health threats.

Outcomes

A critical outcome will be to understand the ontogeny of the development of the immune system in neonates. This will enable the discovery of effective immune modulators and vaccines specifically designed to work at the earliest stages of an animal's production cycle. The discovery of effective countermeasures for neonates will help stop the transmission of infectious diseases at the most vulnerable point and improve the survival of neonates on farms where exposure to pathogens is rapidly increasing due to the congregation of large numbers of animals at one site.

Efforts to understand the ontogeny of the immune system will be integrated with research to discover the early events that control the establishment of infections. Most of our current understanding of infectious diseases comes from small animal laboratory models that do not necessarily translate to livestock or wildlife species. A significant outcome of the research will be scientific information derived from studies in relevant target hosts species. Preliminary studies indicate that the host responses that occur in the first months after infection determine the ensuing severity of disease. There are very few published reports of microbial functional genomic analyses for livestock diseases. Understanding the early gene expression patterns of priority pathogens will provide an opportunity to discover the control elements critical for preventing the establishment of infection in neonates. Gene expression that correlates with increased invasion and/or pathogen distribution will form the basis for discovering highly effective biotherapeutics, vaccines, and diagnostics.

The proposed research supports Performance Measure 4.2.1 -- Provide scientific information to protect animals from pests, infectious diseases, and other disease-causing entities that affect animal and human health; and Performance Measure 4.2.3 -- Develop and transfer tools to the agricultural community, commercial partners, and Federal agencies to control or eradicate domestic and exotic diseases that affect animal and human health.

Means to Achieve Change

- Determine the Functionality of the Immune System in Neonates ($2,250,000). ARS will:
  - -- Discover the factors which influence and control the successful development of the immune system in the neonate.
  - -- Identify determinants of diseases in the dam that impact immune responses in the neonate.
  - -- Discover effective biotherapeutics that will increase neonatal resistance to diseases.
  - -- Develop management protocols to improve the resistance of the neonate to infectious diseases.

- Conduct Functional Genomic Analyses of Priority Pathogens of Livestock and Wildlife Species to Advance Vaccine Discovery Research and New Diagnostic Platforms ($1,750,000). ARS will:
  - -- Conduct full genome sequence analyses of priority pathogens that have been phenotyped for variances in pathogenic determinants.
  - -- Discover biological determinants of pathogenicity that modulate neonatal immunity.
  - -- Discover highly effective vaccine platforms specifically designed for neonates.
  - -- Conduct comparative microbial genomic analyses, and identify unique sequences that will lead to highly specific and sensitive diagnostic platforms.

- Implement a Technology Driven Vaccinology Research Program for the Control and Eradication of Biological Threat Agents ($987,000). ARS will:
  - -- Identify interrelationships between innate immunity and adaptive immunity in cattle, swine, and poultry, and research how innate immunity can impact host adaptive immune responses to vaccination or natural infection.
  - -- Develop antigen delivery systems (i.e., expression vectors for various host animal species to be used for emerging diseases) that target immune system compartments (i.e., mucosal, peripheral, reproductive tract, and other sites).
  - -- Develop effective strategies to evaluate the innate immune response in livestock and poultry, including neonatal and embryonic immunity, innate immune cell function, and accessory cell function.

e) An increase of $5,000,000 for research on Genetics of Disease Resistance in Livestock.

Need for Change

The completion of animal genome projects has the potential of enabling a fundamental paradigm shift in biomedical research. Currently, the management and treatment of animal diseases is limited to the use of traditional tools such as conventional vaccines and pharmaceuticals, on-farm biosecurity systems, test and slaughter protocols, and the imposition of trade restrictions. Armed with animal genome sequences and genetic markets that correlate with disease traits, we will be able to identify the genetic variations that control disease outcomes. These new research tools offer unparalleled opportunities for understanding the phenomenon of "disease resistance" and will revolutionize our approaches to vaccine and drug discovery. 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. Our stakeholders have identified the application of animal genomics for animal health as one of the most important strategic priorities looking forward in the next 5 to 10 years. The European Union has already moved forward in building coalitions to capitalize on these new tools. The OIE (World Organization for Animal Health) has identified animal genomics for animal health as a major priority and is sponsoring several initiatives, including an international symposium in 2007 to identify critical needs and opportunities to advance the use of animal genomics to solve problems in animal health.

Missing is an understanding of how the genomes of individual animals contribute to or impede the efficacy of these disease control strategies. Recent efforts to define the entire DNA sequence of animal genomes (i.e., cattle, chicken, and pigs) offers the ability to use these roadmaps to enhance disease resistance and control at both the individual and herd levels. Armed with animal genome sequences,

genetic markers that correlate with functional mutations, and high throughput analysis methods that can simultaneously evaluate thousands of genotypes, we will now be able to link physiological manifestations of the disease state, pathogen-specific virulence, and immune evasion mechanisms with host genetic variation. Simply stated, we will be able to identify the genetic variations that control the host resistance and disease outcome. These new research tools offer unparalleled opportunities for understanding the phenomenon of "disease resistance" that will revolutionize our approaches to animal and human health.

The effect of genetic variation on the response to disease and treatment has been recognized for decades; however, the basis for this heritability of disease resistance in animals is neither fully understood nor efficiently utilized. One reason is that traditional genetic markers alone have provided insufficient tools for the control of complex disease traits. This has been due in part to the scarcity of well defined and disease challenge studies utilizing sufficient large animal populations. Such experiments have proven to be expensive and cost prohibitive.

With the completion of the human genome project, the analysis of the effects of DNA sequence variation has become an increasingly important source of information in human health. For animal health, we have lacked the precise genetic maps that can pinpoint sequence variations associated with diseases or important biological processes. However, the completion of animal genome projects such as the chicken and cattle provide the means to construct high density SNP maps to characterize genetic variation. These variations occur in adequate frequency in animal populations and present powerful tools for use in the identification of genetic variation that directly contributes to a specific trait related to animal health or productivity.

SNPs are found throughout the genome in both protein coding and non-coding regions. Those located in non-coding regions can serve as important guideposts to the actual causal variation. Similarly, SNPs within protein coding sequences (recently termed cSNPs) are of interest because they themselves may have functional significance (i.e., be the cause of a specific observable trait). Thus, as the number of discovered SNPs increases, the ability to identify genetic variation that affects biological function and disease susceptibility will increase dramatically over the next several years.

With an ever increasing world population, the need for animal protein, and the projected continued global competition in animal agriculture, it is imperative that the United States invest in this new field of research. The application of animal genomics into existing and new research initiatives requires a complex infrastructure that will have as its main components sophisticated bioinformatics capacity coupled with the ability to perform state-of-the-art high throughput genomic and proteomic analyses. ARS is in the unique position of having in place the necessary infrastructure and animal disease expertise to implement a fully integrated multidisciplinary research program in genomic-based animal health research.

Outcomes

The goal of the proposed research is to identify and characterize genetic variations that will lead to improved and enhanced countermeasures to control and prevent priority animal diseases. Emphasis will then be given to understanding the genetics that drive good or poor responses to vaccines and biotherapeutics. Importantly, this research will enable us to understand gene function and disease mechanisms and their associated biological markers, characterizing pathways that confer disease resistance, and integrating this information into workable animal production programs. The proposed research will have a wide range of applications, including the selection of animals with disease resistance; manipulation of germplasm to convey specific heritable disease resistant traits in food animals; and the development of genetic-based diagnostics, vaccines, and biotherapeutics designed to convey disease resistance in genetically-defined animal populations.

ARS research in these areas supports Performance Measure 4.2.2 -- Identify, develop, and release to the U.S. agricultural community genetic markers, genetic lines, breeds, or germplasm that result in food animals with improved (either through traditional breeding or biotechnology) pest- and disease-

resistance traits; and Performance Measure 4.2.3 -- Develop and transfer tools to the agricultural community, commercial partners, and Federal agencies to control or eradicate domestic and exotic diseases that affect animal and human health.

Means to Achieve Change

- Identify Functional Genetic Variations that Modulate the Immune Responses of Cattle, Poultry, and Pigs ($2,850,000). ARS will:
  - -- Develop SNP maps that define polymorphisms in genes that are major controllers of the host immune system.
  - -- Identify and characterize functional mutations resulting in altered immune function.
  - -- Determine whether polymorphisms of genes associated with innate immunity increase protective thresholds and enhance the health of animals under intense management systems.
  - -- Use information from comparative microbial genomics studies to identify pathogenic substances that regulate immune responses.

- Determine the Genetic Factors that Control Host-Pathogen Interactions and Disease Outcomes ($1,150,000). ARS will:
  - -- Enhance understanding of the interplay between specific host and pathogen genes and how the variation within these genes leads to phenotypic variation in pathogenesis.
  - -- Define gene expression patterns and regulatory phenomena that affect the level of host resistance.

- Conduct Controlled Animal Challenge Studies and Identify Genetic Variations that Control Host Responses to Vaccines and Biotherapeutics for Priority Pathogens of Cattle, Poultry, and Pigs ($1,000,000). ARS will:
  - -- Conduct genetic analyses to identify markers or causative genetic variations of livestock and poultry associated with phenotypic variances in pathogenesis, tissue tropism, disease transmission, host range specificity, and clinical disease outcomes resulting from exposure to important pathogens.
  - -- Collaborate with the animal health pharmaceutical industry to determine the genetic profiles of "good responders" to vaccines and biotherapeutics in order to achieve a significant increase in herd immunity and protection against priority.

f) An increase of $2,500,000 for Research Which Supports APHIS' Mission in Responding to Disease Threats.

Need for Change

A variety of different risk assessments have repeatedly shown that FMD, Classical Swine Fever (CSF), and Rift Valley Fever (RVF) are some of the most serious animal disease threats to U.S. agriculture. APHIS was requested better tools be developed to respond to these disease threats. Rapid advances in immunology, molecular biology, microbiology, and disease pathogenesis present significant opportunities to develop new approaches to protecting American animal agriculture. An investment in basic research in animal diseases and disease resistance can enhance the development of new technologies to these control foreign and emerging animal diseases. This investment will also benefit American agriculture by improving our ability to control endemic animal diseases.

To control diseases, such as FMD, CSF, and RVF, APHIS has requested vaccines and/or antivirals as countermeasures that can be put into the National Veterinary Stockpile. Existing products for control of these important diseases either do not have the correct profile for an emergency vaccine, are not licensed for use in the U.S., or do not exist.

Outcomes

ARS will work in creating countermeasures against FMD, CSF, and RVF that are rapid acting, can be delivered to large numbers of animals, and are marked (i.e., allow vaccinated animals to be differentiated from naturally infected animals). In the case of RVF, which is an arthropod-borne disease, ARS will also provide research on the epidemiology or reservoir species, and the entomological factors required to develop vector control methods that also aid in disease outbreak control.

The proposed research supports Performance Measure 4.2.3--Develop and transfer tools to the agricultural community, commercial partners, and Federal agencies to control or eradicate domestic and exotic diseases that affect animal and human health.

Means to Achieve Change

- Develop Countermeasures Against FMD ($1,500,000). ARS will:
  -- Provide research support for FMD, including development of mucosal application of rapid acting vaccines and immunomodulators and development of improved antivirals.

- Develop Countermeasures Against CSF ($500,000). ARS will:
  -- Provide research support for CSF, including development of an orally administered vaccine that allows differentiation of vaccinated and naturally infected animals.

- Develop Countermeasures Against RVF ($500,000). ARS will:
  -- Provide research support for RVF, including identification of epidemiological and entomological factors to develop vector control methods.

g) An increase of $2,500,000 for Equipment for the National Centers for Animal Health, Ames, Iowa.

Need for Change

USDA is building a new facility in Ames, Iowa to meet national needs for animal health research, diagnosis, and product evaluation. The facility modernizes and consolidates ARS' National Animal Disease Center, and APHIS' National Veterinary Services Laboratories and Center for Veterinary Biologics into the "National Centers for Animal Health." Construction of the new facility, which will house the laboratory and administrative personnel from the three entities, is scheduled to be completed in January 2009.

The new facility has a number of equipment needs. USDA will utilize existing equipment where possible, however, some equipment has reached its life expectancy and it is not cost effective to reinstall this equipment in the new facility. The new equipment is for information technology infrastructure, that is, switches for data networks and upgrades to existing voice and data capability; and biological safety cabinets. The total cost of the equipment is $2,500,000.

Means to Achieve Change

- Provide Equipment for the National Centers for Animal Health ($2,500,000). The equipment is required for the new facility.

h) A redirection of $6,317,000 from current research projects to support higher priority livestock protection initiatives (emerging diseases of livestock).

Need for Change

The agency is recommending a redirection of selected, ongoing research projects and resources to support higher priority research to further ensure the protection and safety of the Nation's food and

agriculture system. The following research projects will be reallocated to enhance and strengthen the Department's overall homeland security programs.

Means to Achieve Change

AL, Auburn, Catfish Genome/Vaccines and Microbe Control for Fish Health
FL, Gainesville, Vector Borne Diseases
GA, Athens, Avian Pneumovirus/Asian Bird Influenza/Poultry Diseases
IA, Ames, Johne's Disease
MD, Beltsville, Poultry Diseases
MI, East Lansing, Poultry Disease
MS, Stoneville, Catfish Health

i) A decrease of $4,088,000 from ongoing research projects to support higher priority food and agriculture research initiatives.

Need for Change

The FY 2008 Budget for livestock protection research will address such important national goals as ensuring the long term health and profitability of U.S. animal agriculture by protecting it from emerging/exotic diseases such as AI, FMD, BSE, CWD, CSF, RVF, BVD, PRRS, and PMWS. To finance this higher priority research and support the Administration's ongoing efforts to reduce the Federal deficit, the Department is proposing to discontinue funding for a number of projects added by Congress that, while important, do not have the same nationwide impact.

Means to Achieve Change

FL, Gainesville, Mosquito Trapping Research/West Nile Virus
IL, Peoria, Animal Health Consortium (Base)
TX, Kerrville, Microbial Genomics
WA, Pullman, Malignant Catarrhal Fever Virus/Microbial Genomics
Headquarters, Lyme Disease 4 Poster Project

Information Technology.

An increase of $2,564,000 for ARS' Cybersecurity Program and Critical Infrastructure Protection in support of Homeland Security.

Cybersecurity Program

Need for Change

ARS' Information Technology (IT) systems and networks, which are now exposed to an unprecedented level of risk, are essential to ARS and are important to Homeland Security. Of particular importance is the safeguard of pathogenic, genomic, and other sensitive research information from being acquired or destroyed by unauthorized intruders through unprotected/undetected cyber links.

As technology has enhanced the ability to share information instantaneously, it has also made ARS more vulnerable to cybersecurity attacks. The agency strives to meet cybersecurity challenges by enhancing the confidentiality, integrity, and availability of its critical information. Agencywide centralized security measures are needed to counter immediate security threats and build effective security management strategies and procedures.

The request for funding to establish and maintain an agency cybersecurity program meets and supports the regulatory requirements prescribed in the Federal Information Security Management Act of 2002,

Government Information Security Reform Act of 2000, OMB Circular A-130 (Appendix III), Clinger Cohen Act of 1996, Computer Security Act of 1987, Paperwork Reduction Act of 1995 (as amended), and Government Paperwork Elimination Act of 1998. The requested changes address the pressing and continuing issues of cybersecurity in support of homeland security and the e-Government initiative.

ARS will deliver and implement a centralized and strategically managed program to build a secure infrastructure that will address information management, information technology, and cybersecurity issues in a systematic and preventive manner. The outcomes will provide more secure and available electronic delivery of research and program findings and services to national, State, local and international customers, stakeholders, and partners. More specifically, the outcomes will include:

- A maximized ARS IT secure environment to protect critical and sensitive agency research data from falling into unauthorized hands.

- Measures that offer a secure IT delivery platform, in line with a streamlined enterprise architecture, for supporting the President's Management Agenda of an electronic government (eGovernment) that collaborates with Federal agencies, research communities, and the public.

- A response to the recommendations for strengthening ARS cybersecurity based on vulnerabilities identified previously by the Office of Inspector General audits, USDA reviews, and ARS self-assessments.

Means to Achieve Change

- Increase the Number of Cybersecurity Officers. ARS will:
  -- Provide 10 new cybersecurity engineers or information security managers at strategic locations nationwide.

- Enhance Cybersecurity Tools and their Usage. ARS will:
  -- Equip ARS system administrators and users with vulnerability scanning software, intrusion detection systems, firewalls, virtual private networks, and virus protection tools.
  -- Establish relevant policies/procedures to enforce and monitor the use and reporting of the tools.

- Plan and Implement Cybersecurity Management Plans/Strategies. ARS will:
  -- Update and implement cybersecurity plans.
  -- Prepare and implement risk assessments, contingency/disaster recovery plans, configuration management plans, and certification/accreditation processes.
  -- Periodically test and evaluate the effectiveness of information security policies, procedures, and practices.

- Provide Cybersecurity Training. ARS will:
  -- Conduct annual cybersecurity awareness training programs to inform personnel (including cybersecurity staff, agency system administrators, contractors, and other users of ARS information systems that support the operations and assets of the agency) of the information security risks associated with their activities and their responsibilities in complying with agency policies and procedures designed to reduce these risks.

Critical Infrastructure Protection

Need for Change

ARS maintains and supports a complex, state-of-the-art IT infrastructure comprised of network hardware and software, desktop computers and software, printers and other peripherals, and other technologies. These systems and technologies support the day-to-day work of all ARS employees in providing program delivery and administrative support services to agency customers. Information

technology advances rapidly to provide new or enhanced capabilities for users, improve performance and security, and provide other advancements.

Maintaining an up-to-date agency IT infrastructure is also an important component of homeland security. IT manufacturers constantly update their hardware and software products to resolve the latest security vulnerabilities. Maintaining current IT technology helps minimize the risks of security attacks.

Computers, network hardware, other technologies must be upgraded or replaced at regular intervals to continue to obtain manufacturer support, remain compatible with other technologies within and outside of the agency, and continue to operate effectively. Similarly, software licenses must also be renewed annually to adhere to manufacturer licensing agreements, obtain technical support, and receive periodic patches and upgrades to resolve security vulnerabilities and provide other improvements.

ARS maintains an information technology infrastructure that is reliable, secure, high performing, and enhances compatibility between users throughout the organization.

Means to Achieve Change

- Maintain Microsoft enterprise agreement that provides Microsoft Word, Exchange, and other desktop applications for users.
- Maintain network operating system and utilities, business software licenses, software development tools and systems, and vendor technical support.
- Replace desktop computers on a three-year life cycle basis for headquarters employees (235 PCs per year).
- Replace network file servers as they become outdated and purchase new network resources as needed.
- Replace network printers on a five-year life cycle basis (30 per year).
- Provide ongoing training for IT staff on new technologies.

Crop Protection

ARS is recommending under this program area a net decrease of $11,515,000. This includes pay costs, and new expanded research initiatives totaling $15,733,000, and proposed terminations/reductions totaling $27,248,000.

a) An increase of $3,529,000 for FY 2008 Pay Costs.

Need for Change

Funding for pay costs is critical to support an effective and responsive USDA in-house research capability. Absorption of these legally mandated increases reduces funds available for maintaining and conducting viable research programs.

b) An increase of $3,880,000 for research on Soybean and Wheat Stem Rust.

Need for Change

Wheat and Barley Stripe Rust (also known as Yellow Rust) is emerging as a major disease in the U.S. wheat and barley production regions. Since 2000, Stripe Rust has caused an estimated $460 million in losses to wheat growers and $25 million in losses to barley growers.

New strains of wheat stem rust have recently infected experimental wheats in the highlands of Uganda in East Africa and potentially threaten wheat production elsewhere in the world. These new strains appear to be more virulent than strains (biotypes) previously identified during the last decades. Preliminary evaluation indicates that many U.S. wheat varieties are vulnerable. Other grain rusts, including Leaf and Crown Rusts, continue to cause economic losses.

The economic impact of foliar diseases, such as Soybean Rust, can be devastating. Soybean Rust is caused by two species, Asian (Old World) rust (*Phakopsora pachyrhizi*) and South American (New World) rust (*Phakopsora meibomiae*). Asian Soybean Rust is reported to cause up to 80 percent yield losses in numerous countries throughout the world including Brazil, Argentina, and Paraguay. The first incidence of Asian Soybean Rust within the continental United States was confirmed by APHIS in 2004 in nine soybean producing States: Louisiana, Mississippi, Georgia, Alabama, Florida, Arkansas, Tennessee, South Carolina, and Missouri.

Research and development of new disease management technologies, such as host-plant resistance, biological control, and cultural control must be expanded. Research on the integration of different control technologies into effective, economical, and sustainable integrated disease management systems must be conducted so that practical solutions can be transferred to agricultural producers, processors, and land managers.

Outcomes

ARS scientists will utilize state-of-the-art genetic and genomic tools to mine the agency's National Grain and Soybean Germplasm Collections (the largest in the world) for resistant genes for transfer to new disease-resistant varieties. Resistance testing will be done at ARS' quarantine facilities in Frederick, Maryland, and at international sites where the diseases now occur. ARS scientists will also combine domestic and international sites for testing of appropriate fungicide and biocontrol strategies for disease management in the short term. Working closely with APHIS, ARS will build on successful predictive and diagnostic technologies developed for Soybean Rust to develop comparable technologies to defend U.S. grain crops from possible introduction of new hyper-virulent strains of Wheat and Barley Stem Rusts.

The research on emerging rust diseases of grains and soybeans will minimize or prevent the establishment of these pathogens in the United States. Commodities and crops produced in the United States will be of higher quality for domestic consumption and more marketable internationally. New, more rapid and accurate detection and identification of rust pathogen strains will provide short-term solutions. Long-term solutions will be made available through deployment of resistant genes, integrated control strategies, and pathogenicity studies to determine host-range and virulence. ARS will develop resistance germplasm and more sustainable, environmentally friendly control strategies to provide practical solutions for U.S. production.

The proposed research supports Performance Measure 4.2.4--Develop and release to potential users varieties and/or germplasm of agriculturally important plants that are new or provide significantly improved (either through traditional breeding or biotechnology) characteristics enhancing pest or disease resistance; and Performance Measure 4.2.6--Provide needed scientific information and technology to producers of agriculturally important plants in support of exclusion, detection, and early eradication; control and monitoring of invasive insects, weeds, and pathogens; and restoration of affected areas. Conduct biologically-based integrated and areawide management of key invasive species.

Means to Achieve Change

- Identify and Incorporate Diverse Sources of Genetic Resistance into New Grain and Soybean Varieties and Germplasm ($2,880,000). ARS will:
  - -- Screen U.S. varieties and breeding material at international nurseries for genetic resistance to new strains of Grain and Soybean Rusts before these strains are established in North America.
  - -- Multiply seeds of resistant lines to distribute to U.S. breeders, and expand U.S. rust screening nurseries for plant breeders.
  - -- Identify new sources of resistance in glycine and grain germplasm.
  - -- Map resistant genes and develop molecular markers to incorporate diverse resistant genes.
  - -- Genotype resistant breeding lines to deploy resistant genes to U.S. grain and soybean breeders.
  - -- Develop new bioinformatics and quantitative tools to aid breeders in making efficient genetic selection.
  - -- Develop high yielding germplasm and varieties of grains and soybeans with durable resistance to rusts in partnership with U.S. researchers/breeders.

- Develop Predictive and Diagnostic Technology for Rust Diseases ($500,000).
  For Soybean Rust, APHIS will provide an operational surveillance and monitoring network or framework for timely information on the extent and severity of soybean rust epidemics. ARS research in support of this monitoring network will provide decision criteria for fungicide application, predictive models, and remote sensing technology to properly monitor the geographic location of soybean rust disease colonies, and a web-based system for disseminating distributional information, forecasts, and decision criteria to stakeholders. In addition, specialized diagnostics are needed to facilitate rapid identification of the fungal pathogen. ARS will:
  - -- Develop field diagnostic tools for identification of *Phakopsora pachyrhizi* and selected foliar diseases.
  - -- Develop, compare, and evaluate sampling protocols and early detection tools for efficacy of application.
  - -- Develop DNA methods to identify and distinguish wheat and barley rust strains.

- Develop Rust Disease Management Strategies ($500,000). ARS will:
  - -- Optimize the fungicide spray program for management of rust diseases and maximize the economic return of agricultural production.
  - -- Implement a data driven decision-making process for disease management.

c) An increase of $2,500,000 for Research Which Assists APHIS in Better Responding to Emerging Diseases.

Need for Change

U.S. agriculture is faced with increasingly diverse and severe exotic and emerging plant diseases, particularly those caused by pathogens on the Federal Registry's Select Agent List. The increasing importance of exotic and emerging plant diseases may be attributed to the introduction of pathogens into new geographic regions, modification of the environments that favor diseases, changes in crop management practices; genetic shifts in the pathogen populations, and other processes that may give them an advantage.

The citrus industry in the U.S. is confronted with two recent introductions of diseases which have challenged the industry while other diseases threaten horticulture, floral and ornamental production from offshore. It is important to identify new or unknown pathogens, determine their geographic origin, and biologically characterize them. Accurate taxonomic identification including classification of such pathogens is essential. Pathogenicity studies and molecular markers are needed to discriminate isolates and determine host range. Infectious pathogens from purposeful or malicious introduction, needs to be rapidly identified and controlled. Continued development of pathogen detection,

exclusion, and quarantine treatment technologies is important, both for keeping new diseases from becoming established, and for controlling those which have entered the U.S.

ARS develops priorities for reemerging and exotic disease research in partnership with APHIS and other regulatory agencies. In response to these disease problems, ARS and APHIS meet with representatives from the impacted industries and other Federal and State agencies. Needs are assessed and appropriate approaches determined for providing the scientific research required for effective regulatory action. In addition to significant coordination at the field level, ARS works closely with its counterparts in APHIS to coordinate and prioritize immediate research needs for detection and eradication. ARS research on the pests and pathogens spans basic biology of the organism to effective methods to implement regulatory action.

Outcomes

The proposed research on emerging and exotic diseases of plants will minimize or prevent the establishment of pathogens in the U.S. Commodities and crops produced in the U.S. will be of higher quality for domestic consumption and more marketable internationally. New, more rapid, and accurate detection and identification of unknown pathogens will provide short-term solutions. Long-term solutions will be made available through integrated control strategies, and pathogenicity studies to determine host range and virulence. Development of resistance germplasm and more sustainable, environmentally friendly control strategies will be conducted to provide practical solutions for U.S. farmers and producers.

The proposed research supports Performance Measure 4.2.4--Develop and release to potential users varieties and/or germplasm of agriculturally important plants that are new or provide significantly improved (either through traditional breeding or biotechnology) characteristics enhancing pest or disease resistance.

Means to Achieve Change

- Develop Diagnostic Methods for Emerging Diseases of Citrus and Tree Fruits to Confirm Infection for Epidemiological Studies and Regulatory Actions ($1,300,000). ARS will:
  - -- Provide research support for Citrus Canker detection including rapid PCR field testing, hyperspectral imaging, and survey methodologies.
  - -- Determine epidemiological significance of Asian Citrus Canker on symptomatic and asymptomatic commercial citrus fruit.
  - -- Determine the distance, patterns of spread, and increase of Citrus Leprosis Virus (CLV), and develop diagnostic/confirmation methodology.
  - -- Conduct molecular and taxonomic studies of the *Brevipalpus* mite complexes in the U.S. that putatively vector CLV in Central and South America as a step toward controlling mites, and diseases.
  - -- Develop and test eradication strategy off-shore for CLV infestations.
  - -- Provide research support for Huanglongbing best management practices including development of rapid PCR field tests for detection.

- Design Survey Protocols to Detect and Track the Occurrence of Select Agents and Identified Crop Pathogen Threats ($800,000). ARS will:
  - -- Identify, develop, and evaluate diagnostic assays for select agents.
  - -- Describe the epidemiology of *Ralstonia solanaciarum race 3 biovar 2* in greenhouses including the role of latency in southern wilt.
  - -- Identify and develop available treatments and control strategies for *Ralstonia*.

- Develop Detection and Control Methodologies for Sudden Oak Death Caused by *Phytophthora ramorum* ($400,000). ARS will:
  - -- Develop a practical and efficient test for host plants to detect the presence of *P. ramorum*.

-- Develop survey and treatment technologies, identify hosts, modes of transmission, and expand our knowledge of pathogen biology and potential for spread.

d) An increase of $988,000 for research on Emerging Diseases in Crops.

Need for Change

Exotic and emerging plant diseases pose severe problems throughout the U.S., whether they are the result of bioterrorism or result from naturally occurring epidemics. The increasing importance of exotic and emerging plant diseases may be attributed to the introduction of pathogens into new geographic regions; modification of the environments that favor diseases; changes in crop management practices; genetic shifts in the pathogen populations; and other processes that may give them an advantage.

It is important to identify new or unknown pathogens, determine their geographic origin, and biologically characterize them. Accurate taxonomic identification, including classification of such pathogens, is essential to protect Homeland Security. Pathogenicity studies and molecular markers are needed to discriminate isolates and determine host range. Infectious pathogens from intentional or malicious introduction, needs to be rapidly identified and controlled. Continued development of pathogen detection, exclusion, and quarantine treatment technologies is important, both for keeping new diseases from becoming established in the U.S., and for producing crops and commodities that can be shipped and sold in markets around the world.

Outcomes

The proposed research on emerging and exotic diseases of plants will minimize or prevent the establishment of pathogens in the U.S. and protect Homeland Security. Commodities and crops produced in the U.S. will be of higher quality for domestic consumption and more marketable internationally. New, more rapid, and accurate detection and identification of unknown pathogens will provide short-term solutions. Long-term solutions will be made available through integrated control strategies and pathogenicity studies to determine host range and virulence. Development of resistance germplasm and more sustainable, environmentally friendly control strategies will be conducted to provide practical solutions for U.S. farmers and producers.

The proposed research supports Performance Measure 4.2.5--Provide fundamental and applied scientific information and technology to protect agriculturally important plants from pests and diseases; and Performance Measure 4.2.6--Provide needed scientific information and technology to producers of agriculturally important plants in support of exclusion, detection, and early eradication, control and monitoring in invasive insects, weeds, and pathogens, and restoration of affected areas. Conduct biologically-based integrated and areawide management of key invasive species.

Means to Achieve Change

- Develop Diagnostics for Rapid, Practical, and Specific Identification of Pathogens ($988,000). ARS will:
  - -- Conduct genetic characterization of pathogens for strain fingerprinting and forensic applications.
  - -- Develop rapid, high-throughput diagnostic protocols for priority pathogens that incorporate protein-based or DNA-based technologies.

e) An increase of $4,336,000 for the National Plant Disease Recovery System (NPDRS).

Need for Change

The emergence or spread of a number of plant diseases in this country, such as Soybean Rust, Citrus Variegated Chlorosis, and Bacterial Wilt, would devastate American agriculture. These diseases, the

result of bioterrorism or one of the hundreds of naturally occurring emerging or reemerging plant diseases, must be quickly identified and contained. Additional research must be conducted to minimize the risk of crop diseases, contamination, and/or willful destruction of crops to ensure that the safety of the food supply is not compromised.

Recovery from a catastrophic disease outbreak depends on a national system to manage host/pathogen interactions with a systematic centralized approach to deploy resistant plant resources with cultural/biological/chemical control strategies. In case of a national emergency, the NPDRS within ARS will provide for the recovery from a catastrophic disease outbreak.

The NPDRS minimizes the impacts of crop diseases while maintaining healthy crops and safe commodities that can be shipped and sold in markets around the world. ARS conducts research to discover and exploit naturally occurring and engineered genetic mechanisms for plant pathogen control, develop agronomic germplasm with durable defensive traits, and transfer genetic resources for commercial use in the event of a devastating disease outbreak.

Outcomes

ARS will develop and release varieties and/or germplasm with significantly improved characteristics enhancing disease resistance. Advances in genomics and biotechnology provide genetic tools that facilitate the selection and development of desirable traits in crop species. Key partnerships have already been developed within USDA, State agencies, commodity groups, and industry.

ARS will develop and maintain both collections and databases of pathogens and genetic resistance factors that can be accessed by the agency and cooperating Federal and State partners. Cultural, biological, and chemical control strategies will be implemented to control disease outbreaks. Prioritized attention will be given to crop pathogens on the 2002 Agricultural Bioterrorism Protection Act's listing of select biological agents and toxins determined to have the potential to pose a severe threat to plant health (e.g., Soybean Rust, Citrus Variegated Chlorosis, and Bacterial Wilt).

The proposed research supports Performance Measure 4.2.4--Develop and release to potential users varieties and/or germplasm of agriculturally important plants that are new or provide significantly improved (either through traditional breeding or biotechnology) characteristics enhancing pest or disease resistance; and Performance Measure 4.2.5--Provide functional and applied scientific information and technology to protect agriculturally important plants from pests and diseases.

Means to Achieve Change

- Evaluate Domestic Crop Breeding Stocks and International Sources for Resistance to Diseases.
  - -- Develop genetic markers for disease resistance and initiate genomic and proteomic research to discover the biochemical genetic mechanisms that influence control.
  - -- Develop a gene marker assisted breeding program and develop micro-arrays to expedite the breeding of agronomic genotypes with multiple genes for resistance.

- Conduct Genetic Characterization of Pathogens for Fingerprinting and Forensics and Assess Genetic Variability Among Pathogen Isolates.
  - -- Assess genetic diversity of pathogens to assess potential evolution of new races.
  - -- Monitor and map disease incidents to develop predictive models for probable routes of entry into the U.S.

- Coordinate Planning Among Federal and State Agencies and the Preparation of Resources by Documenting, Monitoring, and Indexing Agricultural Diseases and Sources of Genetic Resistance.
  - -- Ensure that disease resistant varieties of plants are continuously developed and made available to customers.
  - -- Identify and maintain databases of genetic resistance factors.

- Implement Integrated Pest Management Approaches to Control Disease Outbreaks, Including Cultural, Biological, and Chemical Treatments.
  - -- Determine critical crop development stages for chemical and biological treatments and maintain databases of effective control strategies.
  - -- Evaluate seed handling/storage techniques and possible seed treatments with fungicides/ bactericides.
  - -- Develop efficacy data required to register fungicides for use on susceptible crops.
  - -- Expand research on pathogen biology and host/pathogen interactions that can be easily accessible by action and regulatory agencies.

f) An increase of $500,000 for **Security for ARS' Overseas Biological Control Laboratories**.

Need for Change

The Department of State implemented the Capital Security Cost Sharing (CSCS) program in 2005. Under this program, Federal agencies with an overseas presence must contribute a proportionate share of the costs for the construction of new, more secure U.S. facilities. ARS has four overseas biological control laboratories located in Argentina, Australia, China, and France. The State Department has asked ARS to pay its share of the CSCS program for its four overseas laboratories.

The cost of invasive species (insects and weeds) to the United States is estimated to be more than $100 billion each year. ARS' four overseas biological control laboratories serve as the first line of defense against invasive insects and weeds in the U.S. Scientists at these laboratories collect, characterize, and evaluate biological organisms for introduction into the U.S. to control various invasive insects and weeds. Developing safe biological control agents overseas is critically important in combating the Nation's invasive species and protecting U.S. agriculture and natural lands.

The proposed increase of $500,000 is necessary to ensure that ARS can continue to provide safe biological control agents that are vital for the protection of U.S. crops. If ARS has to pay for the CSCS program without the requested increase, it would have to eliminate work on 10 invasive species. This, in turn, would have a significant impact on ARS' domestic biological control programs that are dependent on the research conducted at the overseas laboratories. ARS' domestic biological control programs develop safe and sustainable methods for pest control.

Means to Achieve Change

- Pay its Share of Costs for Construction of New, More Secure U.S. Diplomatic Facilities ($500,000). The additional funds will enable ARS to meet the security cost sharing requirement of the Department of State while continuing its vital biological control research.

g) A redirection of $4,653,000 from current research projects to support higher priority crop protection initiatives (emerging diseases of crops).

Need for Change

The agency is recommending a redirection of selected, ongoing research projects and resources to support higher priority research to further ensure the protection and safety of the Nation's food and agriculture system. The following research projects will be reallocated to enhance and strengthen the Department's overall homeland security programs.

Means to Achieve Change

CA, Parlier, Pierce's Disease
FL, Ft. Pierce, Ft. Pierce Horticulture Laboratory
WA, Pullman, Root Diseases of Wheat and Barley

h) A decrease of $27,248,000 from ongoing research projects to support higher priority food and agriculture research initiatives.

Need for Change

The FY 2008 Budget for crop protection research will address such important national goals as ensuring the long term health and profitability of U.S. plant agriculture by protecting it from emerging/exotic diseases such as Soybean and Wheat Stem Rust, Citrus Canker, Citrus Variegated Chlorosis, Bacterial Wilt, and Sudden Oak Disease. To finance this higher priority research and support the Administration's ongoing efforts to reduce the Federal deficit, the Department is proposing to discontinue funding for a number of projects added by Congress that, while important, do not have the same nationwide impact.

Means to Achieve Change

AK, Fairbanks, IPM for Northern Climate Crops/Virus Free Potato Germplasm
CA, Davis, Pierce's Disease/Glassy-winged Sharpshooter/Sustainable Vineyard/Viticulture Practices
CA, Parlier, Olive Fruit Fly
CA, Salinas, Lettuce Geneticist/Breeder/Postharvest and Controlled Atmosphere Chamber (Lettuce)
FL, Gainesville, Biological Controls & Ag Research/Termite Species in HI
FL, Miami, Coffee and Cocoa Research
GA, Byron, Southeastern Fruit and Tree Nut Research
GA, Tifton, Nematology Research
HI, Hilo, Pineapple Nematode Research
IA, Ames, Corn Rootworm (Risk Assessment for Bt. Corn)
IN, West Lafayette, Oat Virus
KS, Manhattan, Wheat Barley Scab Initiative
LA, Houma (New Orleans worksite), Residue Management in Sugarcane
LA, New Orleans, Formosan Subterranean Termites
MD, Beltsville, Biomedical Materials in Plants/Biomineral Soil Amendments for Control of Nematodes/Coffee and Cocoa Research/Weed Management Research
MD, Ft. Dedrick, Plum Pox
MN, St. Paul, Cereal Disease Research
MS, Stoneville, Resistance Management and Risk Assessment in Bt Cotton and Other Plant Incorporated Protectants/Soybean Cyst Nematode/Sweet Potato Research
ND, Fargo, Canada Thistle/National Sclerotinia Initiative/Wheat and Barley Scab Initiative
NY, Ithaca, Golden Nematode
OK, Stillwater, Invasive Aphid Research
OR, Corvallis, NW Small Fruits and Nursery Crops Research
SC, Charleston, U.S. Vegetable Lab/Staffing
WA, Wapato, Temperate Fruit Flies/Virus Free Fruit Tree Cultivars
WI, Madison, Potato Storage
Various Locations, Minor Use Pesticide (IR-4)
Headquarters, Binational Agricultural Research and Development Program/Biomineral Soil Amendments for Control of Nematodes/Coffee and Cocoa Research/Control of Perennial and Annual Weeds/Floriculture and Nursery Crops/Potato Research/NW Small Fruits and Nursery Crops Research/Wheat & Barley Scab Initiative

Human Nutrition

ARS is recommending under this program area a net increase of $4,342,000. This includes pay costs, and new expanded research initiatives totaling $7,639,000, and proposed terminations/reductions totaling $3,297,000.

a) An increase of $689,000 for FY 2008 Pay Costs.

Need for Change

Funding for pay costs is critical to support an effective and responsive USDA in-house research capability. Absorption of these legally mandated increases reduces funds available for maintaining and conducting viable research programs.

b) An increase of $6,950,000 in support of Obesity Prevention Research.

Need for Change

Obesity is the Nation's fastest growing public health problem, affecting every segment of the American population. Two of three adults are overweight and the number of overweight children has doubled in the past 20 years. Without intervention, overweight children will become obese adults. Also, obesity carries with it the elevated risk for diabetes, hypertension, heart disease, and a number of other debilitating chronic diseases. Thus, obesity compromises the health and quality of life of millions of Americans adversely impacting work productivity, medical costs, and the U.S. economy. In fact, the Economic Research Service estimates that health care costs resulting from poor nutrition and obesity cost Americans over $260 billion annually. This escalation of obesity has occurred despite increases in obesity research funding by other Federal agencies. However, such research traditionally has concentrated largely on biomedical/clinical aspects of the condition and not on obesity prevention or the importance of foods in maintaining healthy body weight. These latter areas of research appropriately fall under the responsibility of USDA.

In 2005, USDA, in partnership with the Department of Health and Human Services, released the latest version of the *Dietary Guidelines for Americans (www.healthierus.gov/dietaryguidelines/)*. This authoritative policy document is based on the best available scientific information and serves as the primary source of dietary health information for U.S. policymakers, nutrition educators, and health providers. Recognizing the need to combat increasing overweight and obesity in the United States, the 2005 version redefined the elements of the traditional food pyramid and added a physical activity component. Although the new guidelines provide a synthesis of solid research in the fields of nutrition and physical activity, as a complete package they have never been tested to assess if the expected health benefits accrue. Thus, to ensure the soundness of the *2005 Dietary Guidelines for Americans,* ARS' Human Nutrition National Program will embark upon multifaceted research to test the efficacy of the *Dietary Guidelines* as an obesity prevention and healthful eating strategy for the American people. No longer can we just hope the guidelines provide suitable advice for preventing unhealthy weight gain in the American population. Confirmation is crucial to stemming the obesity epidemic.

Obesity takes years to develop and most Federally funded research is not of sufficient duration to adequately study prevention of unhealthy weight gain. Also, the scientific literature is replete with short term studies conducted with small numbers of subjects. What is needed are large, comprehensive studies representative of the diverse ethnic populations residing in the United States. There is also a need to extend beyond "laboratory" based research to translational research. It is known that adherence to the *Dietary Guidelines* is poor and Americans will need to make substantive changes in their dietary and physical activity patterns in order to comply with them. However, those factors preventing adherence and those that would facilitate adherence are poorly understood. This is particularly true for high risk populations such as children, low income groups, and minority populations. Such research is vital to a science-based understanding and solutions to the obesity epidemic.

ARS' Human Nutrition National Program has the scientific expertise, the core capability to sustain long term research, and the capacity to conduct food-based and multidisciplinary research. ARS will work closely with other government agencies, as well as a coalition of food industry representatives, to address both consumer and food supply concerns. All are essential components in constructing a successful research strategy for reducing obesity in the United States.

Outcomes

The proposed research will determine the efficacy and effectiveness of the healthful eating and physical activity patterns set forth in the *Dietary Guidelines* in preventing obesity in the U.S. population, with particular focus on preventing obesity in children. In addition to benefiting most Americans, the research results will aid USDA's food assistance programs and the U.S. economy, which is burdened by direct and indirect costs of obesity. The production agriculture and food industry will also gain better information on the types of products compatible with healthy weight maintenance.

This research study will be the first test of the *Dietary Guidelines* in their entirety for any endpoints related to nutrition or health. It will also be the first to systematically examine factors that prevent or facilitate adherence to the *Dietary Guidelines*. The information collected will form the basis for future revisions to the *Dietary Guidelines*, and other Federal nutrition policies and programs, such as the School Lunch program, that must comply with the *Dietary Guidelines*. The next revision of the *Dietary Guidelines* is scheduled for 2010; USDA will be the lead agency.

USDA's Web site for the *Dietary Guidelines* -- *www.myPyramid.gov* -- clearly recognizes that people differ in their optimal dietary needs. USDA now has the opportunity to further this concept by leading the way in discovering underlying metabolic and genetic differences that cause such variability in response to food. Nutrients and physical activity modulate expression of numerous genes which alter diet/disease associations. Linking genotype, genetic expression, and metabolic response to diet will facilitate a greatly improved understanding of why excess weight gain occurs in individuals and will form the basis for more accurate and individualized dietary recommendations.

The proposed research supports Performance Measure 5.2.1 -- Scientifically assess the efficacy of enhancements to the nutritional value of our food supply and identify, conduct, and support intramural and extramural research to develop, test, and evaluate effective clinical and community dietary intervention strategies and programs for modifying diet, eating behavior, and food choices to improve the nutritional status of targeted populations. A special emphasis is on preventing obesity and promoting healthy dietary behaviors.

Means to Achieve Change

- Conduct Efficacy and Translational Research on the *Dietary Guidelines* in Preventing Obesity in the Diverse American Population ($6,950,000). ARS will:
  - -- Establish and conduct a nationwide, multi-center, controlled feeding trial utilizing a randomized clinical trial design to investigate if optimal adherence to the *Dietary Guidelines* prevents unhealthy weight gain in adults. The cutting edge tools of genomics and metabolomics will be utilized in these studies to better understand the propensity of individuals to gain weight.
  - -- Establish and conduct a large, multi-center cross-sectional study to determine barriers and motivators for complying with the *Dietary Guidelines*, particularly among vulnerable populations such as children, low-income people, and minority groups.

c) A decrease of $3,297,000 from ongoing research projects to support higher priority food and agriculture research initiatives.

Need for Change

The FY 2008 Budget for human nutrition research will address such important national goals as obesity which affects every segment of the U.S. population. Obesity compromises the health and quality of life of millions of Americans adversely impacting work productivity, medical costs, and the Nation's economy. To finance this higher priority research and support the Administration's ongoing efforts to reduce the Federal deficit, the Department is proposing to discontinue funding for a number of projects added by Congress that, while important, do not have the same nationwide impact.

Means to Achieve Change

AR, Little Rock, Diet and Immune Function
LA, New Orleans, Diet Nutrition and Obesity Research (Pennington Biomedical Research Center)
MD, Beltsville, Barley Food Health Benefits/National Nutrition Monitoring System
TX, Houston, Chronic Diseases of Children (Baylor College of Medicine/Peanut Institute)/Nutritional Requirements

Environmental Stewardship

ARS is recommending under this program area a net decrease of $39,190,000. This includes pay costs totaling $4,781,000, and proposed terminations/reductions totaling $43,971,000.

a) An increase of $4,781,000 for FY 2008 Pay Costs.

Need for Change

Funding for pay costs is critical to support an effective and responsive USDA in-house research capability. Absorption of these legally mandated increases reduces funds available for maintaining and conducting viable research programs.

b) A decrease of $43,971,000 from ongoing research projects to support higher priority food and agriculture research initiatives.

To finance higher priority research and support the Administration's ongoing efforts to reduce the Federal deficit, the Department is proposing to discontinue funding for a number of projects added by Congress that, while important, do not have the same nationwide impact.

AL, Auburn, Improved Crop Production Practices/National Soil Dynamics Laboratory
AR, Booneville, Agroforestry Research/Endophyte Research/Small Farms
AZ, Tucson, Quantify Basin Water Budget Components in the Southwest
CA, Brawley, (Riverside Worksite), Water Management Research Laboratory (Base)
CA, Salinas, Organic Minor Crop Research
CO, Akron, Central Great Plains Research Station/Dryland Production
CO, Ft. Collins, Soil Plant Nutrient Research
DC, Washington, Turfgrass Research
GA, Dawson, Water Use Reduction/Producer Enhancement Research
GA, Tifton, Water Resource Management/Water Use Management Technology
IA, Ames, Air Quality Research (Utah State)/Integrated Farming Systems/Manure Management Research/Soil Tilth Research/Swine Odor and Manure Management
ID, Bose, Great Basins Rangeland
ID, Kimberly, Sugarbeet Research
IN, West Lafayette, National Soil Erosion Laboratory/Source Water Protection
KY, Bowling Green, Waste Management Research (Western KY Univ.)
KY, Lexington, Improved Forage and Livestock Production (Univ. of Kentucky)/Sustainable Grazing Livestock Systems
ME, Orono, New England Plant, Soil, and Water Research
MS, Oxford, National Sedimentation Laboratory Acoustics/Flood Control Acoustic Technology/ Seismic and Acoustic Technologies in Soils Sedimentation Lab/National Sedimentation Laboratory Yazoo Basin/TMDLs/Sedimentation Issues in Flood-Control Dam Rehabilitations
MS, Stoneville, Irrigated Cropping Systems in the Mid-South
MO, Columbia, Mid-West/Mid-South Irrigation/Watershed Research
MT, Miles City, Livestock and Range Research/Ft. Keogh
MT, Sidney, Northern Plains Agricultural Research Lab/Northern Great Plains Ecosystems
ND, Mandan, Northern Great Plains Research Laboratory/Precision Agriculture Research
NM, Las Cruces, Arid Lands Research/Jornada Experimental Range Research Station/Noxious Weeds

in the Desert Southwest/Rangeland Resources Research
NV, Reno, (Albany Worksite), Ecology of Tamarix/Great Basins Rangeland/Western Grazinglands
OH, Columbus, Source Water Protection
OR, Burns, Great Basins Rangeland/Western Grazinglands
OR, Pendleton, Conservation Research/Tillage
PA, University Park, Arbuscular Mycorrhizal Fungi, (Rodale Institute)/Pasture Systems and Watershed Management
SD, Brookings, Northern Grains Insect Laboratory
TX, Bushland, Ogallala Aquifer
TX, Temple, Grassland Soil and Water Research
TX, Weslaco, Sustainable Olive Production
UT, Logan, Forage and Range Research/Plant Genetic Diversity and Gene Discovery Center, (Utah Ag Experiment Station)
WA, Pullman, Air Quality (PM-10)
WV, Beaver, Appalachian Pasture Based Beef Systems/Medicinal Botanical Production and Processing
WI, Madison, Dairy Forage/Integrated Farming Systems
WY, Cheyenne, Rangeland Resource Management

Library and Information Services

ARS is recommending under Objective 7.1 a net decrease of $176,000. This includes pay costs, and new expanded research initiatives totaling $853,000, and proposed terminations/reductions totaling $1,029,000.

a) An increase of $353,000 for FY 2008 Pay Costs.

Need for Change

Funding for pay costs is critical to support an effective and responsive USDA in-house research capability. Absorption of these legally mandated increases reduces funds available for maintaining and conducting viable research programs.

b) An increase of $500,000 for the Continued Improvement and Expansion of Services Delivered by the National Agricultural Library (NAL) via the National Digital Library for Agriculture (NDLA).

Need for Change

NAL has two legislative mandates: to serve the Nation as one of four national libraries of the United States, and to be the library for the U.S. Department of Agriculture.

To achieve its mandate as a national library, NAL acquires, organizes, and makes accessible one of the largest agricultural information collections in the world. This benefits the Nation's networks of State land-grant and agricultural field libraries and NAL's customers nationally and worldwide who are served by: the Library's extensive Web-based information services; the AGRICOLA online catalog and database; and the NAL expert staff who produce information products and respond to many thousands of customer and stakeholder requests. The NAL staff also provides training in the use of information sources so as to enable customers to conduct their own information research.

To achieve its mandate as USDA's library, NAL is primarily involved in supporting the research, development, and educational and informational activities of the Department; collecting and/or providing access to agency publications and other literature that supports and complements the work of the Department; and in multiplying that research-based information by interpreting, synthesizing, and distributing it via Web sites or in response to customer requests. Following recent closings of libraries by the Forest Service and ARS, NAL has assumed responsibility for services to these libraries' clients and achieved efficiencies for the agencies.

In FY 2005, the National Agricultural Library delivered more than 82 million direct customer service transactions, an increase in volume of more than 350 percent since FY 2000.

In the 21st century, digital libraries are an essential part of the information infrastructure. They represent a new infrastructure and environment created by the integration and use of computing, communications, and digital content on a global scale. And they contribute to the increased use of distributed and networked information around the world.

USDA is a beneficiary of the new infrastructure and environment. On behalf of the Department, NAL has made a commitment to be the hub for the NDLA. One example of its USDA-focused NDLA services is DigiTop. DigiTop provides to USDA scientists, economists, analysts, and other specialists seamless access to full text articles and bibliographic citations, reference tools, and newspaper articles at their desktops worldwide around the clock.

Outcomes

The proposed increase will address the challenges and opportunities associated with the NDLA. They include: expanding partnerships and NAL productivity to provide more digital content for the agricultural community; organizing that content logically so that customers can access it easily and quickly; improving content coverage and timeliness in NAL's AGRICOLA online catalog and database; storing geospatial, systems biology, and other content within a digital repository; testing and implementing search technology that allows for more precise retrieval; and, employing staff with the skills necessary to introduce the innovations and use them to provide appropriate information products and services.

NAL customers will have access to more literature, better coverage, and improved information products and services at their desktops. For consumers, this provides information that can support healthier lives. For agribusinesses, this provides information that can contribute to their success and the overall success of the U.S. economy. For researchers, this prevents duplication; maximizes efficiency of U.S. research; and accelerates research where feasible. For research users, this contributes to the development of research-based educational and informational materials; accelerates technology commercialization and adoption; and optimizes decision making, and policy and economic development.

The proposed increase supports Performance Measure 7.1.1-- Develop and deliver content for NDLA; Performance Measure 7.1.2 -- Integrate the AGRICOLA database into the NDLA; and Performance Measure 7.1.3 -- Ensure long-term access to the resources of the NDLA.

Means to Achieve Change

- Continue to Expand the Membership, Programs and Services of the Agriculture Network Information Center Alliance (AgNIC) ($50,000). ARS will:
  - -- Continue converting key printed publications about agriculture to digital format and provide Web access to them, via collaborative projects between NAL and AgNIC Alliance members, including the land-grant community.
  - -- Continue to support expansion of the Alliance, adding new member institutions, programs, and services.
  - -- Further expand funding for AgNIC partners to develop new subject specific digital content for Web access.

- Continue to Integrate the AGRICOLA Database into the NDLA ($75,000). ARS will:
  - -- Continue to improve the timeliness and coverage of AGRICOLA.
  - -- Continue to integrate information from AGRICOLA with other NAL information products and services.

- Continue to Expand the Information Products and Customized Services Provided via the NAL Collection, and Reference and Information Center Specialists ($75,000). ARS will:
  -- Produce new and updated publications and Web content and links pertaining to key agricultural topics.
  -- Continue to acquire for DigiTop key journals and licensed electronic information products for use by USDA researchers, educators, analysts, specialists, and administrators.

- Begin the Development of a NAL Digital Repository (NALDR) ($300,000). ARS will:
  -- Pilot development of a USDA digital repository using manuscript articles authored by ARS scientists, creating a "live" digital repository incorporating links to the articles from a variety of online indices and databases. The repository will be developed in collaboration with other Federal scientific and technological information services. Articles will be made available to the public only after their official publication. Descriptive and administrative metadata will be harvested from the ARS TEKTRAN and ARIS systems.

c) A decrease of $1,029,000 from ongoing research projects to support higher priority food and agriculture research initiatives.

Need for Change

The FY 2008 Budget for Library and Information Services will address such important national goals as the need to improve and expand the services provided by NAL via the National Digital Library for Agriculture. To finance this higher priority goal and support the Administration's ongoing efforts to reduce the Federal deficit, the Department is proposing to discontinue funding for a number of projects added by Congress that, while important, do not have the same nationwide impact.

Means to Achieve Change

MD, Beltsville, NAL, Animal Welfare Information Center/National Center for Agricultural Law (Drake University)

AGRICULTURAL RESEARCH SERVICE

Geographic Breakdown of Obligations and Staff Years
2006 Actual and Estimated 2007 and 2008

Location	2006		2007		2008	
	Amount	Staff Years	Amount	Staff Years	Amount	Staff Years
ALABAMA, Auburn	$8,723,285	65	$8,214,000	65	$6,199,000	61
ALASKA, Fairbanks	5,158,735	30	5,118,000	30	1,337,000	15
ARIZONA						
Maricopa	9,535,943	87	8,934,000	87	8,934,000	87
Tucson	4,068,560	41	3,784,000	41	3,416,000	40
Total	13,604,503	128	12,718,000	128	12,350,000	127
ARKANSAS						
Booneville	4,987,830	22	4,755,000	22	1,722,000	12
Fayetteville	1,643,133	13	1,486,000	13	1,486,000	13
Little Rock	9,532,276	13	9,149,000	12	9,412,000	17
Pine Bluff	869,397	7	884,000	7	823,000	7
Stuttgart	7,602,754	70	7,316,000	70	5,264,000	65
Total	24,635,389	125	23,590,000	124	18,707,000	114
CALIFORNIA						
Albany	38,737,550	276	36,007,000	268	41,202,000	298
Davis	10,668,469	75	9,736,000	75	10,526,000	80
Parlier	11,076,919	98	10,765,000	95	11,124,000	95
Riverside	5,620,634	47	5,302,000	47	4,812,000	44
Salinas	4,801,708	49	4,479,000	48	4,202,000	48
Shafter	1,385,259	18	1,343,000	18	1,037,000	15
Total	72,290,539	563	67,632,000	551	72,903,000	580
COLORADO						
Akron	2,050,284	26	1,873,000	26	1,221,000	24
Fort Collins	15,254,489	147	14,447,000	144	14,285,000	144
Total	17,304,773	173	16,320,000	170	15,506,000	168
DELAWARE						
Newark	2,077,931	16	1,915,000	16	1,915,000	16
DISTRICT OF COLUMBIA						
National Arboretum	12,110,995	84	10,401,000	82	8,926,000	80
Headquarters Federal Administration	76,881,608	521	69,729,000	514	69,729,000	499
Total	88,992,603	605	80,130,000	596	78,655,000	579
FLORIDA						
Brooksville	1,433,902	13	1,234,000	13	1,234,000	13
Canal Point	2,723,679	33	2,680,000	33	1,490,000	28
Fort Lauderdale	3,521,930	32	2,322,000	32	2,322,000	32
Fort Pierce	10,635,732	87	10,212,000	85	11,146,000	90
Gainesville	14,032,848	126	12,244,000	123	11,075,000	122
Miami	4,363,782	49	4,076,000	49	3,425,000	47
Winter Haven	2,527,401	21	2,325,000	21	1,710,000	20
Total	39,239,274	361	35,093,000	356	32,402,000	352

AGRICULTURAL RESEARCH SERVICE

Geographic Breakdown of Obligations and Staff Years
2006 Actual and Estimated 2007 and 2008

Location	2006 Amount	2006 Staff Years	2007 Amount	2007 Staff Years	2008 Amount	2008 Staff Years
GEORGIA						
Athens	27,988,054	260	26,187,000	251	30,507,000	266
Byron	3,547,683	36	3,377,000	36	2,476,000	35
Dawson	4,186,924	43	4,108,000	43	3,337,000	42
Griffin	2,231,520	23	2,054,000	23	3,104,000	23
Tifton	9,906,140	99	8,777,000	99	7,731,000	95
Total	47,860,322	461	44,503,000	452	47,155,000	461
HAWAII, Hilo	12,578,525	88	10,217,000	88	6,635,000	85
IDAHO						
Aberdeen	5,856,495	50	5,266,000	50	4,261,000	48
Boise	2,072,787	24	1,953,000	24	1,789,000	23
Dubois	2,111,556	22	1,981,000	22	1,981,000	22
Kimberly	3,362,238	36	3,302,000	36	2,707,000	34
Total	13,403,076	132	12,502,000	132	10,738,000	127
ILLINOIS						
Peoria	34,360,945	284	32,924,000	276	33,210,000	281
Urbana	5,744,083	42	4,936,000	42	4,817,000	42
Total	40,105,027	326	37,860,000	318	38,027,000	323
INDIANA, W. Lafayette	7,604,585	75	7,115,000	75	6,502,000	72
IOWA, Ames	47,843,047	448	44,408,000	438	55,110,000	463
KANSAS, Manhattan	10,265,485	80	9,515,000	80	8,307,000	75
KENTUCKY						
Bowling Green	2,475,342	15	2,410,000	15	109,000	2
Lexington	2,576,476	15	2,452,000	15	99,000	2
Total	5,051,818	30	4,862,000	30	208,000	4
LOUISIANA						
Baton Rouge	3,096,783	31	2,869,000	31	2,538,000	30
New Orleans	31,691,867	225	30,003,000	217	25,297,000	197
Total	34,788,650	256	32,872,000	248	27,835,000	227
MAINE, Orono	2,880,268	29	2,648,000	29	2,170,000	26
MARYLAND						
Beltsville	143,247,294	1,118	131,655,000	1,109	130,904,000	1,105
Frederick	5,311,431	50	4,999,000	50	5,471,000	50
Total	148,558,725	1,168	136,654,000	1,159	136,375,000	1,155
MASSACHUSETTS, Boston	15,522,031	10	14,520,000	9	15,960,000	11
MICHIGAN, East Lansing	4,632,924	41	4,546,000	41	4,546,000	41

AGRICULTURAL RESEARCH SERVICE

Geographic Breakdown of Obligations and Staff Years
2006 Actual and Estimated 2007 and 2008

Location	2006 Amount	2006 Staff Years	2007 Amount	2007 Staff Years	2008 Amount	2008 Staff Years
MINNESOTA						
Morris	2,887,076	32	2,596,000	32	2,596,000	32
St. Paul	6,821,860	60	5,920,000	60	6,548,000	61
Total	9,708,935	92	8,516,000	92	9,144,000	93
MISSISSIPPI						
Mississippi State	9,094,813	79	8,531,000	79	6,622,000	73
Oxford	13,657,884	100	12,916,000	98	7,707,000	83
Poplarville	4,966,744	38	4,693,000	38	1,657,000	33
Stoneville	38,094,736	314	35,346,000	306	30,881,000	281
Total	65,814,178	531	61,486,000	521	46,867,000	470
MISSOURI, Columbia	8,619,876	82	8,122,000	81	6,663,000	71
MONTANA						
Miles City	3,408,022	30	3,085,000	30	3,191,000	30
Sidney	4,968,590	53	4,706,000	53	3,317,000	47
Total	8,376,611	83	7,791,000	83	6,508,000	77
NEBRASKA						
Clay Center	19,293,806	134	18,257,000	126	22,124,000	145
Lincoln	5,713,494	65	5,452,000	65	6,651,000	68
Total	25,007,300	199	23,709,000	191	28,775,000	213
NEW MEXICO						
Las Cruces	5,939,805	52	5,573,000	52	2,473,000	29
NEW YORK						
Geneva	3,768,997	29	3,325,000	29	3,042,000	27
Greenport	5,066,448	25	4,901,000	25	10,750,000	55
Ithaca	10,542,081	49	9,841,000	48	11,907,000	50
Total	19,377,526	103	18,067,000	102	25,699,000	132
NORTH CAROLINA						
Raleigh	9,000,929	82	8,113,000	82	8,077,000	83
NORTH DAKOTA						
Fargo	14,894,758	127	14,275,000	124	11,451,000	114
Grand Forks	9,092,692	62	8,688,000	61	9,723,000	64
Mandan	3,761,673	41	3,544,000	41	3,075,000	36
Total	27,749,123	230	26,507,000	226	24,249,000	214
OHIO						
Columbus	1,486,381	14	1,378,000	14	743,000	11
Coshocton	1,302,226	15	1,227,000	15	1,227,000	15
Wooster	5,057,648	44	4,638,000	44	2,989,000	34
Total	7,846,255	73	7,243,000	73	4,959,000	60

AGRICULTURAL RESEARCH SERVICE

Geographic Breakdown of Obligations and Staff Years
2006 Actual and Estimated 2007 and 2008

Location	2006 Amount	2006 Staff Years	2007 Amount	2007 Staff Years	2008 Amount	2008 Staff Years
OKLAHOMA						
El Reno	5,380,798	54	4,921,000	54	4,921,000	54
Lane	2,124,124	23	1,934,000	23	1,711,000	21
Stillwater	4,244,773	35	3,366,000	35	2,932,000	30
Woodward	1,623,091	18	1,513,000	18	1,513,000	18
Total	13,372,786	130	11,734,000	130	11,077,000	123
OREGON						
Burns	2,497,689	23	2,387,000	23	1,288,000	14
Corvallis	12,632,169	117	10,655,000	115	9,255,000	107
Pendleton	1,964,415	21	1,805,000	21	1,455,000	18
Total	17,094,273	161	14,847,000	159	11,998,000	139
PENNSYLVANIA						
University Park	4,525,714	42	4,160,000	42	3,749,000	38
Wyndmoor	33,903,094	249	32,133,000	241	33,378,000	243
Total	38,428,809	291	36,293,000	283	37,127,000	281
SOUTH CAROLINA						
Charleston	4,322,982	44	4,091,000	44	3,452,000	40
Clemson	2,261,501	26	2,186,000	26	1,962,000	24
Florence	3,897,190	33	3,814,000	33	3,608,000	33
Total	10,481,673	103	10,091,000	103	9,022,000	97
SOUTH DAKOTA						
Brookings	3,884,205	41	3,741,000	41	2,760,000	37
TEXAS						
Beaumont	1,373,851	15	1,317,000	15	1,317,000	15
Bushland	6,797,878	44	6,876,000	44	4,540,000	34
College Station	16,189,200	157	14,839,000	154	13,941,000	146
Houston	13,952,267	7	13,023,000	6	12,562,000	5
Kerrville	4,660,345	48	4,227,000	48	4,029,000	47
Lubbock	9,039,166	98	8,230,000	98	5,859,000	83
Temple	3,622,194	37	3,290,000	37	3,104,000	36
Weslaco	10,084,372	107	9,437,000	105	8,870,000	101
Total	65,719,272	513	61,239,000	507	54,222,000	467
UTAH, Logan	8,280,577	80	7,980,000	80	6,737,000	73
WASHINGTON						
Prosser	3,434,187	34	3,034,000	34	2,643,000	31
Pullman	16,022,614	140	14,976,000	140	15,643,000	140
Wapato	4,416,961	58	4,090,000	58	3,763,000	55
Wenatchee	2,099,289	22	1,916,000	22	1,693,000	19
Total	25,973,052	254	24,016,000	254	23,742,000	245
WEST VIRGINIA						
Beaver	7,324,876	57	6,859,000	57	4,876,000	45
Kearneysville	6,811,762	73	6,415,000	73	6,186,000	70
Leetown	7,055,355	34	6,732,000	33	3,331,000	19
Total	21,191,994	164	20,006,000	163	14,393,000	134

AGRICULTURAL RESEARCH SERVICE

Geographic Breakdown of Obligations and Staff Years
2006 Actual and Estimated 2007 and 2008

Location	2006		2007		2008	
	Amount	Staff Years	Amount	Staff Years	Amount	Staff Years
WISCONSIN, Madison	14,145,170	106	13,209,000	105	9,896,000	95
WYOMING						
Cheyenne	2,105,804	21	2,122,000	21	1,958,000	19
Laramie	3,055,564	26	3,093,000	26	3,543,000	26
Total	5,161,368	47	5,215,000	47	5,501,000	45
PUERTO RICO						
Mayaguez	2,839,901	33	2,637,000	33	2,555,000	33
OTHER COUNTRIES						
Argentina, Buenos Aires	634,839	--	508,000	--	508,000	--
France, Montpellier	3,232,395	3	2,927,000	3	2,927,000	3
Panama, Panama City	1,187,032	4	946,000	4	946,000	4
Total	5,054,266	7	4,381,000	7	4,381,000	7
Extramural and Funds Administered from Headquarters-Held Funds	35,106,643	--	37,528,000	--	28,565,000	--
Repair & Maintenance of Facilities	17,643,170	--	16,607,000	--	16,607,000	--
Funds included for Homeland Security	[35,587,000]	--	[33,495,000]	--	[90,724,000]	--
Unobligated Balance	15,093,866	--	--	--	--	--
Subtotal, Available or Estimate	1,150,033,079	8,667	1,057,603,000	8,550	1,001,539,000	8,300
Miscellaneous Fees	-2,904,619	--	--	--	--	--
Supplemental Funding for Avian Influenza	-7,000,000	--	--	--	--	--
Supplemental Funding for Hurricane Relief	-10,000,000	--	--	--	--	--
Transfer from the Office of the Secretary	-350,000	--	--	--	--	--
Transfer from Office of Congressional Relations	-128,000	--	--	--	--	--
Transfer from Agency for Int'l. Development (AID)	-6,000,000	--	--	--	--	--
Rescission	11,353,540	--	--	--	--	--
Pay Costs	--	--	--	--	19,978,000	--
Total, Available or Estimate	1,135,004,000	8,667	1,057,603,000	8,550	1,021,517,000	8,300

AGRICULTURAL RESEARCH SERVICE
Salaries and Expenses

Classification by Objects
2006 Actual and Estimated 2007 and 2008

		2006	2007	2008
Personnel Compensation:				
Headquarters		$61,623,939	$62,131,000	$62,160,000
Field		476,178,786	$480,094,000	$480,315,000
11	Total personnel compensation	537,802,725	542,225,000	542,475,000
12	Personnel benefits	143,398,077	145,602,000	146,733,000
13	Benefits for former personnel	542,701	0	0
	Total pers. comp. & benefits	681,743,503	687,827,000	689,208,000
Other Objects:				
21	Travel and transportation of persons	22,297,943	18,973,000	17,064,000
22	Transportation of things	1,339,772	1,062,000	1,002,000
23.1	Rent payments to GSA	0	0	0
23.2	Rental payments to others	1,128,528	891,000	847,000
23.3	Communications, utilities and misc. charges	47,383,904	35,946,000	31,859,000
24	Printing and reproduction	1,829,533	1,445,000	1,373,000
25.1	Advisory and assistance services	863,875	682,000	648,000
25.2	Other services	1,263,435	5,865,000	630,000
25.3	Purchases of goods and services from Government Accounts	776,577	613,000	582,000
25.4	Operation and maintenance of facilities	37,280,042	28,166,000	24,302,000
25.5	Research and development contracts	172,178,811	157,321,000	138,032,000
25.6	Medical care	158,229	125,000	119,000
25.7	Operation and maintenance of equipment	8,945,270	7,073,000	6,702,000
25.8	Subsistence and support of persons	830,690	695,000	596,000
26	Supplies and materials	92,142,946	71,830,000	63,075,000
31	Equipment	42,869,296	33,369,000	29,289,000
32	Land and structures	5,684,562	4,537,000	4,223,000
41	Grants, subsidies, and contributions	16,222,298	13,370,000	11,966,000
	Total other objects	453,195,711	381,963,000	332,309,000
Total direct obligations		1,134,939,214	1,069,790,000	1,021,517,000
Position Data:				
Average Salary, ES positions		$155,687	$157,076	$157,391
Average Salary, GS positions		$58,922	$59,448	$59,567
Average Grade, GS positions		10.21	10.23	10.23

AGRICULTURAL RESEARCH SERVICE

Status of Program

ARS' research programs directly address the following Department Strategic Plan Goals: Enhance the Competitiveness and Sustainability of Rural and Farm Economies; Enhance Protection and Safety of the Nation's Agriculture and Food Supply; Improve the Nation's Nutrition and Health; Protect and Enhance the Nation's Natural Resource Base and Environment.

All of ARS' major research programs have been "PARTed." The PART findings and improvement plans as well as the agency's PART performance measures and targets are detailed in the "Key Performance Outcomes and Measures" exhibit.

New Products/Product Quality/Value Added

Current Activities:

Biobased products represent a small fraction of the market for industrial products and their performance is often uncertain. Biofuels and some biobased products are not yet economically competitive with petroleum-based products. Many agricultural products are marketed as low value commodities; harvested commodities often suffer losses due to spoilage or damage during shipping, storage, and handling. Healthy foods are often not convenient and/or are not widely accepted by many consumers.

Currently, ARS has active research programs designed to address these new product/product quality/value added issues and concerns. Specific efforts are 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.

3. Providing higher quality, healthy foods that satisfy consumer needs in the United States and abroad.

Selected Examples of Recent Progress:

Commercialization of fruit and vegetable food films. Researchers at Albany, California, worked with an industrial Cooperative Research and Development Agreement (CRADA) partner to commercialize fruit and vegetable based films in a variety of final food product applications. One of these applications uses the films as healthy, colorful alternatives to the seaweed wrap "nori" in a novel line of 7-day sushi-like fusion rolls on sale at Costco supermarkets. This year, the films were also introduced commercially on a wide variety of upscale restaurant entrees, as well as for healthy, flavorful glazes for hams and turkeys.

New value added products from biodiesel and soy processing. Researchers at Wyndmoor, Pennsylvania, devised fermentation processes to convert glycerol/soy molasses into industrial biosurfactants. They recently achieved a significant increase (up to 3-fold) in product yields through the modification of the fermentation and isolation procedures with soy molasses as feedstock. A CRADA was established with an industrial partner to test the applications of these biosurfactants in its commercial products. A patent describing the bioconversion of bioglycerol to these biosurfactants has been filed. This bioconversion technology is expected to lower the feedstock cost of biosurfactant production and address the disposal issue faced by the biodiesel and soy processing industries.

Expeller pressed low linolenic acid soybean oil--a trans-free alternative to hydrogenated oils.
Food manufacturers and commercial users of frying oils such as restaurants need alternatives to hydrogenated oils for frying because of the trans fatty acid content imparted by hydrogenation. Scientists at Peoria, Illinois, found that if low linolenic acid soybean oil is expeller pressed rather than processed

conventionally by hexane extraction, the stability of the oil during frying is similar to that of hydrogenated soybean oil. The combination of expeller pressing and low linolenic acid soybean oil produced a better frying oil than either expeller pressed soybean oil or low linolenic acid soybean oil. In pilot plant frying studies conducted by the ARS Potato Research Worksite in East Grand Forks, Minnesota and in batch frying tests conducted at Peoria, Illinois, the scientists found that low linolenic acid soybean oil that had been expeller pressed was superior to regular soybean oil that had been expeller pressed. Oil processors and food manufacturers now have new oil--expeller pressed low linolenic acid soybean oil--as a trans-free alternative to hydrogenation or added antioxidants in edible oils.

New applications for USDA trademarked jet cooked starch-lipid composites. The FanteskTM process developed by researchers at Peoria, Illinois, was used to prepare a starch-lipid gel that can be reduced in particle size and then blended into low fat ground meat products, such as beef or turkey. The resulting meat products are healthier for the consumer because of their lower fat content; however, their tenderness, juiciness, and flavor are similar to those of higher fat products. A CRADA partner and licensee of the technology are currently working with a manufacturer to produce commercial quantities of the FanteskTM product. They will market the new product under the trade name NutriGras. The product line is being expanded to include ground pork and poultry products.

Enzyme process that enables the commercial production of ethanol from barley. Barley could be converted into ethanol if problems with its high viscosity and low ethanol yields were overcome. Researchers at Wynmoor, Pennsylvania, found that adding beta-glucosidase enzymes to the starch hydrolysis step solves both problems of viscosity and yield.

Complete saccharification and fermentation of wheat straw to fuel ethanol. Reserchers at Peoria, Illinois, have demonstrated that wheat straw pretreated with alkaline peroxide can be enzymatically saccharified to fermentable sugars completely. No common fermentation inhibitors were produced. Both separate enzymatic hydrolysis and fermentation and simultaneous enzymatic saccharification and fermentation approaches worked equally well for production of ethanol from the alkaline peroxide pretreated wheat straw by an ethanologenic recombinant bacterium capable of utilizing multiple sugars (glucose, xylose, arabinose). The research will greatly contribute to the development of an integrated bioprocess technology for fuel ethanol production from lignocellulose.

Livestock Production

Current Activities:

Producers need new scientific information and technologies to increase production efficiency; safeguard the environment; improve animal well-being; reduce production risks and product losses; and understand the relationships between nutrients, reproduction, growth, and conversion to and marketability of animal products. In addition, new research is needed to: identify genes that are responsible for economically important traits; maintain and develop improved germplasm and use genetic resources to optimize and safeguard genetic diversity; understand biological mechanisms; and promote viable, vigorous production systems.

Currently, the agency has active research programs designed to address these livestock production issues and concerns. Specific efforts are directed toward:

1. Developing information on the relationships between nutrients, reproduction, and growth, and on the conversion to and marketability of animal products.

2. Identifying genes responsible for economically important traits, including animal product quality, nutrient utilization, and environmental adaptability.

3. Maintaining, characterizing, and using genetic resources to optimize and safeguard genetic diversity, and promote viable, vigorous animal production systems.

Selected Examples of Recent Progress:

Integrated genetic map developed to aid in assembly and annotation of the bovine genome sequence. ARS scientists at Clay Center, Nebraska, constructed an integrated genetic map comprised of approximately 17,000 markers from several genetic linkage and radiation hybrid maps from around the world. This integrated map was used in the bovine genome sequencing project to serve as the scaffold for assigning sequence contigs to chromosomal positions. In addition, over 1,500 full length complementary DNA sequences were generated and annotated, which are the gold standards for annotating genes on a genome. These accomplishments will greatly accelerate the discovery of DNA markers suitable for marker assisted selection and fine mapping of genes for economically important traits in cattle.

Chicken genome sequence enables DNA fingerprinting of commercial and experimental chicken lines. The availability of the chicken genome sequence offers many opportunities to understand complex biological questions, such as how genetic variation influences economically important traits. As a prelude to this advancement, researchers at East Lansing, Michigan, evaluated a large number of chicken lines including birds from 36 elite commercial lines. By scoring 3,072 single nucleotide polymorphism markers on 2,580 different chickens, it was possible to screen the genome for unique or common alleles among the various chicken lines. This result is relevant to scientists and poultry breeding companies as it helps determine what genes are under genetic selection for economically important traits in industry broiler and layer lines. It is now possible to "trace back" poultry products to individual companies and lines through DNA fingerprinting using these markers. An additional aspect of this project is the development of a linkage disequilibrium map of the chicken genome (i.e., haplotype map) which will facilitate the evaluation of whole genome selection methodology. This is the first comprehensive genetic profile of virtually an entire commodity group. This research provides substantial contributions to poultry breeding and food safety.

Genetic security of animal germplasm enhanced. The security of U.S. animal genetic resources was significantly enhanced in the past year. Samples in the ARS National Germplasm Collection at Fort Collins, Colorado, increased from 229,110 to 296,555, a 29 percent increase. The collection contains germplasm and tissue samples from 7,322 animals from 25 livestock, poultry, and aquatic species. In addition to collecting samples, the repository released genetic material enabling research in quantitative trait loci discovery, impacting the genetic distancing of cattle breeds, and broadening the genetic base of a rare cattle breed.

Slick hair gene localized to bovine chromosome 20. The slick hair coat phenotype has been observed in tropical breeds of Bos taurus cattle. It has been found to be beneficial for heat tolerance with body temperatures, often 0.5° C lower for slick haired animals compared to their normal haired half-sibs during hot summer days. ARS researchers at Brooksville, Florida, conducted a genome scan to map the slick hair gene in Senepol-derived cattle. The gene was localized to a specific region of bovine chromosome 20 bound by two very tightly linked microsatellite markers. The mapping of the slick hair locus is the first step toward the eventual identification of the causative mutation that would constitute the definitive test for the slick hair coat phenotype. The results will facilitate efforts toward introgression of this gene into important temperate Bos taurus breeds (such as Angus and Charolais), to enhance their adaptation to tropical environments.

Discovery of micro Ribonucleic Acid (RNA) expression in cattle and swine. Micro RNA genes are a recently discovered form of genetic regulation with enormous impact on a variety of traits including growth, development, and tissue homeostasis. ARS scientists at Clay Center, Nebraska, performed the first survey of micro RNA in cattle and swine muscle, and identified similarities and differences between reports from human and mouse muscle micro RNA expression profiles. The small RNA fraction containing putative micro RNAs was isolated, cloned, and sequenced to identify regulatory molecules. The first experimentally verified cattle micro RNA sequences were deposited in the public database and comparisons with published data from other species were made to identify potential ruminant specific molecules. These results have significant impact on understanding the biology of ruminant muscle, and address the general problem of annotation and subsequent analysis of the bovine genome sequence.

New vaccines developed to protect fish from Streptococcal diseases. ARS scientists at Auburn, Alabama, developed novel vaccines to control the bacterial pathogens, *Streptococcus agalactiae* and *Streptococcus iniae* in fish. These bacteria have been associated with significant mortalities among a number of freshwater, estuarine, and marine species. Streptococcal disease results in more than $100 million in losses annually in cultured fish. Immunization is estimated to profit the farmer by $100 to $300 per acre because fish eat more feed, grow faster, and suffer less mortality. A major pharmaceutical manufacturer is cooperating in a CRADA to commercialize these vaccines for a worldwide market.

Breeding catfish and rainbow trout to increase disease resistance. ARS scientists at Stoneville, Mississippi, and Leetown, West Virginia, discovered genetic components of resistance to *Edwardsiella ictaluri* in catfish and to *Flavobacterium psychrophilum* in rainbow trout. Field evaluation is underway for an improved strain of catfish. The toll-like receptor gene is expressed at a lower level in resistant catfish. It will be evaluated as a candidate for marker assisted selection of catfish for survivability. Marker assisted selection could improve the accuracy of selection for this elusive trait.

Crop Production

Current Activities:

Producers need new scientific information and technologies to increase production efficiency; safeguard the environment; reduce production risks and product losses; and understand the relationships between nutrients, reproduction, growth, and conversion to and marketability of plant products. In addition, new research is needed to: identify genes that are responsible for economically important traits; maintain and develop improved germplasm and use genetic resources to optimize and safeguard genetic diversity; understand biological mechanisms; and promote viable, vigorous production systems.

Currently, ARS has active research programs designed to address those crop production issues and concerns. Specific efforts are directed toward:

1. Improving the understanding of the biological mechanisms that influence plant growth, product quality, and marketability.

2. Identifying genes responsible for plant product quality, productivity, resistance to diseases/pests, and weather losses.

3. Maintaining, characterizing, and using genetic resources to optimize, safeguard, and enhance genetic diversity, and promote viable, vigorous plant production systems.

Selected Examples of Recent Progress:

Discovery of a soybean DNA marker for Asian Soybean Rust Resistance. ARS scientists at Beltsville, Maryland; Urbana, Illinois; Ft. Detrick, Maryland; and the Monsanto Company have identified a simple sequence repeat genetic marker (BARC_Sat_187) that is 99.2 percent accurate in predicting soybean breeding lines that carry resistance to Asian Soybean Rust at the Rpp1 resistance locus. Asian Soybean Rust caused by *Phakopsora pachyrhizi* was first found in the continental United States in 2004, and poses a major threat to the U.S. soybean crop. Four genes in soybean confer resistance to Asian Soybean Rust (Rpp1, Rpp2, Rpp3, and Rpp4), but the utility of these genes in crop improvement has been impeded by a lack of genetic markers. The BARC_Sat_187 SSR marker will be useful for integrating Rpp1 resistance into modern cultivars.

Crop genetic diversity conserved and distributed to researchers. During FY 2006, the 20-plus genebanks in the ARS National Plant Germplasm System (NPGS) added more than 9,000 separate samples of more than 500 plant species to their collections, bringing to a total of more than 474,000 samples of more than 11,800 plant species conserved by NPGS genebanks. Scientific interest in this germplasm has increased tangibly during the last few years, with the average number of samples distributed per year now totaling more than

130,000, which is 30,000 more than the average a decade ago. These materials are keys for continued progress in crop genetics and breeding requisite for future food security.

Development of bioinformatics tools to construct a physical map of the soybean genome. A genetically anchored physical map of chromosomes is essential for the isolation of genes underlying agronomically important quantitative trait loci. ARS scientists at Ames, Iowa, have built a relational database to hold all of the physical and genetic map data for soybean. This database is able to display the physical map overlayed onto the genetic map and is populated with agronomically important quantitative trait loci. In addition, an online tutorial for the Web-based map displays and databases was also developed. This database will be helpful for interpreting whole genome sequence data being generated by Department of Energy.

Release of the "Sunrise" pear to commercial fruit tree nurseries. The newly released pear variety "Sunrise" fills the need for an early season pear cultivar with excellent fruit quality and appearance, and resistance to the devastating disease known as fire blight. Evaluations by ARS scientists at Kearneysville, West Virginia, and cooperators documented excellent overall consumer acceptance in comparison with existing commercial varieties. It is anticipated "Sunrise" will reduce grower losses and provide good economic return to fruit orchards, especially in regions where the annual risk of fire blight disease limits pear production.

Development and application of valuable molecular disease diagnostic tests for ensuring the health of plant germplasm. ARS researchers at the NPGS genebanks and their university collaborators developed and/or applied powerful molecular diagnostic tools for ensuring that germplasm is free of key diseases. Examples include molecular diagnostic tests for: seedborne Stewart's Wilt in Maize and Bacterial Fruit Blotch of Melons (ARS Ames, Iowa genebank); Citrus Leprosis Virus (ARS Riverside, California genebank); Phytoplasmas in Hazelnut, Strawberry, Pear, and Blueberry (ARS Corvallis, Oregon genebank); Alfalfa Mosaic Virus in Crotolaria (ARS Griffin, Georgia genebank); and Cucumber Mosaic, Banana Streak, and Banana Mild Mosaic Viruses (ARS Mayagüez, Puerto Rico genebank). These molecular diagnostic tests enable rapid, inexpensive, and accurate detection of key pathogens which is critical for maintaining germplasm health and permitting international and domestic germplasm exchange. Ready access to vigorous and health plant germplasm is integral to accelerating progress in crop genetic resource conservation and breeding.

New sunflower germplasm. Four new restorer germplasm lines (RHA 461 to RHA 464) were released by ARS and the North Dakota Agricultural Experiment Station. These germplasm have been selected for their tolerance to Sclerotinia Head Rot, a major sunflower disease. RHA 462 provides tolerance to Phomopsis Stem Canker; RHA 464 has resistance to the most virulent North American races of Rust and Downy Mildew. These germplasms are available for use by industry and public researchers to create hybrids, parental lines, or germplasms with increased disease tolerance.

Determination of genes that affect wheat dough and baking properties. Millers and bakers need high quality wheat, but the basis of good quality wheat is not well understood. ARS researchers at Albany, California, have used wheat biotechnology to determine the role of two wheat glutenin proteins in affecting dough quality and strength. The dough mixing properties of transgenic wheat flours that contained increased levels of either glutenin or protein or both were determined. Results can be used to develop wheat lines with a range of dough strengths that could be valuable to the food industry.

Food Safety

Current Activities:

For the Nation to have affordable and safe food, the food system must be protected at each step from production to consumption. The production and distribution system for food in the United States has been a diverse, extensive, and easily accessible system. This open system is vulnerable to the introduction of pathogens and toxins through natural processes, global commerce, and by intentional means. The food

supply must be protected during production, processing, and preparation from pathogens, toxins, and chemical contamination that cause diseases in humans.

Currently, the agency has active research programs designed to: develop new on-farm preharvest systems, practices, and products to reduce pathogen and toxin contamination of animal and plant derived foods; and develop and transfer to Federal and State agencies and the private sector technologies that rapidly and accurately detect, identify, and differentiate the most critical and economically important foodborne pathogenic bacteria and viruses. Specific efforts are directed toward:

1. Conducting basic, applied, and developmental research and transferring the resulting technologies and management practices to users who are critical to both preventing and detecting contamination of the food supply by microbial pathogens (i.e., bacteria, viruses, parasites), bacterial toxins, fungal toxins (mycotoxins), or chemical residues.

Selected Examples of Recent Progress:

Detection and fingerprinting of *E. coli* O157:H7 in California agricultural environments. Numerous outbreaks of *E. coli* O157:H7 have been linked to produce grown and processed in California. Knowledge of the epidemiology and ecology of *E. coli* O157:H7 in this agricultural environment is critical for preventing contamination of raw produce in the fields. ARS scientists in Albany, California, in collaboration with the California Department of Health Services, Central Coast Regional Water Quality Control Board, and FDA, sampled numerous watershed sites in Salinas Valley, California. Multiple *E. coli* O157:H7 strains, sources of dissemination, and persistence related to the watershed were identified. This information was critical to the industry and regulatory agencies in their analysis of the recent spinach related *E. coli* O157:H7 foodborne illness outbreak.

Preharvest strategies devised to kill Salmonella, Campylobacter, and *E. coli* O157:H7. Foodborne pathogens can live in the gastrointestinal tract of food animals. Researchers from College Station, Texas, and Athens, Georgia, have devised diverse strategies to reduce pathogenic bacteria in food animals during the production chain. An antimicrobial protein was discovered that reduces Salmonella infections in egg-laying chickens by stimulating the birds' own immune system. As a feed additive, this protein shows great promise in reducing Salmonella in poultry and is being subjected to further real world testing. Other researchers have shown that the addition of a bacterial protein (called a bacteriocin) can reduce Campylobacter populations in chickens. In cattle and swine the pharmaceutical product, Ractopamine, that is used to promote growth and increase lean muscle mass, was found to reduce *E. coli* O157:H7 intestinal colonization and fecal shedding in feedlot cattle. All of these pathogen reduction strategies are important because they do not use traditional antibiotics which reduce antibiotic resistance.

Handheld imaging devices. Scientists at Beltsville, Maryland, designed two handheld portable inspection devices equipped with head mount displays and wireless image-voice central communication capabilities for sanitation inspection of food processing plants. The technology has applications for the inspection of foods and processing plant sanitation, such as for fecal contamination on stainless steel plates that are typically used for manufacturing plant equipment. Various food safety regulatory agencies, security agencies, and commodity organizations have shown considerable interest in the technology. A U.S. patent application for the technology has been submitted.

Antioxidants reduce aflatoxin concentrations in tree nuts. Tree nuts sales are estimated at $2 billion per year; approximately 60 to 70 percent of the crop is exported. Aflatoxin is a serious threat to human health and agricultural trade because it is a potent natural carcinogen produced by a fungus. Levels of aflatoxin in tree nuts are closely monitored by importing Nations. Research in Albany, California, has demonstrated that antioxidants reduce fungal synthesis of aflatoxin; some antioxidants enhance the natural breakdown of aflatoxin by the fungus that produces it. Antioxidant levels can be increased through selective breeding or direct application to tree nuts, making them safer for consumers and more acceptable to trading partners.

Livestock Protection

Current Activities:

Economic sustainability of livestock production systems in domestic and global markets is limited by the disease status of the animals. Many factors affect the likelihood of diseases in livestock. These include globalization and international commerce, presence of pathogen vectors, industrialization of agriculture, availability of vaccines and protection systems, movements of animals during production, emergence of new diseases, genetic resistance, and the availability of trained animal health specialists. Livestock production systems are in transition from open and extensive systems to more closely monitored intensive management systems which remain vulnerable to accidental and intentional exposure to pathogens. Many of these pathogens are zoonotic and impact public health.

Currently, ARS has active research programs designed to: protect animals from pests and infectious diseases; identify, develop, and release to the U.S. agricultural community genetic markers, genetic lines, breeds, or germplasm that result in food animals with improved pest and disease resistance traits; and provide producers of agriculturally important animals, scientific information and technologies to control, monitor, and manage invasive insects and pathogens. Specific efforts are directed toward:

1. Identifying, developing, and releasing to the U.S. agricultural community genetic markers, genetic lines, breeds, or germplasm that result in food animals with improved (either through traditional breeding or biotechnology) pest and disease resistance traits.

2. Developing and transferring technologies to the agricultural community, commercial partners, and Federal agencies to identify, control, or eradicate domestic and exotic diseases that impact animal and human health.

Selected Examples of Recent Progress:

Inactivated Avian Influenza (AI) vaccines provide protection against Asian H5N1. Killed AI vaccines have been used in Asia for the past four years to control H5N1 HPAI, but there are concerns that changes in the virus (caused by antigenic drift) may make these vaccines less protective. ARS scientists at Athens, Georgia, determined that several H5 vaccines that have been used or that are commercially available were still protective against a 2006 H5N1 HPAI virus isolated from a chicken in Hong Kong. The vaccine protected chickens from clinical signs and death when challenged with a high doses of the 2006 H5N1 HPAI virus. In addition, the vaccine reduced the growth of the challenge virus in vaccinated chickens with no detectible shedding from the intestines and reduced shedding from the respiratory tract. These data indicate the H5 killed AI vaccines available for poultry provided excellent protection from the 2006 Hong Kong strains of H5N1 HPAI virus.

Genetically controlled incubation period of Chronic Wasting Disease (CWD) in elk. CWD is a member of the Transmissible Spongiform Encephalopathy family of disorders that includes Scrapie, Bovine Spongiform Encephalopathy, and Creutzfeldt-Jacob disease. CWD is a relatively uncharacterized TSE with novel patterns of transmission and agent distribution, and represents the considerable challenge of controlling a persistent disease in free ranging wildlife. CWD in North America has resulted in the loss of domestic and foreign markets, restrictions on trade and movement of live animals, and the substantial costs associated with surveillance of hunter killed animals. ARS scientists at Pullman, Washington, working in collaboration with the ARS National Animal Disease Center in Ames, Iowa, Colorado State University, and Animal and Plant Health Inspection Service (APHIS) Veterinary and Wildlife Services, documented the first association between the Prnp codon 132 genotype and the incubation time in elk with experimental CWD. The research characterized the disease phenotype in elk homozygous and heterozygous for the highly susceptible Prnp allele, demonstrating that there were no differences in the eventual outcome of the disease, only in the incubation period. This information will be useful for producers and regulatory groups in establishing minimum quarantine periods and elk movement requirements, and providing guidance to investigators performing pathogenesis trials.

Control of fire ants without chemicals. ARS scientists at Gainesville, Florida, and Stoneville, Mississippi, have continued to facilitate the distribution of tiny flies that parasitize the ants, documenting their spread in Alabama, Oklahoma, and Tennessee. Scientists have characterized the first virus ever discovered in fire ants and discovered a new species of roundworm that kills the ants. Workers are searching in South America for new biocontrol agents and using modern genetics to match those organisms to populations of fire ants. As the new insect and pathogen enemies of fire ants become established across the Southeastern United States, they will form a natural complex that will lower the number of fire ants to more tolerable levels. As the number of fire ants is reduced, native ants will move into unoccupied habitats, providing further control and improving biodiversity.

New ways to control Horn Flies. Horn Flies are a particularly nasty pest of cattle. They ride along on the cow taking frequent bloodmeals, only leaving to quickly lay eggs on a fresh cow pat. Some estimates attribute over $700 million in damage to cattle per year to this fly in the United States. Current control techniques rely on liberal use of insecticide, frequently failing because of the development of resistance. ARS scientists at Kerrville, Texas, have gone a long way toward finding new ways to control Horn Flies. They have assembled a database of cattle DNA associated with either susceptibility or lack of susceptibility to the Horn Fly. They collaborated with the Areawide Pest Management Research Laboratory, College Station, Texas, to discover a brain signal chemical that performs the essential physiological functions in the fly. Also they were able to control the fly by dusting cattle with the spores from a fungus that is toxic to the insect but not the cow. These discoveries will lead to more sophisticated control techniques that will be combined to perform sustainable, environmentally friendly pest management of the Horn Fly.

Targeting mosquitoes for control. The threat of mosquito-borne diseases that already exist in the U.S., like West Nile, or diseases that might be introduced, like Rift Valley fever, has raised awareness of the need for community mosquito control. Each mosquito abatement district tends to know its own area well, but areas between districts or areas where new districts should be formed, may have large concentrations of mosquitoes in some parts but not in others. Scarce control resources need to be targeted according to the threat. ARS scientists at Gainesville, Florida, and Laramie, Wyoming, working in cooperation with academia, mosquito abatement districts, State governments, and other Federal agencies, have assembled a series of models of mosquito distribution that range from continental to local scale. Combined with temperature-based models of disease transmission risk, these models form a picture of relative risk for the entire Nation. Following further development and distribution, these models will be an essential tool for decision makers who have to put mosquito control resources in areas that will have the greatest impact against disease transmission.

Crop Protection

Current Activities:

Economic sustainability of agricultural crop production in domestic and global markets is limited by the disease status of crops. Many factors affect the likelihood of diseases to crops including, globalization and international commerce, presence of pathogen vectors, availability of protection systems, emergence of new diseases, genetic resistance, and the availability of trained plant health specialists. Crop systems have limited diversity and remain more vulnerable to intentional exposure to pathogens.

Currently, the agency has active research programs designed to: protect plants from pests (including weeds) and diseases; identify, develop, and release to the U.S. agricultural community genetic markers, genetic lines, or germplasm that result in plants with improved pest and disease resistance traits; provide producers of agriculturally important plants, scientific information and technologies to control, monitor, and manage invasive insects, weeds, and pathogens; and conduct biologically-based integrated and areawide management of key invasive species. Specific efforts are directed toward:

1. Providing fundamental and applied scientific information and technology to protect agriculturally important plants from pests and diseases.

2. Providing scientific information and technology to producers of agriculturally important plants on exclusion, detection and early eradication; control and monitoring of invasive insects, weeds and pathogens; and restoration of affected areas. Efforts also focus on conducting biologically-based integrated and areawide management of key invasive species.

Selected Examples of Recent Progress:

Development and deployment of a rapid Polymerase Chain Reaction (PCR)-based assay for citrus greening. The arrival of citrus greening, Huanglongbing, represents a serious threat to citrus production in Florida. ARS scientists at Beltsville, Maryland, developed and validated the first real time and quantitative PCR assay for the greening pathogen. This assay was used by the APHIS and the Florida Department of Agriculture to confirm the presence of citrus greening in Florida. Producers will benefit from early detection, and genetic improvement for resistance will be accelerated.

Resistance to Soybean Rust identified. Soybean Rust, *Phakopsora pachyrhizi,* drastically reduces yields and/or increases production costs for U.S. producers. Yield losses in some countries in Africa, Asia, and South America have been significant. ARS scientists at Ft. Detrick, Maryland, screened over 16,000 soybean accessions in the USDA Germplasm Collection located at Urbana, Illinois. These soybean accessions were evaluated for resistance to *P. pachyrhizi* in Biosafety Level 3 containment greenhouses. The objectives of these evaluations were to identify accessions that may provide new sources of resistance. Many new sources of resistance were discovered. The sources of resistance identified in this research may provide the resistance genes needed for future development of soybean cultivars with Soybean Rust resistance. This information will be critical to soybean researchers that are interested in sources of resistance to Soybean Rust.

New Fire Blight biocontrol agent approved for use in the United States. Fire Blight is a serious disease of apple and pear trees caused by a bacterium. ARS scientists at Wenatchee, Washington, utilized new techniques of evaluating beneficial microorganisms on blossoms, the site of primary infections. This led to the discovery of *Pantoea agglomerans* strain E325, an effective biocontrol agent, and to a patent license agreement with a private company has interested in its commercial development. Research cooperation with the company from 1999 has led to improvements in fermentation and formulation methods, establishment of effective field rates, and information required by regulatory agencies in the United States and Canada. In September 2006, a formulated product consisting of E325, as the active ingredient, was fully registered with the Environmental Protection Agency, allowing its availability to fruit growers for fire blight management during the spring of 2007 and the potential for improved control of this disease.

Release of JTN-5503 soybean germplasm line. ARS scientists at Stoneville, Mississippi, have released an advanced breeding line JTN-5503 with resistance to Soybean Cyst Nematode, Frogeye Leaf Spot, Stem Canker, and Charcoal Rot. The Soybean Cyst Nematode is a serious pest of soybean in all the soybean production regions in the United States. Public soybean breeders have identified resistance to this pest as a major breeding objective. The other diseases can also cause significant yield losses. JTN-5503 was grown in nine States in the USDA Southern Uniform Tests program in 2004 and 2005 and was one of the two top yielding entries in its maturity group. Soybean breeders will use this germplasm line as a parent to develop soybean varieties for soybean producers.

Successful eradication of a major invasive marine weed. The invasive marine algal weed, *Caulerpa taxifolia* (Caulerpa) was eradicated from California through a cooperative interagency effort. Caulerpa had spread to over 30,000 acres in the Mediterranean Sea from 1985 to 1999, and in 2000, the first two U.S. infestations of this species were discovered in California. These infestations threatened over 600 miles of Western coastal subtidal habitat. ARS scientists at the Davis, California, worksite of the Exotic and Invasive Weed Research Unit, conducted research and provided technology transfer as part of a multi-agency eradication effort during the past five years. This work was essential in the development and implementation of methods for effective eradication of Caulerpa. It also provided a very rare example of a quantitative evaluation of eradication efficacy, and helped establish scientifically-based criteria for determining how and when eradication of an invasive weed could be achieved. Results have culminated in a formal declaration of eradication by the California Department of Fish and Game (July 12, 2006). The

program is sure to have saved California millions of dollars by reducing damage and control costs and averting a potential environmental disaster.

Initiation of biological control of giant reed. A biological control program for the invasive weed Giant Reed or Carrizo Cane, *Arundo donax*, has been initiated. Giant Reed is a serious ecological threat to the Rio Grande River Basin because it displaces beneficial vegetation and uses excessive water needed to grow crops. It also places Customs and Border Protection officers from the Department of Homeland Security at risk because smugglers hide in dense infestations. Scientists at the Beneficial Insects Research Unit in Weslaco, Texas, have imported three potential biological control agents from Europe into USDA quarantine facilities in Texas for biological control of Giant Reed. These biological control agents are a shoot-feeding wasp (*Tetramesa romana*), a cane-burrowing fly (*Cryptonevra* spp.), and a rhirzome-infesting scale (*Rhizaspidiotus donacis*). There is significant interest and support for the program from the International Boundary and Water Commission; Department of Homeland Security; Bureau of Reclamation; Fish and Wildlife Service; Texas Rio Grande Watermaster; Texas Parks and Wildlife; Texas Department of Transportation; Texas Lower Rio Grande Valley Irrigation Districts; PRONATURA, Mexico; and CONANP, Mexico.

Human Nutrition

Current Activities:

Improving the Nation's health requires enhancing the quality of the American diet. The United States is experiencing an obesity epidemic resulting from multifaceted causes including a "more is better" mindset, a sedentary lifestyle, and the selection of readily available high calorie foods. Four of the top ten causes of death in the United States – cardiovascular disease, cancer, stroke, and diabetes – are associated with the quality of our diets – diets too high in calories, total fat, saturated fat, cholesterol, or too low in fiber. Americans want fresh foods that taste good, are convenient to prepare and consume, and yet, offer nutrition and health benefits. Building a strong connection between agriculture and human health is an important step to providing a nutritionally enhanced food supply. Promoting healthier food choices and educating Americans to balance caloric intake with sufficient daily physical activity are vital steps to preventing obesity and decreasing risk for chronic disease.

Currently, the agency has active research programs designed to address food consumption patterns; and dietary intervention strategies and programs to prevent obesity and promote healthy dietary behavior. Research is being conducted to implement the combined "What We Eat in America" dietary survey; and to update and revise Dietary Reference Intake and the National Nutrient Database of nutrient content of foods. Research is also being conducted to provide information, technologies, services, and data from the National Nutrient Database, and from the "What We Eat in America" survey to USDA agencies and the private sector to support revision of *the Dietary Guidelines*. Specific efforts are directed toward:

1. Scientifically assessing the efficacy of enhancements to the nutritional value of our food supply and identifying, conducting, and supporting intramural and extramural research to develop, test, and evaluate effective clinical and community dietary intervention strategies and programs for modifying diet, eating behavior, and food choices to improve the nutritional status of targeted populations.

2. Defining functions, bioavailability, interactions, and human requirements (including effects such as genetic, health status, and environmental factors) for known, emerging, and new classes of nutrients; determining their abundance in the food supply; and providing that information in databases.

3. Determining food consumption patterns of Americans, including those of different ages, ethnicities, regions, and income levels; and providing sound scientific analyses of the U.S. food consumption information to enhance the effectiveness and management of the Nation's domestic food and nutrition assistance programs.

Selected Examples of Recent Progress:

Adherence to the *2005 Dietary Guidelines* lowers risk for cardiovascular disease. USDA and Department of Health and Human Services share responsibility for revising the *Dietary Guidelines for Americans* every five years. In the Framingham Heart Offspring cohort study, ARS scientists in Boston, Massachusetts, found a 50 percent lower prevalence of metabolic syndrome in men and women with high adherence to the *Dietary Guidelines*. Metabolic syndrome, characterized by abdominal obesity and the inability to use insulin efficiently, is a forerunner of type 2 diabetes and increases risk for coronary heart disease.

Many Americans receive inadequate amounts of vitamins A, C, and E. Using data from the "What We Eat in America/NHANES 2001-2002" national dietary survey, ARS scientists in Beltsville, Maryland, found a high prevalence of inadequate intakes of vitamins A, E, and C for most age and gender groups in the U.S. This is the only source of nationally representative dietary intake data and is essential to tracking the health and well-being of the American population.

Beneficial role for vitamin D and calcium in reducing the risk for type 2 diabetes. The prevalence of type 2 diabetes has increased rapidly in the U.S. and worldwide. ARS scientists in Boston, Massachusetts, found that women with a combined daily intake meeting the Recommended Dietary Intakes for both calcium and vitamin D had a 33 percent lower risk of developing type 2 diabetes than those with lower intake levels. The findings from this study, that followed nearly 84,000 women for 20 years, suggest a possible dietary strategy for lowering the risk for type 2 diabetes.

Adequate postmenopausal bone density dependent upon calcium intake during the early menopausal years. ARS scientists in Davis, California, demonstrated that calcium intake during the early menopausal years is more important for maintaining adequate bone density than calcium intake during childhood years, in contrast to previously published reports. Dietary strategies to alleviating postmenopausal bone mineral loss help lower health care costs and improve the quality of life for American women.

Carbohydrate calories contribute to body fat. ARS scientists in Little Rock, Arkansas, showed that overconsumption of carbohydrates produced significantly greater weight gain and fat deposition in both human infants and a mouse model. In a related study, ARS scientists in Boston, Massachusetts, found that obese adults on a weight loss diet providing a low glycemic index (carbohydrates that raise blood sugar slightly) experiences greater weight loss over one year than volunteers on a weight loss diet providing a high glycemic index. These studies will help refine dietary recommendations for maintenance of healthy weight.

Fish fatty acids prevent dementia. Analysis of blood from elderly men and women revealed that those with the highest levels of omega-3 fatty acids from fish were half as likely to develop dementia, including Alzheimer's disease. ARS scientists in Boston, Massachusetts, found that eating more than two servings of fish weekly in a group of 900 people was associated with maintenance of normal brain function over nine years of follow-up. This study contributes to solving the controversy about how much omega-3 fats are required for optimal health.

Environmental Stewardship

Current Activities:

Agriculture relies on a natural resource base whose sustainability depends on sound, science-based production practices. The management of the Nation's renewable natural resources often seems to be a continuous balancing of conflicting and competing goals and concerns. While this is often the case, particularly in the short-term, longer-term management strategies combined with adequate knowledge of the complex natural systems can yield maximum sustainable benefits from the country's resources that can satisfy most competing concerns. ARS research is designed to address specific issues relating to agriculture's impact on the environment and the environment's impact on agriculture.

EPA estimates that only 70 percent of the rivers, 68 percent of the estuaries, and 60 percent of the lakes now meet legislatively mandated goals. Dust emissions from agricultural operations and ammonia emissions from animal feeding operations pose a threat to environmental quality and human health. Increases in the atmospheric concentration of greenhouse gases and related increases in weather variability affect the physiology and ecology of plants on croplands and rangelands in often unpredictable ways.

Soil is the major natural resource on which society depends for the production of food, feed, fiber and wood products. Research is needed to develop technologies for managing and overcoming soil limitations such as low fertility, poor soil structure, erosion, limited microbial activity, low organic matter and poor carbon sequestration, and acidity that inhibit production and degrade environmental quality. Animal manure poses a threat to soil, water, and air quality. Inadequate tools, environmental constraints, and the uncertainty of outcomes (i.e., financial, ecological, and social) are constraining the development of sustainable agricultural management systems.

Approximately half of the rangelands have been significantly degraded by fire, invasive weeds, environmental changes, and poor grazing management. Approximately 500 million acres of cropland and grazingland have been degraded by various causes, including erosion, loss of organic matter, compaction, salinity, and soil acidification.

Currently, ARS has active research programs designed to respond to these environmental issues and concerns. Specific efforts are directed toward:

1. Developing the tools and techniques required to maintain and restore the physical, chemical, and biological integrity of the Nation's watersheds and its surface and groundwater resources.

2. Developing approaches that mitigate the impact of poor air quality on crop production; and provide scientific information and technology to maintain or enhance crop and animal production while controlling emissions that reduce air quality or destroy the ozone layer.

3. Developing agricultural practices and decision-support strategies that allow producers to take advantage of the beneficial effects and mitigate the adverse impacts of global change.

4. Developing agricultural practices that maintain or enhance soil resources, thus ensuring sustainable food, feed, and fiber production, while protecting environmental quality.

5. Developing management practices, treatment technologies and decision tools for the effective use of animal manure and selected industrial and municipal byproducts to improve soil properties and enhance crop production while protecting the environment.

6. Developing agricultural systems and decision support systems that increase the efficiency of agricultural enterprises while achieving economic and environmental sustainability.

7. Developing ecologically-based information, technologies, germplasms and management strategies that sustain agricultural production, while conserving and enhancing the diverse natural resources found on rangelands and pasture lands.

Selected Examples of Recent Progress:

Market-based carbon trading based on GRACEnet results. Credible, regionally relevant data documenting agroecosystem effects on soil carbon storage are needed for successful implementation of market-based carbon trading programs. ARS scientist from 29 locations across the United States are conducting a coordinated project called Greenhouse gas Reduction through Agricultural Carbon Enhancement network (GRACEnet) to provide information on soil carbon status and greenhouse gas emission of current agricultural practices. Information from a recent GRACEnet review article was used in the development of a carbon credit program for the North Dakota Farmers Union (NDFU) in collaboration with the Chicago Climate Exchange. Producers participating in the program, which included continuous conservation tillage

(no-till) and seeded grassland are credited with 0.4 metric tons carbon dioxide/acre/year for no-till and 0.75 metric tons carbon dioxide/acre/year for seeded grass over the duration of a five year contract; about 830,000 acres were enrolled during the 2006 sign-up period. The NDFU carbon credit program has the potential to realize multiple benefits for agricultural producers, including increased farm income and improvements in soil quality, while concurrently mitigating agriculture's impact on global climate change.

Nitrous oxide emissions from corn and soybean crops may be underestimated. Measurement of the exchanges of greenhouse gases such as nitrous oxide between the soil and atmosphere are key components of assessments of the effects of farming practices on global climate. Nitrous oxide emissions were measured from corn-soybean systems with full width tillage, no-till, and no-till with rye winter cover crop for two years by ARS scientists from the Air Quality and Agricultural Systems Research Laboratory in Ames, Iowa. There were no significant tillage or cover crop effects on nitrous oxide emission observed. However, comparison of the measurement results with estimates calculated using the Intergovernmental Panel on Climate Change default emission factor indicated that the estimated fluxes underestimate the measured emissions by a factor of three at the Iowa sites. The research indicates that worldwide assessments of nitrous oxide greenhouse gas emissions may be seriously underestimated and requires a reassessment of the impact of nitrous oxides from agriculture on global climate.

Ultra-low oxygen as a quarantine treatment for iceberg lettuce. Following success in controlling the Lettuce Aphid on lettuce and Western Flower Thrips on broccoli using ultra-low oxygen, ARS scientists in Salinas, California, developed an ultra-low oxygen treatment protocol to control Western Flower Thrips on iceberg lettuce that does not cause injury to the lettuce. Postharvest control of Western Flowers Thrips on iceberg lettuce addresses the phytosanitary barriers facing U.S. lettuce in overseas markets. The results of the ultra-low oxygen treatments show they have good potential for development as a safe and effective alternative to traditional fumigation for control of Western Flower Thrips and Lettuce Aphid on exported lettuce and could lead to increase exports of U.S. lettuce to overseas markets.

Water seal to reduce fumigant emissions. Two field trials in small plots were conducted by ARS scientists at the Water Management Research Unit, Parlier, California, on a sandy loam soil. Both showed that water seal (spraying water on soil surface following shank fumigation) can reduce Telone as well as chloropicrin emissions more effectively than standard high density polyethylene (HDPE) tarp and cost substantially less ($800/acre for HDPE tarp versus $300/acre for water seal). Fumigation acreage in California alone is more than 50,000 acres each year, making the cost savings substantial.

Ozone offers an alternative method to eliminate Black Widow Spiders from table grapes. Black Widow Spiders are often found in table grapes and must be killed before the grapes are exported. Research conducted by ARS scientists at the San Joaquin Valley Agricultural Sciences Center, Parlier, California, showed that ozone could be utilized to kill the spiders in a short period of time and that the addition of carbon dioxide was not necessary to enhance the efficacy. These results show that the use of ozone could be an effective method to eliminate live Black Widow Spiders from table grapes, making their importation more acceptable by foreign countries.

Documentation of ammonia emissions from beef cattle feedlots. Ammonia emitted from beef cattle feedlots represents a loss of manure nitrogen fertilizer value and can negatively impact the environment locally and regionally. ARS scientists from Bushland, Texas, and Watkinsville, Georgia, along with cooperators from Texas A&M University, West Texas A&M University, and the University of Alberta used four micrometeorology and nutrient balance methods to measure ammonia emissions from a 50,000 head feedlot. All four methods resulted in similar ammonia emissions of 44 to 60 percent of fed nitrogen during the summer, and 15 to 40 percent of fed nitrogen during the winter. On an annual basis, ammonia emissions from the feedlot averaged 31.7 pounds per head capacity, with 48 percent of fed nitrogen lost as ammonia. This multi-year study provides the most comprehensive measurement of ammonia emissions from a beef cattle feedlot currently available to guide policy and regulatory decisions. Data generated in this experiment will contribute to the development of a process model for ammonia emissions.

Swine wastewater treatment systems reduce greenhouse gas emissions. Substantial greenhouse gas (GHG) emission reductions in confined swine operations can result when anaerobic swine lagoons are replaced

with advanced technologies that use aerobic treatment. A recently approved swine wastewater treatment technology developed by ARS scientists from Florence, South Carolina, and industry cooperators reduces or eliminates ammonia emissions, nutrient losses, odors, and pathogens. In addition, this system is more effective than anaerobic lagoons and anaerobic digesters in reduction of GHG emissions. Replacement of an anaerobic lagoon at a 4,360 head swine operation with the new treatment technology reduced GHG emissions from 4,972 tons of carbon dioxide equivalents per year to 50 tons of carbon dioxide equivalents per year. This GHG reduction translates into a direct economic benefit to the producer of approximately $4.50 per pig capacity per year at a Chicago Climate Exchange trading value of $4 per ton of carbon dioxide equivalent emissions reduction. GHG emission reduction credits can compensate for the higher installation cost of new aerobic treatment systems and help facilitate producer adoption of environmentally superior technologies to replace anaerobic lagoons.

Helping farmers economically transition from conventional to conservation tillage systems. Many producers who are using conventional tillage systems mistakenly think that they must suffer several years of reduced crop yields prior to their soils responding positively to a reduced tillage system. The first phase of a large 20-acre long-term field experiment was completed by ARS scientists at Auburn, Alabama, and Watkinsville, Georgia, to determine the impacts of transitioning from a conventional tillage to a conservation tillage system. This experiment was the first in the region to examine interactions among crop management systems, productivity, and landscape positions using soil survey, topography, and electrical conductivity maps to define management zones. Results indicated that in every kind of field management, the use of conservation systems resulted in immediate increased crop productivity – 14 percent on average for cotton compared to the conventional tillage systems. The results of this experiment indicate that producers who farm Coastal Plain soils can immediately begin to take advantage of increased yields when converting their row crop production system from conventional tillage to conservation tillage.

Economic feasibility of growing Switchgrass for bioenergy. On-farm trials are required to determine the economic feasibility of producing Switchgrass as bioenergy crop in the Eastern Great Plains so the Nation can accurately assess the feasibility of this energy option. ARS scientists at Lincoln, Nebraska, in cooperation with the University of Nebraska managed and assessed Switchgrass production for five years on 10 farms spread across Nebraska and the Dakotas. Average yield was 3.4 tons/acre with average production cost of $33/ton plus $17/ton for land rent. Prorating the establishment costs over nine years would reduce costs by $6/ton. Two farmers experienced in Switchgrass production were able to produce the biomass for less than $40/ton including land costs. At this cost, the farm-gate feedstock cost per gallon of ethanol produced would be about $0.50 per gallon. Biomass production costs can be feasible so overall economic viability depends on biomass transportation to the processing plant and conversion costs.

Library and Information Services (National Agricultural Library (NAL))

Current Activities:

Timely, relevant information is an essential raw material for the research process, as well as for effective policy development and decision-making. Targeted information services are also required to support specialized USDA audiences such as inspectors, regulators, nutritionists, and others, as well as their peers, customers, and stakeholders nationwide. The general public requires information on a very broad set of agriculture related topics, ranging from small business development to gardening to nutrition to food safety to farming to textiles to statistics and beyond. The permanent preservation of USDA's and the Nation's agricultural intellectual heritage is a key national responsibility. NAL is mandated to fulfill these roles and is a national resource for all users of agricultural information. NAL's work in collecting, preserving and ensuring access to agricultural information is fundamental to the continued well-being and growth of U.S. agriculture, and to the development of food supplies for the Nation and world. Specific efforts are directed toward:

1. Developing and delivering content for the NAL National Digital Library for Agriculture (NDLA).

2. Integrating the NAL AGRICOLA database into the NDLA.

3. Ensuring long-term access to the resources of the NAL NDLA.

Selected Examples of Recent Progress:

Increased and enhanced customer services. The Library's total volume of direct customer services grew to over 92 million transactions in FY 2006, a more than 7 percent increase from FY 2005, largely because of increased usage of NAL Web-based products and services. The redesign and migration of the NAL Web site www.nal.usda.gov following new USDA style guidelines was a major priority for NAL in 2006. NAL staff met all USDA-mandated migration deadlines by developing software tools, content templates, and style guidelines needed to transition NAL's 64,000 page Web presence. The new NAL Web presence includes functionality that reduces the number of click-throughs needed to find information and also supports searching of NAL databases (such as AGRICOLA) as well as Web pages, from a single search box (functionality initially developed for www.science.gov). NAL developed new and formalized existing Library-wide practices for linking to public facing Web sites. These practices guide agency functions, assure adherence to appropriate quality standards, and comply with maintenance standards required by OMB and USDA. In another important customer service arena, the Library maintained a two-day turnaround time for all document delivery and interlibrary loan requests. The percentage of document delivery requests delivered electronically continues to rise. In FY 2006, 90 percent of all journal articles supplied by NAL were delivered electronically, an increase of 3 percent over FY 2005.

DigiTop and DigiCALS. During FY 2006, NAL continued the refinement and expansion of digital content subscription offerings to USDA employees throughout the world through the USDA Digital Desktop Library service (DigiTop). Usage of DigiTop resources continues to increase at a rate of about 13 percent annually. A total of 678,000 article downloads by USDA employees in FY 2006 indicates the success of this enhanced service. A new metasearching tool called Central Search was deployed to enhance access and retrieval of DigiTop resources. Numerous in-person and virtual training sessions were conducted at USDA locations throughout the country. During FY 2006, NAL added new scientific journal articles and retrospective backfiles for over 2,660 titles, significantly increasing and expanding the value of this popular service to USDA. NAL continues to pursue sustained funding from USDA agencies to support future development and availability of USDA access to DigiTop beyond FY 2006. Agencies contributed a total of $2.5 million to NAL for DigiTop. During FY 2006, the Library's DigiTop-CALS service integrated current awareness alert services through Dialog and EBSCO, and expanded the USDA user base for the current awareness chargeback services. Further, the USDA DigiTop service integrated full-text (context sensitive) linking to select DigiTop subscribed databases using software from Serial Solutions. NAL implemented federated crosssearching solutions to increase the effectiveness of DigiTop user experience. In addition, the DigiTop Web site was redesigned for increased ease-of-use.

AgNIC. Between October 2005 and spring 2007 the Agriculture Network Information Center (AgNIC) Alliance - www.agnic.org – will have welcomed 8 new member institutions, for a total of 63 members. Four digital content-building projects were completed and four new projects were begun, funded by the AgNIC specific cooperative agreements program, which has funded 23 projects since its inception in FY 2004. There were about 170 million hits to the NAL servers and AgNIC partner Web sites in FY 2006. In 2007, the annual meeting of the AgNIC Alliance will for the first time be hosted by a member institution, Mississippi State University.

National Digital Library for Agriculture (NDLA) Design Concept Web Site. In 2005 the Library began formal consultations with customers, stakeholders, and potential partners about developing the National Digital Library for Agricultural (NDLA). In 2006 the Library began development of a Web site, expected to be launched by early 2007, for display and testing of a design concept for the NDLA.

AGRICOLA Re-Scope. AGRICOLA (agricola.nal.usda.gov) is the catalog and index to the collections of NAL, as well as a primary free of charge public source for worldwide access to agricultural information. NAL has completed a process of redefining the scope of the AGRICOLA indexing operation to reflect the Library's current capacity and capabilities. Rather than pursue a goal of comprehensiveness, AGRICOLA will focus on indexing information that directly supports the operations of NAL and serves customer needs as much as possible. The mix of items will include USDA publication, articles authored by USDA

scientists, core agricultural serial titles, as well as digital and printed content material not indexed by commercial indexing services. The re-scoped AGRICOLA index will continue to serve as the search tool to access NAL's collections and as the search portal to the National Agricultural Library Digital Repository.

National Agricultural Library Digital Repository (NALDR). The publishing industry is in the midst of a fundamental shift in modality from printed paper publications to digital publication. This paradigm shift is affecting scientific communications and the nature of performing research. At the core of its mission, NAL must acquire and maintain the scholarly and scientific publications and content required to support agriculture. To fulfill NAL's mandate, the Library now must develop the ability to store and preserve in perpetuity digital publications, for long-term access. In FY 2006 the Library completed a pilot study and began the implementation of a National Agricultural Library - Digital Repository (NAL-DR). The NALDR http://naldr.nal.usda.gov was launched on April 12, providing full text access to publications either digitized by NAL or through NAL's partnerships with other institutions. Over 2,214 volumes (172,175 pages) have been added to the repository thus far, with all documents linked to AGRICOLA. NAL is digitizing, creating metadata for, and storing digitized articles for inclusion in the NALDR. By early 2007, the first articles will be available and will be hyperlinked to AGRICOLA. The following organizations have provided funding for new projects to digitize and make digitize their publications: The Bean Improvement Cooperative, USDA Agricultural Marketing Service and the World's Poultry Science Association. NAL will maintain at least one print copy and provide digital access in perpetuity.

Information Centers. Alternative Farming Systems Information Center (AFSIC) published a third edition of the popular digital publication: "*Organic Agricultural Products: Marketing and Trade Resources*," a comprehensive guide to more than 1,000 online information resources about organic markets, marketing, and trade, available in pdf and html on a free CD or at the AFSIC Web site: http://www.nal.usda.gov/afsic . Animal Welfare Information Center (AWIC) staff conducted 2 on-site and 8 external workshops to train people how to search for information about alternatives to the use of animals in research and exhibited at 10 professional meetings. AWIC produced several new Web-based publications, and 7 CD information products on animal diseases, farm and lab animal care and welfare, searching for alternatives to animal use, care of pandas and other key topics for those species regulated under the Animal Welfare Act. Food and Nutrition Information Center (FNIC) staff developed a database of recipes (http://foodstamp.nal.usda.gov/recipes.php) for nutrition educators working with the Food Stamp Program eligible population. Recipe costs are based on information provided by the USDA Economic Research Service which purchased data from AC Nielson. The majority of recipes in the database were submitted by nutrition educators in the Food Stamp Program. Nutrition.gov, supported by funding from USDA and HHS agencies, received over 3.3 million hits in FY 2006. More Web sites are linking to Nutrition.gov with the addition of metadata to enhance search results, resulting in improved visibility. Nutrition.gov received a record high 347,000 hits in February 2006, and a Google search for "nutrition" now shows Nutrition.gov with #1 ranking. Food Safety Information Center (FSIC) staff collaborated with the University of Mississippi's National Institute of Food Service Management to develop an online application for generating HACCP forms specific to food service employee needs. As an example of Rural Information Center (RIC) services, RIC staff provided information about funding sources to a small medical transportation company which led to the receipt of a grant from one of the foundations. Technology Transfer Information Center (TTIC) MTACRADA partner, Artifex Equipment Inc., reported sales of its super slurper-book drying product, Zorbix, to a number of major libraries worldwide as well as several private conservators. The WIC Learning Online Module was approved for 3.9 contact hours for nurses by the Maryland Nurses Association. The pilot version of IBIDS Clinical contains bibliographic records describing studies and organizational statements pertaining to three dietary supplements: Chromium, Ginkgo, and Vitamin E.

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, $16,000,000, to remain available until expended.

AGRICULTURAL RESEARCH SERVICE

Analysis of Change in Appropriation

BUILDINGS AND FACILITIES - CURRENT LAW

Estimate, 2007	$140,000,000
Budget Request, 2008	0
Decrease in Appropriations	-$140,000,000

Summary of Increases and Deceases - Current Law
(On basis of appropriation)

Item of Change	2007 Estimated	Changes	2008 Estimated
California: Agricultural Research Center, Salinas	$6,000,000	-$6,000,000	$0
Connecticut: Center of Excellence for Vaccine Research, Storrs	2,700,000	-2,700,000	0
District of Columbia: U. S. National Arboretum Bladensburg Road Entrance Construction	1,500,000	-1,500,000	0
Florida: Sugarcane Field Station, Canal Point	2,200,000	-2,200,000	0
Louisiana: ARS Sugarcane Research Laboratory, Houma	16,893,000	-16,893,000	0
New York: Center for Grape Genomics, Geneva	7,290,000	-7,290,000	0
Texas: Knipling-Bushland U. S. Livestock Insects Research Laboratory, Kerrville	2,400,000	-2,400,000	0
Washington: ARS Research Laboratory, Pullman	35,698,000	-35,698,000	0
Unidentified Projects	65,319,000	-65,319,000	0
California: Center for Advanced Viticulture and Tree Crop Research, Davis 1/	--	--	-1,698,083
San Joaquin Valley Agricultural Science Center, Parlier 1/	--	--	-788,193
U. S. Salinity Lab, Riverside 1/	--	--	-14,369
U. S. Agricultural Research Center, Salinas 1/	--	--	-1,238,568
Florida: Subtropical Horticultural Research Center, Ft. Pierce 1/	--	--	-121
Hawaii: U. S. Pacific Basin Agricultural Research Center, Hilo 1/	--	--	-1,054,554
Idaho: Advanced Genetics Laboratory, Aberdeen 1/	--	--	-223
Aquaculture Facility, Hagerman (Billingsley Creek) 1/	--	--	-186,783
Kentucky: Animal Waste Management Research Laboratory, Bowling Green 1/	--	--	-560,348
Forage Animal Production Laboratory, Lexington 1/	--	--	-747,131
Louisiana: ARS Sugarcane Research Laboratory, Houma 1/	--	--	-1,238,568
Maine: Northeast Marine Cold Water Aquaculture Research Center, Orono/Franklin 1/	--	--	-376,396
Michigan: Avian Disease & Oncology Laboratory, East Lansing 1/	--	--	-63,193
Minnesota: Soil & Water Laboratory, Morris 1/	--	--	-2,604
Cereal Disease Laboratory, St. Paul 1/	--	--	-71,508
Mississippi: Biotechnology Laboratory, Lorman 1/	--	--	-373,566
South Central Poultry Research Laboratory, Starkville 1/	--	--	-933,914
Missouri: National Plant & Genetics Security Center, Columbia 1/	--	--	-1,579,513
Montana: Animal Bioscience Facility, Bozeman 1/	--	--	-747,131
New Mexico: Jornada Experimental Range Research Laboratory, Las Cruces 1/	--	--	-28,256
New York: Center for Grape Genomics, Geneva 1/	--	--	-1,238,568
Center for Health-Based Crop Genomics, Ithaca 1/	--	--	-1,238,568
North Dakota: Human Nutrition Research Center, Grand Forks 1/	--	--	-263,041

Item of Change	2007 Estimated	Changes	2008 Estimated
Ohio: Greenhouse Production Research, Toledo..... 1/	--	--	-298,852
Texas: Plant Stress Laboratory, Lubbock..... 1/	--	--	-882
Subtropical Agricultural Research Laboratory, Weslaco... 1/	--	--	-18,503
Washington: ARS Research Laboratory, Pullman..... 1/	--	--	-1,238,568
Georgia: Biocontainment Laboratory and Consolidated Poultry Research Facility, Athens..... 1/	--	--	+16,000,000
Total Available.....	$140,000,000	-$140,000,000	$0

1/ Proposed rescission of available unobligated balances to finance the planning and design of the Biocontainment Laboratory and Consolidated Poultry Research Facility, Athens, GA.

AGRICULTURAL RESEARCH SERVICE

Project Statement - Current Law
(On basis of appropriations)

	2006 Actual AMOUNT	2007 Estimated AMOUNT	Increase or Decrease	2008 Estimated AMOUNT
Total Obligations.....	$270,875,755	$103,607,643	-$8,117,643	$95,490,000
Unobligated Balances:				
Available Start of Year.....	-373,607,868	-261,815,163	-36,392,357	-298,207,520
Available End of Year.....	261,815,163	298,207,520	-79,490,000	218,717,520
Unobligated Balance Permanently Reduce.....			-16,000,000	-16,000,000
Total Available or Estimate.....	159,083,050	140,000,000	-140,000,000	-0-
Rescission.....	1,311,950			
Total Available or Estimate.....	$160,395,000	$140,000,000		

Justification for Increases and Decreases

Buildings and Facilities

a) An increase of $16,000,000 for the planning and design of a Biocontainment Laboratory and Consolidated Poultry Research Facility, Athens, Georgia.

Need for Change

Three major influenza pandemics have swept the globe in the 20th century causing millions of deaths. The next pandemic flu is likely to be a prolonged and widespread outbreak. The severity of the next pandemic cannot be predicted, but modeling studies suggest that its effect in the United States could be severe.

ARS' Southeast Poultry Research Laboratory (SEPRL) in Athens is the major facility in USDA for conducting research on exotic and emerging poultry diseases. SEPRL has conducted crucial research over the past 20 years on exotic poultry diseases, specifically Avian Influenza (including the Hong Kong H5N1 virus), velogenic Newcastle disease, and West Nile virus in the New England States. SEPRL has the only USDA program that provides research support to the Animal and Plant Health Inspection Service (APHIS), Food Safety and Inspection Service (FSIS), The Food and Drug Administration (FDA), and the Centers for Disease Control and Prevention (CDC) for these diseases.

The Richard Russell Agricultural Research Center (RRC), which is adjacent to SEPRL, has three research units that are the primary USDA locations for conducting research on poultry food safety: Antibiotic Resistance Research Unit, Poultry Microbiology Safety Research Unit, and Poultry Processing and Meat Quality Research Unit. The Antibiotic Resistance Research Unit focuses on how antibiotic resistance arises in bacteria from agricultural animals; it develops new methods for preventing the emergence of such resistance. The other two units provide critical pre- and postharvest poultry food safety research on Salmonella typhimurium, Campylobacter jejuni, Clostridium perfringens, and Listeria monocytogenes.

The Avian Disease and Oncology Laboratory (ADOL) in East Lansing, Michigan, conducts research on poultry tumor viruses, Marek's disease, and retroviruses (i.e., Avian Leukosis J, Reticuloendotheliosis and other lymphoid leukosis viruses). Scientists at the laboratory developed the in ovo vaccination technology that protects chickens from Marek's disease. In addition, ADOL has been an international leader in mapping the chicken genome, developing transgenic chickens, and implementing genetic resistance in chickens to tumor viruses.

SEPRL's, RRC's, and ADOL's poultry research facilities are inadequate for addressing highly virulent poultry diseases that require increased biocontainment capabilities and state-of-the-art facilities. SEPRL has BSL-2+ and BSL-3 Ag facilities that were constructed in 1964 and 1976. These facilities (32 small, inefficient buildings) no longer meet SEPRL's expanded research needs. The buildings which were designed for four scientists and their support staff currently serve twelve scientists and their support staff. Critical, cutting edge research is not being conducted because of facility limitations. RRC's poultry research units lack vital BSL-2+ and BSL-3 Ag biocontainment facilities for conducting laboratory and animal studies. ADOL's facilities, some of which were constructed as early as 1939, are out of date and deficient.

The proposed new, modernized facility will meet the combined long term needs of SEPRL, RRC, and ADOL for biocontainment laboratory and animal space. It will enable scientists to more adequately address the emerging/exotic poultry diseases which threaten not only the Nation's poultry industry but potentially the health of hundreds of thousands of Americans. The new facility will contain biocontainment space divided between permanent laboratory space for permanent SEPRL scientists; laboratory space for rotating RRC scientists when working on projects requiring BSL-2+ and BSL-3 Ag biocontainment; animal biocontainment space; and administrative/office space. In addition, the facility will include a farm to house breeding colonies of disease free chickens used for research. The

estimated total project cost for the consolidated facility is $189 million. In FY 2008, ARS requests $16 million for planning and design of the new facility.

In order to finance the requested increase, ARS proposes the rescission of unallocated appropriated funds for partially funded new buildings and facilities projects added by the Congress, and from unobligated balance of completed facilities.

CA, Davis, Center for Advanced Viticulture and Tree Crop Research
CA, Parlier, San Joaquin Valley Agricultural Science Center
CA, Riverside, U. S. Salinity Laboratory
CA, Salinas, U. S. Agricultural Research Center
FL, Ft. Pierce, Subtropical Horticultural Research Center
HI, Hilo, U.S. Pacific Basin Agricultural Research Center
ID, Aberdeen, Advanced Genetics Laboratory
ID, Hagerman, (Billingsley Creek), Aquaculture Facility
KY, Bowling Green, Animal Waste Management Research Laboratory
KY, Lexington, Forage Animal Production Laboratory
LA, Houma, Sugarcane Research Laboratory
ME, Orono/Franklin, Northeast Marine Cold Water Aquaculture Research Center
MI, East Lansing, Avian Disease & Oncology Laboratory
MN, Morris, Soil & Water Laboratory
MN, St. Paul, Cereal Disease Laboratory
MO, Columbia, National Plant and Genetics Security Center
MS, Lorman, Biotechnology Laboratory (Alcorn State University)
MS, Starkville, South Central Poultry Research Laboratory
MT, Bozeman, Animal Bioscience Facility
NM, Las Cruces, Jornada Experimental Range Management Research Laboratory
ND, Grand Forks, Human Nutrition Research Center
NY, Geneva, Grape Genetics Research Center
NY, Ithaca, Center for Health-Based Crop Genomics
OH, Toledo, Greenhouse Production Research (University of Toledo)
TX, Lubbock, Plant Stress Laboratory
TX, Weslaco, Kika de la Garza Subtropical Agricultural Research Laboratory
WA, Pullman, ARS Research Laboratory

AGRICULTURAL RESEARCH SERVICE
Buildings & Facilities

Classification by Objects
2006 Actual and Estimated 2007 and 2008

		2006	2007	2008
Other Objects:				
25.2	Other services	267,521	102,325	94,307
32	Land and Structures	3,355	1,283	1,183
Total B & F Obligations		270,876	103,608	95,490

Agricultural Research Service
Status of Construction Projects as of January 2007

Status of research facilities authorized or funded in prior years and reported as uncompleted in the 2007 Explanatory Notes, are as follows:

NOTE: Design criteria, provided by ARS, specifies the program requirements for the facility and forms the basis for negotiation of architect-engineer contracts. Diagrammatic drawings or concept drawings provide the basis for the 1st review of the architect's design. Tentative drawings or architect's design are provided by the architect for firming up cost estimates and basis for developing the completed, final working drawings.

Location and Purpose	Year	Amount of Funds	Description
California, Albany	2000 Planning and Design	$2,600,000	Construction of the 6 Phase modernization of the Research and
Western Regional	2001 Construction	4,889,220	Development Facility is in progress. Construction of Phases 1
Research Center	2002 Construction	3,800,000	and 2 are complete. The designs for Phases 3, 4, and 5 of the
(R&D Facility)	Total	11,289,220	six-phased modernization project are complete. Redesign of Phase 3 is in progress and is scheduled for completion in the 2nd Quarter, FY 2007.
California, Davis	2004 Planning and Design	$2,684,070	Pre-design is scheduled for completion in the 2nd Quarter, FY
Center for Advanced	2005 Construction	2,976,000	2007. Lease agreement with University is in progress.
Viticulture and Tree Crop Resear	2006 Construction	3,588,750	
	Total	9,248,820	
California, Salinas	2004 Planning and Design	$4,473,450	Design is scheduled for completion in the 2nd Quarter, FY 2007.
Agricultural Research Station	2005 Planning and Design	2,976,000	
	2006 Construction	3,588,750	
	Total	11,038,200	
District of Columbia	2000 Planning and Design	$500,000	The continuing renovation of the National Arboretum is in
U.S. National Arboretum	2001 Design & Construction	3,322,674	progress, including: completion of the design for the
	2002 Design & Construction	4,600,000	renovation of the Administration Building; construction of the
	2003 Design & Construction	1,688,950	headhouse/greenhouse facility scheduled for completion in the
	Total	10,111,624	1st Quarter, FY 2008; completion of the pre-design for the Lab/Office addition; and completion of design for the Bladensburg Road Entrance.
Georgia, Athens	1992 Planning	400,000	Pre-design is complete.
Southeast Poultry Research	1993 Construction	677,000	
Laboratory		1,077,000	

Location and Purpose	Year	Amount of Funds	Description
Hawaii, Hilo	1999 Planning and Design	$4,500,000	Design of Phases 1 and 2 is complete. Construction of Phase 1 is scheduled for completion in the 2nd Quarter, FY 2007.
U.S. Pacific Basin	2000 Construction	4,500,000	
Agricultural Research	2001 Construction	4,989,000	
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	
	Total	31,365,576	
Idaho, Hagerman	2005 Planning and Design	$992,000	Lease agreement is in place. Design was awarded in 4th Quarter, FY 2006 and is scheduled for completion in the 1st Quarter, FY 2008.
Aquaculture Facility	2006 Construction	990,000	
	Total	1,982,000	
Illinois, Peoria	2000 Construction Design	$1,800,000	The modernization of the Central Wing is in progress. Construction is being accomplished in four phases. Construction of Phases 1, 2A, and 2B are complete. Construction of Phase 2C is scheduled for completion in the 4th Quarter, FY 2007.
National Center for	2002 Construction	6,500,000	
Agricultural	2004 Construction	2,684,070	
Utilization Research	2005 Construction	2,976,000	
(Central Wing)	2006 Construction	3,588,750	
	Total	17,548,820	
Iowa, Ames	2001 Design & Construction	8,980,200	The accelerated plan for the completion of the modernization of ARS/APHIS animal facilities is in progress. The status of major components of the modernization are as follows: -Phase 1 Lab/Office (APHIS) was completed in FY 2004. -Large Animal BSL-3Ag facilities construction is scheduled for completion in the 2nd Quarter, FY 2007. -Central Utility Plant & Infrastructure, Phase 1 construction is complete. Phase 2 construction is scheduled for completion in the 2nd Quarter, FY 2007. Phase 3 construction is scheduled for completion in the 1st quarter, 2009. -Design for Consolidated Laboratory facility, caged Animal, gnotobotics, and surgery facilities is complete. Construction started in the 4th Quarter of FY 2005 with full completion scheduled in 1st Quarter, FY 2009. - Design of the dairy facility, animal receiving, manure composting, and scrapie barn is complete. -Design for the Low Containment Large Animal Facility is complete. Low Containment Large Animal Facility construction contract was awarded and will be completed 1st quarter of 2009.
National Centers for	2002 Design & Construction	40,000,000	
Animal Health	2002 Construction	50,000,000	
	2002 APHIS Transfers	15,753,000	
	(Supplemental)	(14,081,000)	
	(Other Transfers)l	(1,672,000)	
	2002 Construction	25,000,000	
	2003 Construction	32,785,500	
	2003 Construction	110,000,000	
	2005 Construction	121,024,000	
	2006 Construction	58,212,000	
	Total	461,754,700	

Location and Purpose	Year	Amount of Funds	Description
Kansas, Manhattan Grain Marketing and Production Research Center	1995 Planning and Design	$950,000	Construction of Phases 1 and 2 of the four-phased project is complete. The construction of Phases 3 and 4 is scheduled for completion in the 4th Quarter, FY 2007.
	1996 Construction	1,000,000	
	1997 Construction	500,000	
	1999 Construction	1,400,000	
	2000 Planning and Design	100,000	
	2001 Construction	3,492,300	
	2002 Construction	3,000,000	
	2003 Construction	4,252,180	
	Total	14,694,480	
Kentucky Bowling Green Animal Waste Management Research Laboratory	2005 Planning and Design	$2,281,600	Pre-design is complete. Design is scheduled for award in the 2nd Quarter, FY 2007. Lease agreement is in place.
	2006 Construction	2,970,000	
	Total	5,251,600	
Kentucky, Lexington Forage Animal Research Laboratory	2005 Planning and Design	$2,976,000	Pre-design is complete. Lease agreement is in progress. Design is scheduled for award in the 2nd Quarter, FY 2007.
	2006 Construction	3,960,000	
	Total	6,936,000	
Louisiana, Houma Sugarcane Research	2004 Planning and Design	$1,342,035	Pre-design is complete. Design is scheduled for completion in the 2nd Quarter, FY 2007.
	2005 Construction	2,976,000	
	2006 Construction	3,588,750	
	Total	7,906,785	
Louisiana, New Orleans Southern Regional Research Center (Industrial Wing)	1998 Planning and Design	$1,100,000	Design and construction activities to stabilize and restore Center facilities due to wind and water damages caused by Hurricane Katrina are in progress. Short-term facilities recovery to facilitate return of displaced SRRC employees is scheduled for completion in the 3rd Quarter, FY 2007. Pre-design for the long-term restoration of facilities is scheduled for completion in the 2nd Quarter, FY 2007. Design is scheduled for completion in the 4th Quarter, FY 2007.
	1999 Modernization	6,000,000	
	2000 Modernization	5,500,000	
	2006 Supplemental (design)	4,900,000	
	2006 Supplemental (constructio	20,000,000	
	Total	37,500,000	
Maine, Orono/Franklin National Cold Water Marine Aquaculture Center	2001 Planning and Design	$2,494,500	Construction of Phase 1 (Pump House and Storage Tanks) is complete. Design of Phase 2 (Lab/Office/Tank Bldg., Franklin site) is complete. Construction will be accomplished through a Construction Manager at Risk Contract and is scheduled for completion in the 3rd Quarter, FY 2007.
	2002 Construction	3,000,000	
	2003 Construction	9,090,525	
	2004 Design & Construction	2,684,070	
	2005 Design & Construction	2,976,000	
	2006 Design & Construction	2,475,000	
	Total	22,720,095	

Location and Purpose	Year	Amount of Funds	Description
Maryland, Beltsville Beltsville Agricultural Research Center, (BARC)	1988 Design & Construction	$5,750,000	2001 Funds:
	1989 Design & Construction	6,100,000	- Construction of the Beltsville Human Nutrition Research
	1990 Design & Construction	9,860,000	Center is complete.
	1991 Design & Construction	15,999,792	- Design of Building 307 is complete.
	1992 Design & Construction	16,000,000	2002/2003 Funds:
	1993 Design & Construction	13,547,000	- Construction of tornado damage repairs is scheduled for full
	1994 Design & Construction	19,700,000 **	completion in the 2nd Quarter, FY 2007.
	1995 Design & Construction	3,960,000	2004 Funds:
	1996 Design & Construction	8,000,000	Construction of the new Poultry Production Facility is
	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	
	Total	151,789,182	
Maryland, Beltsville National Agricultural Library	1998 Design & Construction	$2,500,000	The continuing renovation of the NAL building is in progress, including: replacement of the computer room HVAC and fire suppression systems; completion of chiller replacement and brick repairs of three building elevations; and 14th floor window replacements.
	1999 Design & Construction	1,200,000	
	2001 Design & Construction	1,766,106	
	2002 Construction	1,800,000	
	2003 Design & Construction	1,490,250	
	2004 Design & Construction	894,690	
	Total	9,651,046	
Michigan, East Lansing Avian Disease and Oncology Laboratory	1992 Planning	$250,000	Design for this multi-phased facility modernization is complete.
	1993 Planning	212,000	
	1998 Planning and Design	1,800,000	
	Total	2,262,000	
Mississippi, Lorman Biotechnology Laboratory Alcorn State University	2006 Planning and Design	$1,980,000	A lease agreement with Alcorn State University for the new facility is in progress.

**Appropriated under USDA Rental Payments Account

Location and Purpose	Year	Amount of Funds	Description
Mississippi, Oxford Plant Propagation Greenhouse	2003 Design and Construction	$1,987,000	Construction is scheduled for completion in the 2nd Quarter, FY 2007.
Mississippi, Poplarville Thad Cochran Southern Horticultural Laboratory	2002 Design 2003 Construction 2006 Supplemental	$800,000 9,140,200 4,300,000 $14,240,200	Completed new facility sustained wind and water damages caused by Hurricane Katrina. Design of the Headhouse/Greenhouse project will be awarded in the 2nd Quarter, FY 2007. Construction, which will be accomplished through a Construction Manager at Risk Contract, is scheduled for award in the 2nd Quarter, FY 2007.
Mississippi, Starkville Poultry Science Research Facility	2005 Planning and Design 2006 Construction Total	$2,976,000 4,950,000 7,926,000	Pre-design is complete. Lease agreement is in place. Design is scheduled for completion in the 3rd Quarter, FY 2007.
Mississippi, Stoneville Jamie Whitten Delta States Research Center	2004 Construction 2005 Construction Total	$4,831,326 2,976,000 7,807,326	Design is complete. Construction of Phase 1 of the multi-phased center modernization is scheduled for completion in the 4th Quarter, FY 2008.
Missouri, Columbia National Plant and Genetics Security	2004 Planning and Design 2005 Construction 2006 Construction Total	$2,415,663 4,960,000 3,687,750 11,063,413	Pre-design is complete. Design is scheduled for completion in the 2nd Quarter, FY 2007.
Montana, Bozeman Animal BioScience Facility	2005 Planning and Design 2006 Construction Total	$1,984,000 3,960,000 5,944,000	Pre-design is complete. Lease agreement is in place. Design is scheduled for award in the 2nd Quarter, FY 2007.
Montana, Sidney Northern Plains Agricultural Research Laboratory	1998 Planning and Design 1999 Construction 2004 Planning, Design and Construction Total	$606,000 7,300,000 2,505,132 10,411,132	Construction of Phase 1 (Lab/Office Building) of the two-phased project is complete. Construction of Phase 2 (Quarantine Lab) is scheduled for completion in the 2nd Quarter, FY 2008.
New York, Geneva Grape Genetics	2004 Planning and Design 2005 Construction 2006 Construction Total	$2,415,663 2,976,000 3,588,750 $8,980,413	Design is scheduled for completion in the 3rd Quarter, FY

Location and Purpose	Year	Amount of Funds	Description
New York, Ithaca	2004 Planning and Design	$3,847,167	Design is scheduled for completion in the 3rd Quarter, FY 2007.
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	Pre-design is complete. Lease agreement is in place.
University of Toledo	2006 Construction	1,584,000	
	Total	3,568,000	
Oklahoma, El Reno	2004 Construction	$2,147,256	Design is complete. Construction is scheduled for completion in the 2nd Quarter, FY 2007.
Grazinglands Research Lab			
Oklahoma, Woodward	2002 Planning and Design	$1,500,000	Phase 1 of the three-phased construction project is complete. Phase 2 construction is 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 of Phases 1 through 7 already completed. Design for Phases 8 and 9 is complete.
Eastern Regional Research Cente	1998 Construction	5,000,000	
	1999 Construction	3,300,000	
	2000 Construction	4,400,000	
	2002 Design & Construction	5,000,000	
	Total	21,700,000	
South Carolina, Charleston	1988 Feasibility Study	$50,000	Construction of Phase 1 (Headhouse) is complete. Construction of Phase 2A (Headhouse) was completed in the 1st Quarter, FY 2007. Redesign of Phase 2B (Greenhouse) is complete. Construction is scheduled for award in the 2nd Quarter, FY 2007.
U.S. Vegetable	1990 Planning and		
Laboratory	Construction	1,135,000	
	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	

Location and Purpose	Year	Amount of Funds	Description
Washington, Pullman ARS Research Lab	2004 Planning and Design	$3,936,636	Lease agreement with University is in place. Design is scheduled for completion by the 4th Quarter, FY 2007.
	2005 Construction	2,976,000	
	2006 Construction	3,588,750	
	Total	10,501,386	
West Virginia, Kearneysville Appalachian Fruit Lab	2003 Planning and Design	$471,913	Construction Phases 1 and 2 (immediate laboratory repairs and renovation) are scheduled for completion in the 3rd Quarter, FY 2007. The construction award for the Greenhouse project is scheduled for award in the 2nd Quarter, FY 2007 with completion scheduled for the 1st Quarter, FY 2008.
	2004 Construction	1,789,380	
	2005 Construction	3,608,896	
	2006 Construction	2,024,550	
	Total	7,894,739	
West Virginia, Leetown National Center for Cool and Cold Water Aquaculture (Broodstock Facility)	2002 Design & Construction	$2,200,000	Construction is scheduled for award in the 2nd Quarter, FY 2007.
	2006 Construction	891,000	
	Total	$3,091,000	
Wisconsin, Marshfield Nutrient Management Laboratory	2003 Planning, Design and Construction	$2,980,120	Design of Phase 1 and Phase 2 are complete. Phase 1 construction is scheduled for completion in the 2nd Quarter, FY 2008. Phase 2 construction is scheduled for award in the 3rd Quarter, FY 2007.
	2004 Construction	3,668,229	
	2005 Construction	4,860,800	
	2006 Construction	7,920,000	
	Total	19,429,149	

***Reprogrammed from Horticultural Crop and Water Management Research Laboratory, Parlier, CA

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 strategic goals and objectives:

USDA Strategic Goal/Objective	Agency Strategic Goal	Agency Objectives	Programs that Contribute	Key Outcome
USDA Strategic Goal 2: Enhance the Competitiveness and Sustainability of Rural and Farm Economies **USDA Strategic Objective 2.1:** Expand Domestic Market Opportunities	**Agency Goal 2:** Enhance the Competitiveness and Sustainability of Rural and Farm Economies	Objective 2.1: Provide the science-based knowledge and technologies to generate new or improved high quality value-added products and processes to expand domestic and foreign markets for agricultural commodities.	New Products/ Product Quality/ Value Added	Key Outcome 2: Higher quality, healthier foods; and new products/ uses from agriculture.
USDA Strategic Goal 2: Enhance the Competitiveness and Sustainability of Rural and Farm Economies **USDA Strategic Objective 2.2:** Increase the Efficiency of Domestic Agricultural Production and Marketing Systems	**Agency Goal 2:** Enhance the Competitiveness and Sustainability of Rural and Farm Economies	Objective 2.2: Contribute to the efficiency of agricultural production systems.	Livestock Production Crop Production	Key Outcome 2: Higher quality, healthier foods; and new products/ uses from agriculture.
USDA Strategic Goal 4: Enhance Protection and Safety of the Nation's Agriculture and Food Supply **USDA Strategic Objective 4.1:** Reduce the Incidence of Foodborne Illnesses Related to Meat, Poultry, and Egg Products in the U.S.	**Agency Goal 4:** Enhance Protection and Safety of the Nation's Agriculture and Food Supply	Objective 4.1: Provide science-based knowledge on safe production, storage, processing, and handling of plant and animal products, and the detection and control of toxin-producing and/or pathogenic bacteria and fungi parasites, mycotoxins, chemical residues, and plant toxins so as to assist regulatory agencies and the food industry in reducing the incidence of foodborne illnesses.	Food Safety	Key Outcome 4: Strategies/technologies which improve the Nation's food supply.

USDA Strategic Goal/Objective	Agency Strategic Goal	Agency Objectives	Programs that Contribute	Key Outcome
USDA Strategic Goal 4: Enhance Protection and Safety of the Nation's Agriculture and Food Supply **USDA Strategic Objective 4.2:** Reduce the Number and Severity of Agricultural Pest and Disease Outbreaks	**Agency Goal 4:** Enhance Protection and Safety of the Nation's Agriculture and Food Supply	Objective 4.2: Develop and deliver science-based information and technologies to reduce the number and severity of agricultural pest, insect, weed, and disease outbreaks.	Livestock Protection Crop Protection	Key Outcome 4: Strategies/technologies which improve the Nation's food supply.
USDA Strategic Goal 5: Improve the Nation's Nutrition and Health **USDA Strategic Objective 5.2:** Promote Healthier Eating Habits and Lifestyles	**Agency Goal 5:** Improve the Nation's Nutrition and Health	Objective 5.2: Promote healthier individual food choices and lifestyles and prevent obesity; improve human health by better understanding the nutrient requirements of individuals and the nutritional value of foods; and determine food composition patterns of Americans.	Human Nutrition	Key Outcome 5: More nutritious food which promotes good health.
USDA Strategic Goal 6: Protect and Enhance the Nation's Natural Resource Base and Environment **USDA Strategic Objective 6.1:** Protect Watershed Health to Ensure Clean and Abundant Water	**Agency Goal 6:** Protect and Enhance the Nation's Natural Resource Base and Environment	Objective 6.1: Provide science-based knowledge and education to improve quality and management of air and water resources.	Environmental Stewardship (Air/Water Quality; Global Climate Change)	Key Outcome 6: Improved soil, water, and air resources.
USDA Strategic Goal 6: Protect and Enhance the Nation's Natural Resource Base and Environment **USDA Strategic Objective 6.2:** Enhance Soil Quality to Maintain Productive Working Cropland	**Agency Goal 6:** Protect and Enhance the Nation's Natural Resource Base and Environment	Objective 6.2: Provide science-based knowledge and education to improve quality and management of soil resources.	Environmental Stewardship (Soil Quality; Agricultural Systems Integration)	Key Outcome 6: Improved soil, water, and air resources.

USDA Strategic Goal/Objective	Agency Strategic Goal	Agency Objectives	Programs that Contribute	Key Outcome
USDA Strategic Goal 6: Protect and Enhance the Nation's Natural Resource Base and Environment **USDA Strategic Objective 6.3:** Protect Forests and Grasslands	**Agency Goal 6:** Protect and Enhance the Nation's Natural Resource Base and Environment	Objective 6.3: Provide science-based knowledge and education to improve the management of forests, rangelands, and pastures.	Environmental Stewardship (Rangelands/ Grazinglands)	Key Outcome 6: Improved soil, water, and air resources.
USDA Management Initiative: Electronic Government	**Management Initiative 7(1):** Provide Agricultural Library and Information Services to USDA and the Nation via the National Agricultural Library (NAL)	Objective 7.1: Provide rapid, comprehensive, and long-term access to the full range of agricultural information resources through a variety of NAL delivery systems with particular emphasis on digital technologies.	Library and Information Services	Key Outcome 7(1): Agricultural information which meets the needs of customers.
N/A	**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 of priority 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.

AGRICULTURAL RESEARCH SERVICE

Strategic Objective 2.1: Expand Domestic Market Opportunities.
Strategic Objective 2.2: Increase the Efficiency of Domestic Agricultural Production and Marketing Systems.
Strategic Objective 4.1: Reduce the Incidence of Foodborne Illnesses Related to Meat, Poultry, and Egg Products in the U.S.
Strategic Objective 4.2: Reduce the Number and Severity of Agricultural Pest and Disease Outbreaks.
Strategic Objective 5.2: Promote Healthier Eating Habits and Lifestyles.
Strategic Objective 6.1: Protect Watershed Health to Ensure Clean and Abundant Water.
Strategic Objective 6.2: Enhance Soil Quality to Maintain Productive Working Cropland.
Strategic Objective 6.3: Protect Forests and Grasslands.
Management Initiative 7(1): Provide Agricultural Library and Information Services to USDA and the Nation via the National Agricultural Library.
Management Initiative 7(2): Provide Adequate Federal Facilities Required to Support the Research Mission of ARS.

Strategic Objective and Funding Matrix
(On basis of appropriation)

	2006 Actual		2007 Estimate		Increase	2008 Budget	
	Amount	Staff Years	Amount	Staff Years	or Decrease	Amount	Staff Years
Strategic Objective 2.1:							
Product Quality/Value Added	$105,261,440	953	$99,249,000	939	$+5,341,000	$104,590,000	953
Total, Strategic Objective 2.1	**$105,261,440**	**953**	**$99,249,000**	**939**	**+5,341,000**	**$104,590,000**	**953**
Strategic Objective 2.2:							
Livestock Production	84,994,348	508	80,139,000	501	-9,413,000	70,726,000	458
Crop Production	201,065,382	1,738	189,545,000	1,714	-20,643,000	168,902,000	1,610
Total, Strategic Objective 2.2	**286,059,730**	**2,246**	**269,684,000**	**2,215**	**-30,056,000**	**239,628,000**	**2,068**
Strategic Objective 4.1:							
Food Safety	104,449,720	845	98,482,000	833	+4,716,000	103,198,000	845
Total, Strategic Objective 4.1	**104,449,720**	**845**	**98,482,000**	**833**	**+4,716,000**	**103,198,000**	**845**
Strategic Objective 4.2:							
Livestock Protection	82,533,258	564	77,819,000	557	+30,452,000	108,271,000	674
Crop Protection	196,808,389	1,533	185,239,000	1,512	-11,515,000	173,724,000	1,447
Total, Strategic Objective 4.2	**279,341,647**	**2,097**	**263,058,000**	**2,069**	**+18,937,000**	**281,995,000**	**2,121**
Strategic Objective 5.2:							
Human Nutrition	84,629,372	299	79,794,000	294	+4,342,000	84,136,000	301
Total, Strategic Objective 5.2	**84,629,372**	**299**	**79,794,000**	**294**	**+4,342,000**	**84,136,000**	**301**
Strategic Objective 6.1							
Environmental Stewardship	99,915,451	942	94,206,000	930	-10,139,000	84,067,000	878
Total, Strategic Objective 6.1	**99,915,451**	**942**	**94,206,000**	**930**	**-10,139,000**	**84,067,000**	**878**
Strategic Objective 6.2							
Environmental Stewardship	76,272,757	337	72,196,000	787	-12,465,000	59,731,000	726
Total, Strategic Objective 6.2	**76,272,757**	**337**	**72,196,000**	**787**	**-12,465,000**	**59,731,000**	**726**
Strategic Objective 6.3							
Environmental Stewardship	46,747,818	797	43,796,000	332	-16,586,000	27,210,000	259
Total, Strategic Objective 6.3	**46,747,818**	**797**	**43,796,000**	**332**	**-16,586,000**	**27,210,000**	**259**
Management Initiative							
National Agricultural Library	23,771,106	151	20,531,000	151	-176,000	20,355,000	149
Repair & Maintenance	17,643,170	--	16,607,000	--	--	16,607,000	--
Management Initiative	**41,414,276**	**151**	**37,138,000**	**151**	**-176,000**	**36,962,000**	**149**
Collaborative Research	6,000,000	--	--	--	--	--	--
Miscellaneous Fees	4,847,002	--	--	--	--	--	--
Funds Included for Homeland Security	[35,587,000]	--	[33,495,000]	--	[+57,229,000]	[90,724,000]	--
Unobligated Balance	15,093,866 a/	--	--	--	--	--	--
Total, Available	1,150,033,079	8,667	1,057,603,000	8,550	-36,086,000	1,021,517,000	8,300
Miscellaneous Fees	-2,904,619	--	--	--			
Emergency Supplemental for Avian Influenza	-7,000,000	--	--	--			
Emergency Supplemental for Hurricane Relief	-10,000,000	--	--	--			
Transfer from Office of the Secretary	-350,000	--	--	--			
Transfer from Office of Congressional Relations	-128,000	--	--	--			
Transfer from Agency for Int'l Development (AID)	-6,000,000	--	--	--			
Rescission/Across the Board Reduction	11,353,540	--	--	--			
Total, Available	1,135,004,000	8,667	1,057,603,000	8,550			

NOTE: Research activities carried out in support of Homeland Security are reflected under the Food Safety, Livestock Protection, and Crop Protection program areas.
a/ Includes the unobligated balances of $2,906,837 for S&E funds and $12,187,029 for Avian Influenza/Hurricane Relief Supplementals.

Selected Accomplishments Expected at the FY 2008 Proposed Resource Level

New Products/Product Quality/Value Added

- 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 new technologies that integrate feedstock pretreatment, biological conversion, and product recovery processes, and fundamental knowledge regarding fermentation, milling, and membrane separations.
- Generate higher value coproducts from current low value production byproducts.

Livestock Production

- Continue to build populations stored in the National Animal Germplasm Program. Characterize swine germplasm for efficiency of nutrient utilization.
- Achieve significant progress in demonstrating economically important traits in improved lines of Rainbow Trout and North Atlantic Salmon.
- Use the completed chicken, cattle, swine, and catfish genome sequences to identify novel genes impacting the efficiency of nutrient utilization and adaptation to the production environment, including rumen and gut microorganisms. Complete haplotype maps of the cattle and chicken genomes.
- Transfer improved catfish germplasm to the U.S. catfish industry.
- Identify and characterize genes that affect disease resistance, stress, and other important characteristics affecting the biosecurity of food animal populations.
- Increase the number of cryopreserved specimens by 10 percent.

Crop Production

- Apply a computer decision support system for crop production that reduces risks/losses.
- Apply biocontrol technology to crop plants to enhance disease resistance, product quality, and other important traits.
- Apply new genomic tools to accelerate the genetic improvement of "specialty crops," for superior product quality and resistance to abiotic and biotic stresses.
- 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 important to genomic research.
- Increase crop genetic resource regeneration and maintenance capacity.
- Secure more wild relatives of crops in gene banks.
- Enhance capacity to manage key crop digital images.

Food Safety

- Make significant improvements to previously developed food animal surveillance and epidemiology programs.
- Use microarrays or other gene-based methods 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.
- Fine tune the 2007 program to lower the costs of reducing antibiotic resistance.
- Identify a fungal crop interaction that drives mycotoxin formation which can be adapted to strategies to limit mycotoxin formation.

- Develop strategies to control toxins of plant origin in food products.
- Develop sampling systems and protocols for various food systems to detect intentional contamination.
- Develop rapid systems for target amplification to detect pathogens in foods.
- Develop detection and processing intervention systems for chemical or biological contamination of liquid egg products.
- Develop models to provide simulations of the distribution of bio-security agents in foods.
- Develop an innovative low cost, opto-electronic portable imaging device for food safety and food biosecurity use.

Livestock Protection

- Identify genes that convey specific disease-resistance traits. 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 and protozoa of livestock and poultry.
- Identify genes that are markers for individual cattle and their progeny that are poor hosts for ticks and the horn fly.
- Identify and release new pathogens and predators of imported fire ants based on biological and genetic studies.
- Develop antigenic and genetic targets of cattle ticks for development of anti-tick vaccines in cattle.
- Complete the bench validation of four new diagnostic tests.

Crop Protection

- Develop genomic approaches to control crop diseases, such as Soybean Rust and Wheat Striped Rust.
- Incorporated into pest risk assessments, eleven systems which increase knowledge of the ecology, physiology, epidemiology, and molecular biology of 15 emerging diseases, 10 invasive insects, and 5 invasive weeds.
- 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 and determine possible control measures.

Human Nutrition

- Evaluate dietary patterns useful for preventing obesity.
- Conduct research on requirements/bioavailability of nutrients to define their role in promoting health/preventing obesity.
- Examine the interaction of dietary intake with genetic predisposition for promoting health.
- Release data from dietary supplement database.
- Provide updates of the National Nutrient Database.
- Provide reports from the "What We Eat in America" survey.
- Publish findings on community/individual nutrition intervention strategies.

Environmental Stewardship

- Develop at least one tool that uses remote sensing to assess changes in land use and its impact on water resources.
- Develop at least one tool to evaluate environmental risks and cost effectiveness associated with the selection and placement of various conservation practices.

- Develop an integrated technology for producing watershed scale water use maps.
- Develop at least one cropping system that uses limited water supplies for drought and salt tolerance.
- Develop management practices and/or control technologies that reduce ammonia emissions from animal feeding operations.

Library and Information Services

- Increase DigiTop access and availability by at least 5 percent.
- Add at least three new AgNIC partners.
- Increase overall NAL service delivery to at least 5 percent.
- Upgrade/enhance software for accessing, navigating, evaluating, and delivering AGRICOLA database services.
- Digitize 5,000 document images for web access.
- Continue to collaborate with the U.S. Agricultural Information Network libraries and AgNIC partners to preserve digital agricultural information.

Buildings and Facilities

- Plan/design the Biocontainment Laboratory and Consolidated Poultry Research Facility in Athens, Georgia.

AGRICULTURAL RESEARCH SERVICE

Summary of Budget and Performance
Key Performance Outcomes and Measures

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

Key Outcome: Higher quality, healthier foods; and new products/uses from agriculture.

Key Performance Measures:

Objective 2.1: Expand Domestic Market Opportunities

- Measure #1: Improve the efficiency and reduce the cost for the conversion of biomass to energy.

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

- Measure #2: Identify genes responsible for economically important traits, including animal product quality, efficiency of nutrient utilization, and environmental adaptability.

Key Performance Targets:

Performance Measure	2004 Actual	2005 Actual	2006 Actual	2007 Target	2008 Target
Measure #1					
a. Units	•Increased ethanol yield from corn grain by processing the corn fiber. •Optimized the reaction for in situ transesterification of soybean to biodiesel.	•Expanded development and use of biobased fuels. •Developed systems for producing, harvesting, and handling biomass crops for energy production.	• Developed an on-farm method for converting agricultural crops and wastes to an energy source. •Developed a system for more efficient harvesting and preprocessing of a biomass crop for energy production.	• Develop new technologies that integrate feedstock pretreatment, biological conversion, and product recovery processes, as well as fundamental knowledge regarding fermentation, milling, and membrane separations.	•Develop new technologies that integrate feedstock pretreatment, biological conversion, and product recovery processes, and fundamental knowledge regarding fermentation, milling, and membrane separations.

Performance Measure	2004 Actual	2005 Actual	2006 Actual	2007 Target	2008 Target
	•Developed germplasm/cultivars of grasses, legumes, and cereal grains that produced greater yields of biomass with improved quality for conversion to biofuel.			•Generate higher value coproducts from current low value production byproducts.	•Generate higher value coproducts from current low value production byproducts.
b. Dollars	$13,860,000	$13,868,000	$14,121,000	$13,568,000	$24,810,000
Measure #2					
a. Units	•Identified several major genes responsible for economically important traits in food animals.	•Completed a minimum 6X draft sequence/ annotation of the cattle and swine genomes. •Tested the ability to incorporate a major gene group with beneficial economic traits into food animals.	•Identified and characterized genes that affect disease resistance, stress, and other important characteristics affecting the biosecurity of food animal populations.	•Identify and characterize genes that affect disease resistance, stress, and other important characteristics affecting the biosecurity of food animal populations.	•Identify and characterize genes that affect disease resistance, stress, and other important characteristics affecting the biosecurity of food animal populations.
b. Dollars	$24,455,000	$24,919,000	$25,235,000	$23,794,000	$26,120,000

Notes: (1) FY 2007 and 2008 Targets are based on receiving proposed funding increases.
(2) FY 2003 data for the Performance Measures listed here is not available.
(3) All of ARS' Performance Measures are not included in this table.

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

Key Outcome: Strategies/technologies that improve the Nation's food supply.

Key Performance Measures:

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

- Measure #1: Provide scientific information to protect animals from pests, infectious diseases, and other disease-causing entities that impact animal/human health.

- Measure #2: Identify, develop, and release to the U.S. agricultural community genetic markers/lines, breeds, or germplasm that result in food animals with improved pest/disease resistance traits.
- Measure #3: Develop/transfer technologies to the agricultural community, commercial partners, and Federal agencies to control/eradicate domestic/exotic diseases that impact animal/human health.
- Measure #4: Develop/release to potential users varieties/ germplasm of agriculturally important plants that are new or provide significantly improved characteristics enhancing pest/disease resistance.
- Measure #5: Provide fundamental and applied scientific information/ technologies to protect agriculturally important plants from pests/diseases.
- Measure #6: Provide information/technologies to producers of agriculturally important plants in support of exclusion, detection, and early eradication; control and monitoring of invasive insects, weeds, and pathogens; and restoration of affected areas. Conduct biologically-based integrated/areawide management of key invasive species.

Key Performance Targets:

Performance Measure	2004 Actual	2005 Actual	2006 Actual	2007 Target	2008 Target
Measure #1					
a. Units	•Identified genes, single nucleotide polymorphisms (SNPs) or biomarkers that can be used to identify animals with disease-resistance traits. •Identified and applied new technologies that increase our understanding of virulence factors and host defense mechanisms. Priority was given to finding factors that modulate infectivity, polymicrobial infections, host specificity, tissue tropism, and the mechanisms that facilitate the shed/spread of pests and	•Identified genes that convey specific disease-resistance traits. •Characterized gene functions/ mechanisms responsible for disease-resistance traits. •Characterized genetic profiles with specified levels of disease-resistance under field conditions. •Conducted epidemiological investigations to understand disease transmission mechanisms. •Accelerated research on host responses to pathogens on the	•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.	•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.	•Identify genes that convey specific disease-resistance traits. •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

Performance Measure	2004 Actual	2005 Actual	2006 Actual	2007 Target	2008 Target
	infections diseases.	role innate/adaptive immunity plays in controlling viral/ bacterial/parasitic/mixed infections. •Identified/eval-uated new adjuvant technologies and vaccine delivery systems.			research program for control and eradication of biological threat agents.
b. Dollars	$52,304,000	$53,011,000	$56,674,000	$51,372,000	$59,466,000
Measure #2					
a. Units	•Identified genetic/proteomic elements that modulate resistance against priority poultry diseases.	•Discovered genetic profiles that convey protective immunity against infectious diseases/parasites.	•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.	•Discover genetic profiles that convey protective immunity against infectious diseases/parasites. •Develop control programs for invasive drug-resistant nematodes and protozoa of livestock and poultry. •Identify and release new pathogens and predators of imported fire ants based on biological and genetic studies.	•Discover genetic profiles that convey protective immunity against infectious diseases/parasites. •Develop control programs for invasive drug resistant nematodes and protozoa of livestock and poultry. •Identify and release new pathogens and predators of imported fire ants based on biological and genetic studies.
b. Dollars	$487,000	$501,000	$475,000	$486,000	$7,817,000

Performance Measure	2004 Actual	2005 Actual	2006 Actual	2007 Target	2008 Target
Measure #3					
a. Units	•Completed bench validation of four new diagnostic tests. •Completed proof-of-concept efficiency studies for two new vaccines.	•Completed the bench validation of four new diagnostic tests.	•Completed the bench validation of four new diagnostic tests.	•Complete the bench validation of four new diagnostic tests.	•Complete the bench validation of four new diagnostic tests.
b. Dollars	$24,960,000	$24,977,000	$25,385,000	$25,961,000	$40,988,000
Measure #4					
a. Units	•Breeding strategies were tested/evaluated. •72 crop varieties were released.	•Breeding strategies were developed and new varieties (with insect/disease resistance) were released to crop producers.	•Developed production systems with new insect/disease resistant releases that decrease pesticide use by 15 percent.	•Develop genomic approaches to control crop diseases, such as soybean rust and wheat striped rust.	•Develop genomic approaches to control crop diseases, such as soybean rust and wheat striped rust.
b. Dollars	$19,033,000	$20,249,000	$21,393,000	$20,049,000	$23,503,000
Measure #5					
a. Units	•Approaches were developed which increased knowledge of the ecology, physiology, epidemiology, and molecular biology of emerging diseases/pests. They were incorporated into pest risk assessments.	•Eleven systems were developed which increase knowledge of the ecology, physiology, epidemiology, and molecular biology of 10 emerging diseases, 10 invasive insects, and 5 invasive weeds. The knowledge was incorporated into pest risk assessments.	•Eleven systems were developed which increase knowledge of the ecology, physiology, epidemiology, and molecular biology of 10 emerging diseases, 10 invasive insects, and 5 invasive weeds. The knowledge was incorporated into pest risk assessments.	•Eleven systems will be developed which increase knowledge of the ecology, physiology, epidemiology, and molecular biology of 15 emerging diseases, 10 invasive insects, and 5 invasive weeds. The knowledge will be incorporated into pest risk assessments.	•Eleven systems will be developed which increase knowledge of the ecology, physiology, epidemiology, and molecular biology of 15 emerging diseases, 10 invasive insects, and 5 invasive weeds. The knowledge will be incorporated into pest risk assessments.
b. Dollars	$65,758,000	$68,848,000	$69,270,000	$65,975,000	$58,042,000

Performance Measure	2004 Actual	2005 Actual	2006 Actual	2007 Target	2008 Target
Measure #6					
a. Units	•Ten integrated pest management approaches and six diagnostic molecular assays to detect/identify emerging diseases/pests were developed/made available for validation by action agencies/State cooperators. •Ten biologically-based integrated control/ management strategies and 11 knowledge-based strategies were made available in support of producers.	•Ten integrated pest management approaches and 6 diagnostic molecular assays to detect/identify emerging diseases/pests were validated and incorporated into detection, early eradication, and control programs. •Ten biologically-based integrated control/ management strategies and 11 knowledge-based strategies were made available in support of producers.	•Conducted research to control sudden oak death, tamarisk (salt cedar), emerald ash borer, yellow starthistle, Asian longhorned beetle, and lobate lac scale. •Improved taxonomic knowledge of invasive species. Characterized pathogens and identified key pathways of infection.	•Provide information on emerging diseases and invasive species that will enhance identification and detection. •Characterize pathogens and invasive species, and determine key events in disease development and infection processes and determine possible control measures.	•Provide information on emerging diseases and invasive species that will enhance identification and detection. •Characterize pathogens and invasive species, and determine key events in disease development and infection processes and determine possible control measures.
b. Dollars	$103,344,000	$103,904,000	$106,145,000	$99,215,000	$92,179,000

Notes: (1) FY 2007 and 2008 Targets are based on receiving funding increases.
(2) FY 2003 data for the Performance Measures listed here is not available.
(3) All of ARS' Performance Measures are not included in this table.

Goal 5: Improve the Nation's Nutrition and Health

Key Outcome: More nutritious food which promotes good health.

Key Performance Measures:

Objective 5.2: Promote Healthier Eating Habits and Lifestyles

- Measure #1: Scientifically assess the efficacy of enhancements to the nutritional value of our food supply and identify, conduct, and support intramural and extramural research to develop, test, and evaluate effective clinical and community dietary intervention strategies and programs for modifying diet, eating behavior, and food choices to improve the nutritional status of targeted populations. A special emphasis is to prevent obesity and promote healthy dietary behaviors.
- Measure #2: Determine food consumption patterns of Americans, including those of different ages, ethnicities, regions, and income levels. Provide scientific analyses of the U.S. food consumption information to enhance the effectiveness and management of the Nation's domestic food and nutrition assistance programs.

Key Performance Targets:

Performance Measure	2004 Actual	2005 Actual	2006 Actual	2007 Target	2008 Target
Measure #1					
a. Units	•Designed experiments to assess the benefits of new healthy foods.	•Evaluated the health benefits of a new healthy food.	•Studied school-based interventions to prevent unhealthy weight gain in children.	•Evaluate dietary patterns useful for preventing obesity.	•Evaluate dietary patterns useful for preventing obesity.
b. Dollars	$10,499,000	$10,598,000	$11,572,000	$10,911,000	$14,664,000
Measure #2					
a. Units	•Provided updates of the National Nutrient Database. •Provided reports from the "What We Eat in America" survey.	•Provided updates of the National Nutrient Database. •Provided reports from the "What We Eat in America" survey.	•Provided yearly updates of the National Nutrient Database. •Released two year data from the "What we Eat in America" survey.	•Provide updates of the National Nutrient Database. •Provide reports from the "What We Eat in America" survey.	•Provide updates of the National Nutrient Database. •Provide reports from the "What We Eat in America" survey.

Performance Measure	2004 Actual	2005 Actual	2006 Actual	2007 Target	2008 Target
	•Published findings on requirements/ bioavailability of nutrients and their role in promoting health/ preventing obesity. •Published findings on community/individual nutrition intervention strategies.	•Published findings on requirements/ bioavailability of nutrients and their role in promoting health/ preventing obesity. •Published findings on nutrition intervention strategies.		•Publish findings on requirements/ bioavailability of nutrients and their role in promoting health/ preventing obesity. •Publish findings on community/individual nutrition intervention strategies.	•Publish findings on requirements/ bioavailability of nutrients and their role in promoting health/ preventing obesity. •Publish findings on community/individual nutrition intervention strategies.
b. Dollars	$13,664,000	$13,700,000	$13,841,000	$13,050,000	$13,170,000

Notes: (1) FY 2007 and 2008 Targets are based on receiving proposed funding increases.
(2) FY 2003 data for the Performance Measures listed here is not available.
(3) All of ARS' Performance Measures are not included in this table.

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

Key Outcome: Improved soil, water, and air resources.

Key Performance Measure:

Objective 6.1: Protect Watershed Health to Ensure Clean and Abundant Water

- Measure #1: Develop tools/techniques required to maintain/restore the physical, chemical, and biological integrity of the Nation's watersheds and its surface/groundwater resources.

Key Performance Targets:

Performance Measure	2004 Actual	2005 Actual	2006 Actual	2007 Target	2008 Target
Measure #1					
a. Units	•Developed methods to assess the risk of water scarcity on irrigated/dry lands. •Quantified the effects of climate, soils, vegetation, watershed characteristics, and pollutant loading on the effectiveness of riparian areas/wetlands for improving water quality. •Developed watershed models that determine impacts of sediments/ contaminants on surface/ground waters. •Quantified factors that control movement of pesticides in soil/aquatic environments.	•Evaluated the role of sediments in transport, storage, and fate of nutrients/ pesticides. •Developed models/ decision support systems for use in water quality risk assessments of agricultural conservation programs. •Conducted research on watershed dam safety.	•Developed at least one method to assess and quantify environmental benefits from conservation practices. •Developed two drought assessment tools for use by USDA action agencies. •Developed two methods for evaluation and prediction of the performance of watershed structures.	•Develop at least one tool that uses remote sensing to assess changes in land use and its impact on water resources. •Develop at least one tool to evaluate environmental risks and cost effectiveness associated with the selection and placement of various conservation practices. •Develop an integrated technology for producing watershed scale water use maps. •Develop one cropping system that uses limited water supplies for drought/salt tolerance.	•Develop at least one tool that uses remote sensing to assess changes in land use and its impact on water resources. •Develop at least one tool to evaluate environmental risks and cost effectiveness associated with the selection and placement of various conservation practices. •Develop an integrated technology for producing watershed scale water use maps. •Develop one cropping system that uses limited water supplies for drought/salt tolerance.
b. Dollars	$63,150,000	$64,139,000	$65,600,000	$61,852,000	$51,942,000

Notes: (1) FY 2007 and 2008 Targets are based on receiving proposed funding increases.
(2) FY 2003 data for the Performance Measures listed here is not available.
(3) All of ARS' Performance Measures are not included in this table.

Management Initiative: Expand Electronic Government

Key Outcome: Agricultural information which meets the needs of customers.

Key Performance Measures:

Objective 7.1: Provide Agricultural Library and Information Services to USDA and the Nation via the National Agricultural Library

- Measure #1: Develop/deliver content for the National Digital Library for Agriculture (NDLA).
- Measure #2: Integrate the AGRICOLA database into the NDLA.
- Measure #3: Ensure long-term access to the resources of the NDLA.

Key Performance Targets:

Performance Measures	2004 Actual	2005 Actual	2006 Actual	2007 Target	2008 Target
Measure #1					
a. Units	•Increased DigiTop access and availability by at least 25 percent. •Added 2 new AgNIC partners. •Increased overall NAL service delivery by at least 20 percent.	•Increased DigiTop access and availability by at least 25 percent. •Added at least 3 new AgNIC partners. •Increased overall NAL service delivery by at least 20 percent.	•Increased DigiTop access and availability by at least 25 percent. •Added at least 3 new AgNIC partners. •Increased overall NAL service delivery by at least 15 percent.	•Increase DigiTop access and availability by at least 25 percent. •Add at least 3 new AgNIC partners. •Increase overall NAL service delivery by at least 15 percent.	•Increase DigiTop access and availability by at least 5 percent. •Add at least 3 new AgNIC partners. •Increase overall NAL service delivery by at least 5 percent.
b. Dollars	$7,398,000	$7,786,000	$8,857,000	$7,649,000	$7,240,000

Performance Measures	2004 Actual	2005 Actual	2006 Actual	2007 Target	2008 Target
Measure #2					
a. Units	•Implemented new Oracle-based library management system for the acquisition, cataloging, and indexing of resources for the AGRICOLA database.	•Upgraded/en-hanced software for accessing, navigating, evaluating, and delivering AGRICOLA database services.	•Upgraded/enhanced software for accessing, navigating, evaluating, and delivering AGRICOLA database services.	•Upgrade/enhance software for accessing, navigating, evaluating, and delivering AGRICOLA database services.	•Upgrade/enhance software for accessing, navigating, evaluating, and delivering AGRICOLA database services.
b. Dollars	$6,854,000	$6,876,000	$7,457,000	$6,441,000	$6,561,000
Measure #3					
a. Units	• Digitized 15,000 document images for web access.	•Digitized 15,000 document images for web access. •Continued with the U.S. Agricultural Information Network libraries and AgNIC partners to preserve digital agricultural information.	•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.	•Digitize 15,000 document images for web access. •Continue to collaborate with the U.S. Agricultural Information Network libraries and AgNIC partners to preserve digital agricultural information.	•Digitize 15,000 document images for web access. •Continue to collaborate with the U.S. Agricultural Information Network libraries and AgNIC partners to preserve digital agricultural information.
b. Dollars	$6,855,000	$6,877,000	$7,457,000	$6,441,000	$6,554,000

Notes: (1) FY 2007 and 2008 Targets are based on receiving proposed funding increases.
(2) FY 2003 data for the Performance Measures listed here is not available.
(3) All of ARS' Performance Measures are not included in this table.

PART/Strategic Plan Performance Measures

In preparing the FY 2008 budget, ARS' National Program Staff reviewed the agency's research projects considering PART findings and applying the R&D criteria of relevance, performance, and quality. This review enabled ARS identify low performing and/or low priority research and helped guide budget and program decisions.

ARS is in the process of finalizing its new Strategic Plan for 2006-2011. ARS' Plan, based on the Department's revised Strategic Plan, has new performance measures. The agency's FY 2009 budget will be tied to a combination of these new performance measures and the new PART performance measures.

ARS has developed five general PART performance measures which apply to all of its programs:

(1) Percentage of projects annually assessed to have direct relevancy in contributing to the achievement of ARS long-term goals.
(2) Five-year rolling average of projects receiving a passing score by independent, external expert panels on the first submission through the (OSQR) Office of Scientific Quality Review process.
(3) The percentage of annual research project milestones met.
(4) Number of retrospective, independent external program assessments.
(5) Relative increase in peer reviewed publications.

In addition, ARS has developed the following program – specific PART performance measures and targets:

New Products/Product Quality and Livestock/Crop Production

(1) Cumulative number of new technologies developed and used by ARS customers to reduce the cost, improve the efficiency, increase the yield, and increase the sustainability of production and conversion of biobased feedstocks to biofuels.

Year	Target (Technologies Developed and Used)	Actual
2002	1	1
2003	2	2
2004	4	4
2005	6	6
2006	9	9
2007	12	
2008	15	
2009	18	
2010	21	
2011	24	
2012	27	

(2) Cumulative number of new technologies developed and used by ARS customers to increase productivity and efficiency of animal agriculture, and enhance the economic value and well-being of agricultural livestock and poultry by improving the nutritional quality and yield of meat, milk, egg, and other animal by-products while decreasing the environmental footprint of production systems.

Year	Target (Technologies Developed and Used)	Actual
2002	2	2
2003	4	5
2004	6	8
2005	9	
2006	12	
2007	15	
2008	18	
2009	21	
2010	24	
2011	27	

(3) Cumulative number of new technologies developed and used by ARS customers to increase productivity and efficiency of producing important crops, and to enhance the economic value of agricultural crops by improving the nutritional quality of food and feed ingredients as determined by APHIS, ERS, FDA, NIH, FAS DHS, National Oilseed Processors Association, North American Millers Federation, National Bakers Association, etc.

Year	Target (Technologies Developed and Used)	Actual
2002	2	2
2003	4	4
2004	6	6
2005	9	9
2006	12	12
2007	15	
2008	18	
2009	21	
2010	24	
2011	27	

Food Safety and Livestock/Crop Protection

(1) Cumulative number of new technologies by the program and used by ARS customers to detect, identify, and control the most critically and economically important foodborne containments causing illness, death, or chronic disease that impacts public health and industry as determined by FSIS, APHIS, ERS, CDC, FDA, DHS, DoD, Risk Assessment Consortium, and the Codex Alimentarius Commission.

Year	Target (Technologies Developed and Used)	Actual
2002	3	3
2003	6	6
2004	9	10
2005	13	13
2006	17	17
2007	21	
2008	25	
2009	30	
2010	35	
2011	40	

(2) Cumulative number of new diagnostic tests developed and used by ARS customers to identify, control, and/or eradicate economically important and/or easy targets for domestic and exotic diseases affecting animal and human health as determined by APHIS, ERS, FDA, DHS, DoD, American Association of Veterinary Laboratory Diagnosticians, and the World Animal Health Organization.

Year	Target (Tests Developed and Used)	Actual
2002	2	2
2003	4	4
2004	6	6
2005	9	9
2006	12	12
2007	15	
2008	18	
2009	21	
2010	24	
2011	27	

(3) Cumulative number of new technologies developed and used by ARS customers to detect, identify, control, and/or eradicate domestic and exotic diseases affecting economically important crops as determined by APHIS, ERS, EPA, NASA, DHS, Corn Growers Association, American Soybean Association, etc.

Year	Target (Technologies Developed & Used)	Actual
2002	2	2
2003	4	4
2004	6	6
2005	9	9
2006	12	12
2007	15	
2008	18	
2009	21	
2010	24	
2011	27	

Human Nutrition

(1) Cumulative number of Federal and Institute of Medicine reports used to establish Federal nutrition policies and regulations that employ program research results in formulating recommendations to safeguard the health of the American people.

Year	Target (Reports used)	Actual
2003	2	4
2004	5	5
2005	8	8
2006	10	10
2007	13	
2008	16	
2009	20	
2010	24	
2011	28	
2012	32	

(2) Cumulative number of food intake and nutrient content databases released by the program and used by ARS customers to establish Federal dietary policy guidelines, food assistance and feeding programs, and food labeling to safeguard the health of the American people.

Year	Target (Databases Released and Used)	Actual
2003	4	4
2004	10	10
2005	13	13
2006	16	16
2007	20	
2008	24	
2009	28	
2010	32	
2011	36	
2012	40	

Environmental Stewardship

(1) Cumulative number of sustainable production practices and technologies developed by the program and used by customers and partners to enhance production of food, feed, fiber, and crops for bioenergy and biobased products.

Year	Target (Practices/Technologies/ Tools Developed and Used)	Actual
2003	2	2
2004	4	4
2005	6	6
2006	8	8
2007	10	
2008	13	
2009	16	
2010	19	
2011	23	
2012	27	

(2) Cumulative number of practices and technologies specifically designed by the program and used by customers and partners to protect the environment from agriculturally generated pollutants.

Year	Target (Practices/Technologies/ Tools Developed and Used)	Actual
2003	2	2
2004	4	4
2005	6	6
2006	8	8
2007	10	
2008	13	
2009	16	
2010	19	
2011	22	
2012	25	

(3) Cumulative number of risk reduction decision tools developed by the program and used by customers and partners to reduce on-farm risks to producers and off-site risks to the public and the environment.

Year	Target (Decision Tools Developed & Used)	Actual
2003	1	1
2004	2	2
2005	3	3
2006	4	4
2007	5	
2008	7	
2009	9	
2010	11	
2011	13	
2012	15	

PART Findings/Improvement Plan

A PART analysis of the New Products/Product Quality and Livestock and Crop Production (Goal 2) research program was conducted by ARS and submitted to OMB. OMB scored the program 74, "Moderately Effective." ARS is taking the following actions to improve the performance of the program:

- Revising the "societal" based long-term performance measures (i.e., percentage of biofuels used and improvements in the agricultural productivity index).
- Conducting an independent, external Retrospective Panel Review of ARS' Crop Production programs during FY 2007.
- Using Congressional earmarks, add-ons, and pass-through funds to address Administration goals and submit them to the Office of Scientific Quality Review (OSQR) for independent external peer review to ensure quality.

A PART analysis of the Food Safety and Livestock/Crop Protection (Goal 3) research program was conducted by ARS and submitted to OMB. OMB scored the Food Safety Program 82, "Moderately Effective," and the Livestock/Crop Protection program 74, "Moderately Effective."

- Conducting an independent, external Retrospective Panel Review of ARS' Veterinary, Medical, and Urban Entomology program during FY 2007.
- Monitoring the long-term measures to document the actual use of research outputs/outcomes (i.e., knowledge and technologies).
- Using Congressional earmarks, add-ons, and pass-through funds to address Administration goals and submit them to OSQR for independent external peer review to ensure quality.

A PART analysis of the Human Nutrition (Goal 5) research program was conducted by ARS and submitted to OMB. OMB scored the program 82.5, "Moderately Effective." One problem that prevented the program from receiving an "Effective" rating was its lack of ambitious targets for improving the quality of its research projects. ARS is taking the following actions to improve the performance of the program:

- Developing a new Human Nutrition National Program Action Plan during FY 2007 to improve the program's effectiveness during the next 5-year program cycle.
- Conducting an independent external Retrospective Panel Review of the program during FY 2007.
- Monitoring the long-term performance measures to document the actual use of research outputs/outcomes (i.e., new knowledge and technologies).

A PART analysis of the Environmental Stewardship (Goal 6) research program was conducted by ARS and submitted to OMB. OMB scored, the program 78.5, "Moderately Effective." One problem that prevented the program from receiving an "Effective" rating was its lack of ambitious targets for improving the quality of its research projects. ARS is taking the following actions to improve the performance of the program:

- Conducting an independent, external Retrospective Panel Review of ARS' Global Change and Air Quality programs during FY 2007.
- Monitoring the long-term performance measures to document the actual use of research outputs/outcomes (i.e., new knowledge and technologies).
- Using Congressional earmarks, add-ons, and pass-through funds to address Administration goals, and submitting them to OSQR for an independent, external peer review to ensure quality.

AGRICULTURAL RESEARCH SERVICE

Full Cost by Departmental Strategic Objective

Strategic Objective 2.1: Expand Domestic Market Opportunities.

Program Items:	2006 Amount ($000)	2007 Amount ($000)	2008 Amount ($000)
Direct Costs:			
Research and Development	95,851	89,033	94,674
Indirect Costs:			
Program and Administrative/ Financial Management	7,120	7,737	7,517
USDA Central Charges	2,160	2,338	2,262
Task Force, Advisory Committees, and Other Support Costs	130	141	137
Total Indirect Cost	9,410	10,216	9,916
Total Cost	105,261	99,249	104,590
FTE's	953	939	953

Performance Measures:

Develop cost-effective and functional industrial and consumer products from agricultural and forestry resources.

Provide higher quality, healthy foods that satisfy consumer needs in the United States and abroad.

Improve efficiency and reduce cost for conversion of biomass to energy.

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

Program Items:	2006 Amount ($000)	2007 Amount ($000)	2008 Amount ($000)
Direct Costs:			
Research and Development	260,483	237,603	207,092
Indirect Costs:			
Program and Administrative/ Financial Management	19,350	24,293	24,661
USDA Central Charges	5,872	7,344	7,426
Task Force, Advisory Committees, and Other Support Costs	355	444	449
Total Indirect Cost	25,577	32,081	32,536
Total Cost	286,060	269,684	239,628
FTE's	2,246	2,215	2,068

Performance Measures:

Provide producers with scientific information and technology that increase production efficiency, develop improved germplasm, safeguard the environment, improve animal well-being, and reduce production risks and product losses.

Develop needed information on the relationships between nutrients, reproduction, growth, and conversion to and marketability of animal products.

Identify genes responsible for economically important traits, including animal product quality, efficiency of nutrient utilization, and environmental adaptability.

Maintain, characterize, and use genetic resources to optimize and safeguard genetic diversity and promote

viable, vigorous animal production systems.

Provide producers with scientific information and technology that increase production efficiency, safeguard the environment, and reduce production risks and product losses.

Improve the understanding of the biological mechanisms that influence plant growth, product quality, and marketability to enhance the competitive advantage of agricultural commodities.

Identify genes responsible for plant product quality and resistance to disease, pests, and weather losses.

Maintain, characterize, and use genetic resources to optimize, safeguard, and enhance genetic diversity and promote viable and vigorous plant production systems.

Strategic Objective 4.1: Reduce the Incidence of Foodborne Illnesses Related to Meat, Poultry, and Egg Products in the U.S.

Program Items:	2006 Amount ($000)	2007 Amount ($000)	2008 Amount ($000)
Direct Costs:			
Research and Development	95,110	91,384	96,431
Indirect Costs:			
Program and Administrative/ Financial Management	7,066	5,375	5,129
USDA Central Charges	2,144	1,625	1,545
Task Force, Advisory Committees, and Other Support Costs	130	98	93
Total Indirect Cost	9,340	7,098	6,767
Total Cost	104,450	98,482	103,198
FTE's	845	833	845

Performance Measures:

Develop new on-farm preharvest systems, practices, and products to reduce pathogen and toxin contamination of animal- and plant- derived foods.

Develop and transfer to Federal agencies and the private sector systems that rapidly and accurately detect, identify, and differentiate the most critical and economically important foodborne microbial pathogens.

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

Program Items:	2006 Amount ($000)	2007 Amount ($000)	2008 Amount ($000)
Direct Costs:			
Research and Development	254,362	244,015	263,396
Indirect Costs:			
Program and Administrative/ Financial Management	18,898	14,421	14,098
USDA Central Charges	5,735	4,359	4,245
Task Force, Advisory Committees, and Other Support Costs	347	263	256
Total Indirect Cost	24,980	19,043	18,599
Total Cost	279,342	263,058	281,995
FTE's	2,097	2,069	2,121

Performance Measures:

Provide scientific information to protect animals from pests, infectious diseases, and other disease-causing entities that impact animal and human health.

Identify, develop, and release to the U.S. agricultural community genetic markers, and lines, breeds, or germplasm that result in the food animals with improved (either through traditional breeding or biotechnology) pest - and disease-resistance traits.

Develop and transfer tools to the agricultural community, commercial partners, and Federal agencies to control or eradicate domestic and exotic diseases that impact animal and human health.

Develop and release to potential users varieties and/or germplasm of agriculturally important plants that are new or provide significantly improved (either through traditional breeding or biotechnology) characteristics enhancing pest or disease resistance.

Provide fundamental and applied scientific information and technology to protect agriculturally important plants from pests and diseases.

Provide information and technologies to producers of agriculturally important plants in support of exclusion, detection and early eradication; control and monitoring of invasive insects, weeds, and pathogens; and restoration of affected areas. Conduct biologically-based integrated and areawide management of key invasive species.

Strategic Objective 5.2: Promote Healthier Eating Habits and Lifestyles.

Program Items:	2006 Amount ($000)	2007 Amount ($000)	2008 Amount ($000)
Direct Costs:			
Research and Development	77,062	72,730	77,173
Indirect Costs:			
Program and Administrative/ Financial Management	5,724	5,349	5,278
USDA Central Charges	1,738	1,618	1,590
Task Force, Advisory Committees, and Other Support Costs	105	97	95
Total Indirect Cost	7,567	7,064	6,963
Total Cost	84,629	79,794	84,136
FTE's	299	294	301

Performance Measures:

Scientifically assess the efficacy of enhancements to the nutritional value of our food supply and identify, conduct, and support intramural and extramural research to develop, test, and evaluate effective clinical and community dietary intervention strategies and programs for modifying diet, eating behavior, and food choices to improve the nutritional status of targeted populations. A special emphasis is to prevent obesity and promote healthy dietary behaviors.

Define functions, bioavailability, interactions, and human requirements (including effects such as genetic, health status, and environmental factors) for known, emerging, and new classes of nutrients. Determine the abundance of known, emerging, and new classes of nutrients in the food supply and provide that information in databases.

Determine food consumption patterns of Americans, including those of different ages, ethnicities, regions, and income levels. Provide sound scientific analyses of the U.S. food consumption information to enhance the effectiveness and management of the Nation's domestic food and nutrition assistance programs.

Strategic Objective 6.1: Protect Watershed Health to Ensure Clean and Abundant Water.

Program Items:	2006 Amount ($000)	2007 Amount ($000)	2008 Amount ($000)
Direct Costs:			
Research and Development	90,984	85,402	76,236
Indirect Costs:			
Program and Administrative/ Financial Management	6,757	6,665	5,937
USDA Central Charges	2,050	2,016	1,787
Task Force, Advisory Committees, and Other Support Costs	124	123	107
Total Indirect Cost	8,931	8,804	7,831
Total Cost	99,915	94,206	84,067
FTE's	942	930	878

Performance Measures:

Develop the tools and techniques required to maintain and restore the physical, chemical, and biological integrity of the Nation's watersheds and its surface and groundwater resources.

Develop approaches that mitigate the impact of poor air quality on crop production; and provide scientific information and technology to maintain or enhance crop and animal production while controlling emissions that reduce air quality or destroy the ozone layer.

Develop agricultural practices and decision-support strategies that allow producers to take advantage of beneficial effects and mitigate adverse impacts of global change.

Strategic Objective 6.2: Enhance Soil Quality to Maintain Productive Working Cropland.

Program Items:	2006 Amount ($000)	2007 Amount ($000)	2008 Amount ($000)
Direct Costs:			
Research and Development	69,455	65,267	54,043
Indirect Costs:			
Program and Administrative/ Financial Management	5,158	5,248	4,312
USDA Central Charges	1,565	1,586	1,298
Task Force, Advisory Committees, and Other Support Costs	95	95	78
Total Indirect Cost	6,818	6,929	5,688
Total Cost	76,273	72,196	59,731
FTE's	337	787	726

Performance Measures:

Develop ecologically-based information, technologies, germplasm, and management strategies that sustain agricultural production while conserving and enhancing the diverse natural resources found on rangelands and pasture lands.

Develop agricultural practices that maintain or enhance soil resources, thus ensuring sustainable food, feed, and fiber production while protecting environmental quality.

Develop management practices, treatment technologies, and decision tools for effective use of animal manure and selected industrial and municipal byproducts to improve soil properties and enhance crop production while protecting the environment.

Develop agricultural and decision-support systems that assist in increasing the efficiency of agricultural enterprises and achieve economic and environmental sustainability.

Strategic Objective 6.3: Protect Forests and Grasslands

Program Items:	2006 Amount ($000)	2007 Amount ($000)	2008 Amount ($000)
Direct Costs:			
Research and Development	42,569	39,593	24,619
Indirect Costs:			
Program and Administrative/ Financial Management	3,162	3,184	1,964
USDA Central Charges	959	962	591
Task Force, Advisory Committees, and Other Support Costs	58	57	36
Total Indirect Cost	4,179	4,203	2,591
Total Cost	46,748	43,796	27,210
FTE's	797	332	259

Performance Measures:

Develop ecologically-based information, technologies, germplasm, and management strategies that sustain agricultural production while conserving and enhancing the diverse natural resources found on rangelands and pasture lands.

Develop agricultural practices that maintain or enhance soil resources, thus ensuring sustainable food, feed, and fiber production while protecting environmental quality.

Develop management practices, treatment technologies, and decision tools for effective use of animal manure and selected industrial and municipal byproducts to improve soil properties and enhance crop production while protecting the environment.

Develop agricultural and decision-support systems that assist in increasing the efficiency of agricultural enterprises and achieve economic and environmental sustainability.

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

Program Items:	2006 Amount ($000)	2007 Amount ($000)	2008 Amount ($000)
Direct Costs:			
Information Services	20,943	18,284	18,148
Indirect Costs:			
Program and Administrative/ Financial Management	2,461	1,959	1,924
USDA Central Charges	348	273	269
Task Force, Advisory Committees, and Other Support Costs	19	15	14
Total Indirect Cost	2,828	2,247	2,207
Total Cost	23,771	20,531	20,355
FTE's	151	151	149

Performance Measures:

Develop and deliver content for the National Digital Library for Agriculture (NDLA).

Integrate the NAL AGRICOLA database into the NDLA.

Ensure long-term access to the resources of the NAL NDLA.

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

Program Items:	2006 Amount ($000)	2007 Amount ($000)	2008 Amount ($000)
Total Cost:	159,083	8,415	16,000
FTE's:	--	--	--

Performance Measure:

Complete priority buildings and facilities projects on schedule and within budget.

Total for Management Initiatives

Program Items:	2006 Amount ($000)	2007 Amount ($000)	2008 Amount ($000)
Direct Costs:			
Information Services	20,943	18,283	18,148
Indirect Costs:			
Program and Administrative/ Financial Management	2,461	1,959	1,924
USDA Central Charges	348	273	269
Task Force, Advisory Committees, and Other Support Costs	19	15	14
Total Indirect Cost	2,828	2,247	2,207
Buildings and Facilities	159,083	8,415	16,000
Total Cost	182,854	28,945	36,355
FTE's	151	151	149

Total Cost for All Strategic Objectives and Management Initiatives

Program Items:	2006 Amount ($000)	2007 Amount ($000)	2008 Amount ($000)
Direct Costs:			
Research and Development	1,006,819	943,311	911,812
Indirect Costs:			
Program and Administrative/ Financial Management	75,696	74,231	70,820
USDA Central Charges	22,571	22,121	21,013
Task Force, Advisory Committees, and Other Support Costs	1,363	1,333	1,265
Total Indirect Cost	99,630	97,685	93,098
Total Cost	1,106,449	1,040,996	1,004,910
FTE's	8,667	8,550	8,300

Other Items Not Included in Strategic Objectives:

Homeland Security	(35,587)	(33,495)	(90,724)
Unobligated Balance	15,094	--	--
Miscellaneous Fees	4,847	--	--
Collaborative Research Program	6,000	--	--
Repair and Maintenance	17,643	16,607	16,607
Total Cost	1,150,033	1,057,603	1,021,517
Buildings and Facilities Account	159,083	8,415	16,000
Grand Total, Cost	1,309,116	1,066,018	1,037,517