FY 2009 Explanatory Notes
Agricultural Research Service

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AGRICULTURAL RESEARCH SERVICE

Purpose Statement

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

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

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

The ARS mission is to conduct research to develop and transfer solutions to agricultural problems of high national priority and to provide information access and dissemination to: ensure high-quality, safe food, and other agricultural products; assess the nutritional needs of Americans; sustain a competitive agricultural economy; enhance the natural resource base and the environment; and provide economic opportunities for rural citizens, communities, and society as a whole.

ARS' 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, 2007, there were 6,952 full-time employees and 2,158 other than full-time employees. Of the total, 504 full-time employees and 26 other than full-time employees worked in offices located in the Washington, D.C. metropolitan area.

OIG Reports (Completed)

#50601-10-Hq, 11/20/06, OIG/EPA Chesapeake Bay Restoration Agricultural Impact On Water Quality.

#50601-15-Te, 3/12/07, Review of FY 2005 Congressional Earmarks.

OIG Reports (In Progress)

#02601-1-SF, Management Controls Over Research Agreements.

#50601-4-Hy, Adequacy Of Internal Controls Over Travel Card Expenditures Followup.

#50501-9-FM, Management And Security Over USDA Wireless Connections.

#50601-13-CH, Implementation of Renewable Energy Programs In USDA.

#50601-16-Te, Controls Over Genetically Engineered Animal And Plant Research.

GAO Reports (Completed)

#07-264, 2/2/07, State Department: State Has Initiated A More Systematic Approach For Managing Its Aviation Fleet.

#07-283, 2/28/07, Crude Oil: Uncertainty About Future Oil Supply Makes It Important To Develop A Strategy For Addressing A Peak And Decline In Oil Production.

#07-520, 5/31/07, South Florida Ecosystem: Restoration Is Moving Forward But Is Facing Significant Delays, Implementation Challenges And Rising Costs.

#07-652, 6/11/07, Avian Influenza: USDA Has Taken Important Steps To Prepare For Outbreaks, But Better Planning Could Improve Response.

#07-604, 6/21/07, Pandemic Influenza: Efforts To Forestall Onset Are Underway; Identifying Countries At Greatest Risk Entails Challenges.

#07-781, 8/14/07, Influenza Pandemic: Further Efforts Are Needed To Ensure Clearer Federal Leadership Roles And An Effective National Strategy.

#07-1171R, 9/13/07, USDA: Information On Classical Plant And Animal Breeding Activities.

#07-1172, 9/28/07, Climate Change Research: Agencies Have Data-Sharing Policies But Could Do More To Enhance The Availability Of Data From Federally Funded Research.

GAO Reports (In Progress)

#192238, Federal Grant And Direct Assistance Participants Who Owe Outstanding Federal Taxes.

#310590, Use Of Encryption By Federal Agencies.

#360830, Marine Aquaculture Development.

#360855, Veterinarian Capabilities For Disease Prevention, Food Safety, And Defense.

#360862, Review Of Concentrated Animal Feeding Operations.

#360871, Coordinated Framework For Regulation Of Genetically Modified Agriculture.

#369867, Carbon Offsets.

#450489, Critical Infrastructure Protection For Pandemic Influenza.

#450540, User Fee Design.

#450547, Improving Federal Agency Use Of Performance Information.

#460579, Issues Associated With The Expansion Of Biosafety Level 3 And 4 Laboratories.

#543177, Federal Leasing Trends And Challenges.

AGRICULTURAL RESEARCH SERVICE

Available Funds and Staff Years
2007 Actual and Estimated 2008 and 2009

Item	Actual 2007		Estimated 2008		Estimated 2009	
	Amount	Staff Years	Amount	Staff Years	Amount	Staff Years
Salaries and Expenses	$1,128,944,427	8,227	1,128,944,000	8,227	1,037,016,000	8,016
Rescission	--	--	-7,903,000	--	--	--
Miscellaneous Fees	11,057,614	--	--	--	--	--
Pathogenic Avian Influenza Emergency Appropriation	4,129,411	--	--	--	--	--
Transfer to Office of Ethics	--	--	-406,000	--	--	--
Transfer from Office of Congressional Relations	128,000	--	--	--	--	--
Transfer from United States Department of State	2,959,000	--	--	--	--	--
Total, Salaries and Expenses	1,147,218,452	8,227	1,120,635,000	8,227	1,037,016,000	8,016
Buildings & Facilities	--	--	47,082,000	--	13,220,000	--
Rescission	--	--	-330,000	--	--	--
Total, Buildings & Facilities	0	--	46,752,000	--	13,220,000	--
Total, Agricultural Research Service	1,147,218,452	8,227	1,167,387,000	8,227	1,050,236,000	8,016
Obligations under other USDA appropriations:						
Agricultural Marketing Service	220,386	1	221,000	1	221,000	1
Animal & Plant Health Inspection Service	11,018,328	26	11,019,000	26	11,019,000	26
Cooperative State Research, Education, & Extension Service	10,994,404	25	10,995,000	25	10,995,000	25
Departmental Administration	1,285,125	3	1,286,000	3	1,286,000	3
Economic Research Service	2,943,843	7	2,944,000	7	2,944,000	7
Farm Service Agency	570,828	2	571,000	2	571,000	2
Food & Nutrition Service	1,039,420	3	1,039,000	3	1,039,000	3
Food Safety & Inspection Service	2,931,460	7	2,931,000	7	2,931,000	7
Foreign Agricultural Service	483,427	1	483,000	1	483,000	1
Forest Service	1,765,019	4	1,765,000	4	1,765,000	4
Hazardous Waste	4,000,000	10	4,000,000	10	4,000,000	10
National Agricultural Statistics Service	4,002,494	10	4,002,000	10	4,002,000	10
Natural Resources Conservation Service	3,487,006	9	3,487,000	9	3,487,000	9
Risk Management Agency	213,310	1	213,000	1	213,000	1
Misc., Other USDA Funds	193,179	--	193,000	--	193,000	--
Total, Other USDA Appropriations	45,148,229	109	45,149,000	109	45,149,000	109
Total, Agriculture Appropriations	1,192,366,681	8,336	1,212,536,000	8,336	1,095,385,000	8,125

Available Funds and Staff Years
2007 Actual and Estimated 2008 and 2009

Item	Actual 2007		Estimated 2008		Estimated 2009	
	Amount	Staff Years	Amount	Staff Years	Amount	Staff Years
Other Federal Funds:						
Agency for International Development	2,199,139	5	2,199,000	5	2,199,000	5
Department of Defense	5,296,193	13	5,296,000	13	5,296,000	13
Department of Energy	731,692	2	732,000	2	732,000	2
Department of Health & Human Services	4,691,596	12	4,692,000	12	4,692,000	12
Department of Homeland Security	1,912,534	5	1,913,000	5	1,913,000	5
Department of the Interior	1,088,725	3	1,089,000	3	1,089,000	3
Department of Justice	218,957	1	219,000	1	219,000	1
Environmental Protection Agency	1,596,461	4	1,596,000	4	1,596,000	4
National Aeronautics & Space Administration	1,338,301	3	1,338,000	3	1,338,000	3
National Oceanic & Atmospheric Administration	157,431	1	157,000	1	157,000	1
Misc., Other Federal Funds	59,574	--	60,000	--	60,000	--
Total, Other Federal Funds	19,290,603	49	19,291,000	49	19,291,000	49
Non-Federal Funds:						
Binational Agricultural Research & Development (BARD)	280,521	2	281,000	2	281,000	2
California, State of	727,602	3	728,000	3	728,000	3
California, University of	1,593,253	4	1,593,000	4	1,593,000	4
Colorado State University	179,751	1	180,000	1	180,000	1
Cornell University	181,047	1	181,000	1	181,000	1
Cotton Incorporated	1,195,390	3	1,195,000	3	1,195,000	3
Florida, State of	1,069,688	3	1,070,000	3	1,070,000	3
Florida, University of	129,315	1	129,000	1	129,000	1
Georgia, University of	127,477	1	127,000	1	127,000	1
International Food Policy Research Institute	451,092	2	451,000	2	451,000	2
Iowa State University	361,087	2	361,000	2	361,000	2
Kansas State University	112,598	1	113,000	1	113,000	1
Massachusetts, University of	141,262	1	141,000	1	141,000	1
Michigan State University	225,409	1	225,000	1	225,000	1
Minnesota, University of	285,268	1	285,000	1	285,000	1
National Pork Board	246,662	2	247,000	2	247,000	2
Ohio State University	121,193	1	121,000	1	121,000	1
Revocable Permits & Easements	847,971	--	848,000	--	848,000	--

Available Funds and Staff Years
2007 Actual and Estimated 2008 and 2009

Item	Actual 2007		Estimated 2008		Estimated 2009	
	Amount	Staff Years	Amount	Staff Years	Amount	Staff Years
Non-Federal Funds: (continued)						
Sale of Animals & Personal Property (Proceeds)	1,019,333	--	1,019,000	--	1,019,000	--
Schripps Research Institute	100,796	1	101,000	1	101,000	1
Southern Florida Water Management District	529,158	2	529,000	2	529,000	2
Texas A&M University	153,483	1	153,000	1	153,000	1
United Soybean Board	3,371,913	8	3,372,000	8	3,372,000	8
Misc., Non-Federal Funds	3,184,794	--	3,185,000	--	3,185,000	--
Total, Non-Federal Funds	16,636,063	42	16,635,000	42	16,635,000	42
Miscellaneous Contributed Funds:	15,811,346	84	17,000,000	84	17,000,000	84
Total, Agricultural Research Service	1,244,104,693	8,511	1,265,462,000	8,511	1,148,311,000	8,300

AGRICULTURAL RESEARCH SERVICE

Permanent Positions by Grade and Staff Year Summary
2007 Actual and Estimated 2008 and 2009

	2007			2008			2009		
Grade	Head-quarters	Field	Total	Head-quarters	Field	Total	Head-quarters	Field	Total
ES-00	15	28	43	15	28	43	14	27	41
GS/GM-15	50	579	629	50	579	629	48	563	611
GS/GM-14	57	650	707	57	650	707	56	632	688
GS/GM-13	122	756	878	122	756	878	118	734	852
GS-12	97	556	653	97	556	653	95	540	635
GS-11	35	650	685	35	650	685	34	631	665
GS-10	1	7	8	1	7	8	1	7	8
GS-9	32	1,058	1,090	32	1,058	1,090	31	1,028	1,059
GS-8	15	412	427	15	412	427	14	400	414
GS-7	48	814	862	48	814	862	46	791	837
GS-6	33	426	459	33	426	459	32	413	445
GS-5	20	246	266	20	246	266	20	239	259
GS-4	2	54	56	2	54	56	2	52	54
GS-3	0	8	8	0	8	8	0	8	8
GS-2	0	4	4	0	4	4	0	4	4
Other Graded Positions.....	7	0	7	7	0	7	7	0	7
Ungraded Positions.....	0	579	579	0	579	579	0	563	563
Total Permanent Positions.....	534	6,827	7,361	534	6,827	7,361	518	6,632	7,150
Unfilled Positions end-of-year..	30	379	409	30	379	409	30	379	409
Total Permanent Full-Time Employment, end-of-year..	504	6,448	6,952	504	6,448	6,952	488	6,253	6,741
Staff Year Estimate.....	513	7,998	8,511	513	7,998	8,511	500	7,800	8,300

AGRICULTURAL RESEARCH SERVICE (ARS)

SIZE, COMPOSTITION AND COST OF MOTOR VEHICLE FLEET

The 2009 Budget Estimates proposes the replacement of 143 vehicles, 17 of which are passenger motor vehicles. These acquisitions will replace existing vehicles without additions to the fleet. Due to the timing of vehicle receipt and sales through the exchange/sale process, there is an overlap in the vehicle receipt, replacement, and disposal inventory. However, we are not adding to the overall fleet.

Professional research investigators and technical personnel primarily use the ARS vehicle fleet. When conducting daily work, research personnel travel to farms, ranches, commercial firms, State agricultural experiment stations, research fields, etc. Most sites are in rural locations. A high degree of mobility is vital for this work so it is not feasible to use common carriers. Comparative studies of cost requirements between private and Government vehicles show that most often it is more economical to use Government owned vehicles.

It is ARS policy to pool vehicle use, keeping the number of vehicles to a minimum. ARS requires quarterly vehicle operational reports and makes periodic surveys to determine the extent of vehicle use and condition.
ARS assigns its fleet nation-wide for use with research studies and technical assistance. Replacement is based on program management, vehicle mileage/age, and funding. Federal regulations establish minimum replacement standards for passenger vehicles is 3 yrs or 60,000 miles. Replacement standards for light duty trucks are 6 yr or 60,000 miles. ARS retains vehicles that meet minimum standards when 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 yrs in age.

ARS has decreased the number of passenger vehicles, (sedans and station wagons), because of the need for multi-purpose vehicles that transport passengers and haul research equipment. Our primary fleet consists of light duty trucks. The appearance of an increase for trucks is due to the different classifications standards used by the General Services Administration (GSA) when requesting replacement vehicles and the reporting criteria used by the Federal Asset Statistical Tool (FAST). When requesting replacement vehicles, agencies use GSA standards. These standards are: 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.) However, 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. It is difficult to determine fleet composition when using two different standards. The difference in changes reflects changes in composition due to data clean-up and review, not overall numbers. ARS will continue to review its fleet for opportunities to decrease the number of vehicles, without affecting the mission, and ultimately saving on operational costs. For consistency with FAST inventory, we use FAST standards for this report. However, inventory is based on GSA standards. We continue to review inventory information to accurate classify the fleet.

Due to continued significant interface failures between USDA's Purchase Card Management System-Fleet Module and PROP, missing fleet data was estimated based on prior history, financial reports, and inflation rates. The PCMS-Fleet system did not accurately feed USDA operational costs during FY2007 for charges incurred using the fleet card. Routinely, the fleet card captures 80% of all of the Agency's fleet costs. We continue to work with NFC and OPPM to identify and resolve these problems prior to the reporting periods. However, the NFC was not able to resolve the problem, as it still occurs today. The continued interface problems and lack of resolution continue to hinder definitive cost reporting. However, USDA is replacing both the fleet card system and the property system in November 2008 which should result in increased data integrity and ease in reporting. The varying cost of petroleum has made it difficult to estimate the increase of planned operating costs. Annual increases are closer to 10% rather than 6% increase.

Size, compositions and cost of agency motor vehicle fleet as of September 30, 2007 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 *								Annual Operating Costs
	Sedans & Station Wagons	Light Trucks, SUVs and Vans 4X2	4X4	Medium Trucks	Ambulance	Buses	Heavy Trucks	Total Vehicles	
FY 2006	299	1,811	506	982	1	1	34	3,634	$3,603
Change**	-2	-22	-2	-8	0	0	0	-34	-$25
FY2007	297	1789	504	974	1	1	34	3,600	$3,578
Change**	-5	-18	0	-3	0	0	0	-26	-$20
FY2008	292	1771	504	971	1	1	34	3,574	$3,558
Change**	1	0	0	0	0	0	0	1	$10
FY2009	293	1771	504	971	1	1	34	3,575	$3,568

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.

No significant fleet increases, changes reflect composition
Cost increase reflect projected fuel increases and cost of operating an older fleet

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 forland 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, [$1,128,944,000] $1,037,016,000: 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 buildingor $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 hereafter 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].

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

AGRICULTURAL RESEARCH SERVICE

Analysis of Change in Appropriation

SALARIES AND EXPENSES - CURRENT LAW

Appropriations Act, 2008		$1,128,944,000
Budget Estimate, 2009		1,037,016,000
Increase in Appropriations		-91,928,000
Adjustments in 2008:		
Appropriation Act, 2008	$1,128,944,000	
Rescission under P.L. 110-161 a/	-7,903,000	
Activities transferred to Departmental Administration, Office of Ethics b/	-406,000	
Adjusted Base for 2008		$1,120,635,000
Budget Estimate, 2009		1,037,016,000
Decrease over adjusted 2008		-83,619,000

a/ The amount is rescinded pursuant to Division A, Title VII, Section 752 of P.L. 110-161.

b/ Beginning in 2008, the Department will transfer and consolidate all Ethics activities under the Office of Ethics in Departmental Administration (DA). On a comparable basis, the full annual cost of the activity is $406,000 in 2009.

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

Item of Change	2008 Estimated	Pay Costs	Program Enhancements	Program Terminations	2009 Estimated
Product Quality/Value Added	105,063,000	+$1,661,000	+$5,864,000	-$14,963,000	$97,625,000
Livestock Production	84,835,000	+886,000	+1,843,000	-17,457,000	70,107,000
Crop Production	200,649,000	+3,032,000	+2,457,000	-15,109,000	191,029,000
Food Safety	104,495,000	+1,477,000	+7,021,000	-7,231,000	105,762,000
Livestock Protection	82,399,000	+986,000	+4,598,000	-19,169,000	68,814,000
Crop Protection	196,032,000	+2,676,000	+4,341,000	-14,314,000	188,735,000
Human Nutrition	85,339,000	+522,000	+12,177,000	-18,559,000	79,479,000
Environmental Stewardship	222,514,000	+3,620,000	+7,779,000	-34,333,000	199,580,000
National Agricultural Library	21,783,000	+265,000	+1,000,000	-4,689,000	18,359,000
Funds Included for Homeland Security	[35,454,000]	--	--	--	[64,346,000]
Repair and Maintenance	17,526,000	--	--	--	17,526,000
Total Available	1,120,635,000	+15,125,000	+47,080,000	-145,824,000	1,037,016,000

NOTES: Research activities carried out in support of Homeland Security are reflected under the Food Safety, Livestock Protection, and Crop Protection program areas. With regard to ARS' Food Safety research, $7 million of the projects funded in FY 2008 have been reclassified to be in support of Homeland Security in FY 2009.

AGRICULTURAL RESEARCH SERVICE

Project Statement by Program
(On basis of appropriation)

	2007 Actual		2008 Budget		Increase or	2009 Estimated	
	Amount	Staff Years	Amount	Staff Years	Decrease	Amount	Staff Years
Product Quality/Value Added	$105,373,479	924	$105,063,000	924	-7,438,000	$97,625,000	904
Livestock Production	85,085,369	493	84,835,000	493	-14,728,000	70,107,000	453
Crop Production	201,240,795	1,590	200,649,000	1,590	-9,620,000	191,029,000	1,564
Food Safety	104,748,033	819	104,495,000	819	+1,267,000	105,762,000	822
Livestock Protection	86,751,842	547	82,399,000	547	-13,585,000	68,814,000	510
Crop Protection	197,018,048	1,403	196,032,000	1,403	-7,297,000	188,735,000	1,383
Human Nutrition	85,665,996	290	85,339,000	290	-5,860,000	79,479,000	285
Environmental Stewardship	223,172,190	2,013	222,514,000	2,013	-22,934,000	199,580,000	1,951
National Agricultural Library	23,671,637	148	21,783,000	148	-3,424,000	18,359,000	144
Repair and Maintenance	17,635,339	--	17,526,000	--	--	17,526,000	--
Collaborative Research Program	2,959,000	--	--	--	--	--	--
Miscellaneous Fees	8,726,766	--	--	--	--	--	--
Funds Included for Homeland Security	[35,704,000]	--	[35,454,000]	--	--	[64,346,000]	--
Unobligated Balance	5,169,958	--	--	--	--	--	--
Total Available or Estimate	1,147,218,452	8,227	1,120,635,000	8,227	-83,619,000	1,037,016,000	8,016
Miscellaneous Fees	-11,057,614	--	--	--			
Rescission/Across the Board Reduction	--	--	7,903,000	--			
Emergency Supplemental for Avian Influenza	-4,129,411	--	--	--			
Transfer from Office of Congressional Relations	-128,000	--	--	--			
Transfer from U. S. Department of State	-2,959,000	--	--	--			
Transfer to Office of Ethics	--	--	406,000 a/	--			
Total Appropriation	1,128,944,427	8,227	1,128,944,000	8,227			
Staff Years:							
Direct		8,227		8,227			8,016
Reimbursable		284		284			284
Total, Staff Year Estimate		8,511		8,511			8,300

NOTE: Research activities carried out in support of Homeland Security are reflected under the Food Safety, Livestock Protection, and Crop Protection program areas. With regard to ARS' Food Safety research, $7 million of the projects funded in FY 2008 have been reclassified to be in support of Homeland Security in FY 2009.

a/ Beginning in 2008, the Department will transfer and consolidate all Ethics activities under the Office of Ethics in Departmental Administration (DA). On a comparable basis, the full annual cost of the activity is $406,000 in 2009.

Justification of Increases and Decreases

ARS' FY 2009 Salaries and Expenses (S&E) Budget recommends an increase of $47 million in new and expanded research initiatives on food safety, human nutrition (obesity prevention), water reuse (drought), crop and livestock diseases and pests, agricultural genomics and germplasm, bioenergy and biobased products, and information services. These increases will be financed through the redirection of existing resources as detailed below. The S&E Budget includes $64 million for the Food and Agriculture Defense Initiative, an increase of 68 percent over the FY 2008 funding level. The Budget also proposes an increase of $780,000 for additional research on Colony Collapse Disorder of Honey Bees, and $15.1 million for pay costs.

The President's Budget request for ARS represents a net reduction of $84 million. The FY 2009 Budget proposes the termination of multiple lines of ongoing research, and the closure of 11 of ARS' locations and worksites, and 9 of its laboratories throughout the country. The costs associated with separation, transfer, or relocation of the approximately 700 employees impacted, and the disposal of associated property and assets is estimated to range from $30 to $50 million. As a result, implementation of the FY 2009 Budget with its proposed closures and project terminations will necessarily require reprogramming authority or supplemental appropriations.

New Products/Product Quality/Value Added

ARS is proposing under this program area a net decrease of $7,438,000. This includes pay costs, and new and expanded research initiatives totaling $7,525,000, and decreases totaling $14,963,000.

a) An increase of $1,661,000 for **FY 2009 Pay Costs**, which includes $429,000 for the annualization of the fiscal year 2008 pay raise, and $1,232,000 for the anticipated fiscal year 2009 pay raise.

Need for Change

Funding for pay costs is critical for recruiting and retaining top level scientists and staff, conducting viable research programs, and carrying out ARS' mission. Absorption of these costs reduces the number of scientists and support personnel essential for conducting the agency's research programs. If pay costs are not fully funded, ARS will be unable to fill critical positions and will have to reduce spending for much needed laboratory equipment, supplies, and other materials.

b) An increase of $5,864,000 for research on **Bioenergy and Bioproducts**.

Need for Change

America's dependence on foreign oil for energy and chemical materials threatens the Nation's security and adversely affects the country's economy. Imports account for 64 percent of our national oil consumption, forcing consumers to spend $300 million a day, or more than $100 billion annually, on oil from foreign sources. The heightened interest in homeland security and national defense 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. The biofuel industry requires new and expanded feedstocks to significantly offset petroleum supplies. Cellulose, the major component of plant cell walls, is the most abundant biological material, and is an attractive feedstock source. A recent report by the Department of Energy (DOE) and USDA concluded that one third of U.S. petroleum demand could be replaced with biofuel produced from domestic cellulosic material. Sources of cellulose include agricultural residue (i.e.,

corn stover, wheat straw, and sugarcane bagasse), herbaceous energy crops (i.e., switch grass, Bermuda grass, and miscanthus), animal wastes, wood and forest residues, and municipal solid waste.

To realize the potential of bioenergy, large quantities of renewable biomass feedstock of acceptable quality must be produced in a sustainable manner and delivered to biorefineries for conversion to energy and coproducts. Long-term, sustainable energy crop production must preserve natural resources, including soils, ecological systems, and the environment. Attaining long-term, sustainable energy crop production will require efficient and effective water use and management, including the use of degraded water from animal feeding operations, agricultural processing plants, and rural water treatment facilities. Biomass harvesting and delivery presents technological challenges because energy-crop and plant-residue biomass tends to be low density material that is harvested over a large area. In addition, agricultural biomass usually must be harvested or collected over a short period of time, then stored over the entire year before its delivery to conversion facilities. Technologies must be developed for energy efficient and environmentally sustainable harvest, handling, preprocessing, storage, and delivery of very large quantities of cellulosic biomass.

This renewed interest in expanding the use of agricultural products and waste materials in generating energy, fuel, and biobased industrial products will improve the Nation's energy security, the balance of payments, the environment, and the rural economy.

Outcomes

Research will result in the sustainable, efficient, and economic production of energy/fuel from agricultural products; achieve the use of renewable, cost effective energy sources to enable on-the-farm preprocessing of cellulosic feedstocks; and facilitate the integration of sustainable bioenergy production with other farming operations for food, feed and fiber production for maximum producer profit.

The proposed research supports Performance Measure 2.1.1 – Create new scientific knowledge and innovative technologies that represent scientific/technological advancements or breakthroughs applicable to bioenergy.

Means to Achieve Change

- **High-Value Economic Production Systems for the Southern Great Plains** ($2,034,000). ARS will:
  - -- Determine optimal crop combinations and sequences for biobased energy production from biomass crops, oil seed, and other crops with value added traits for industrial purposes, and identify high value regional market specialty crops that will produce maximum economic return and value added trait yield under different regional ecosystem conditions.
  - -- Identify integrated whole system strategies to link production, postharvest processing, by-product utilization, and waste water recycling to optimize producer-processor-market relationships for optimal system economic return and environmental benefits.
  - -- Develop advanced decision making technologies that help managers evaluate the economic and environmental consequences of producing specific crops.
  - -- Provide technical information and guidelines that support USDA Farm Bill Conservation and Energy Titles in the development of sustainable biobased energy production systems, and the mission of USDA Rural Development by determining the feasibility of technologies and systems that can be used to develop rural-based businesses.

- **Sustainable Sugar and Energy Cane Production Systems** ($1,099,000). ARS will:
  - -- Enhance cane genetics and breeding program to develop cultivars with increased disease resistance, sugar yields, and productivity on diverse soils in colder climates.

- -- Identify genetic plant growth efficiency mechanisms and combine these mechanisms with soil fertility and water management strategies for cultivars with increased productivity and decreased purchased input demands.
- -- Determine the effects of in-field, whole farm, and watershed level conservation practices on water and other natural resources, and provide guidelines that support USDA Farm Bill Conservation Title programs.
- -- Identify whole system strategies to optimize cane use for sugar or ethanol production, co-energy generation from cane bagasse for refinery plant operation, and biomass for ecosystem servicing.
- -- Partner with Gulf Coast ecosystem researchers to design cost effective production and conservation systems that can alleviate hurricane damage associated with wetland degradation.

- **Sustainable Systems for Handling Diverse Cellulosic Feedstocks** ($1,733,000). ARS will:
  - -- Determine the optimal amount of cellolosic feedstock crop residues that can be produced in different regional ecosystem conditions used for biobased energy production and still maintain ecosystem servicing benefits from farm lands.
  - -- Develop suitable and profitable handling technologies to utilize low density biomass that cannot be shipped great distances.
  - -- Identify integrated whole system strategies to link commodity production, local scale biobased energy production, and their interface with other rural-based energy production opportunities for optimal system economic return and environmental benefits.
  - -- Provide technical information and guidelines that support the mission of USDA Rural Development and the USDA Farm Bill Conservation and Energy Titles for sustainable biobased energy production systems by determining the feasibility of technology and systems that can be used to develop rural-based businesses.

- **Integrated Energy Production in Peanut-Based Systems** ($556,000). ARS will:
  - -- Enhance genetics and breeding for industrial use peanuts designed for increased oil content and other value added industrial products.
  - -- Utilize genetic plant growth and water use efficiency mechanisms and combine them with soil fertility, pest resistance, and supplemental irrigation strategies to produce cultivars with increased productivity and decrease water and energy input demands.
  - -- Identify optimal whole farm economic strategies to incorporate the production of biobased energy and other value added industrial products into peanut-based systems without disrupting agricultural diversity or compromising natural resource quality.
  - -- Identify integrated whole system strategies to optimally link agricultural production, postharvest processing, and waste byproduct utilization.
  - -- Provide technical information and provide guidelines that support the USDA Farm Bill Conservation and Energy Title.

- **Renewable (Solar and Wind) Energy for On-Farm Processing of Cellulosic Feedstocks** ($442,000). ARS will:
  - -- Utilize renewable energy sources such as wind and solar energies for cost effective, on-farm preprocessing of cellulosic biomass intended for conversion to bioenergy and/or biobased products. Examples of preprocessing include drying, chopping, and densification.
  - -- Determine cost effective on farm storage methods for cellulosic biomass before and after preprocessing.

c) A decrease of $14,963,000 in ongoing research programs, laboratories, or locations to provide savings to finance higher priority research initiatives.

Need for Change

Research projects under this program activity have been identified for termination given that they are: (1) nonpriority, Congressionally-added earmarks; (2) considered by the Administration to be of lesser priority; (3) duplicative or can be accomplished more effectively elsewhere; or (4) can be more efficiently implemented with less overhead costs at another location. The savings achieved from these terminations will be redirected to finance the higher priority agricultural research initiatives identified in the FY 2009 Budget, will improve program and operational efficiencies, and will serve to restrain Federal spending.

GA, Athens, Quality and Safety Assessment Research
GA, Dawson, Irrigation, Crop Rotation and Tillage Technologies and Decision Support Systems for Peanut Production
GA, Dawson, Postharvest Measurement and Management Systems to Improve Peanut Quality and U.S. Competitiveness
IL, Peoria, Crop Production and Food Processing
LA, Baton Rouge, Integrated Water, Agrochemical, and Crop Management Systems to Sustain Water and Soil Quality
MD, Beltsville, Foundry Sand By-Products Utilization
MI, East Lansing, Sugarbeet and Bean Research
OK, Lane, Genetics and Production Research
OR, Pendleton, Cropping Systems and Precision Land Management in the Dryland Pacific Northwest
OR, Pendleton, Soil Conservation Systems for Sustainability of Pacific Northwest Agriculture
SD, Brookings, Biomass Crop Production
TX, Bushland, Remote Water Pumping and Electric Power Generation with Renewable Energy
TX, Lubbock, Cotton Production and Processing Research
TX, Weslaco, Kika de le Garza Subtropical Agricultural Research Center
HQ, Biotechnology Research and Development Corporation
HQ, National Corn to Ethanol Research Pilot Plant

Livestock Production

ARS is proposing under this program area a net decrease of $14,728,000. This includes pay costs, and new and expanded research initiatives totaling $2,729,000, and decreases totaling $17,457,000.

a) An increase of $886,000 for **FY 2009 Pay Costs**, which includes $229,000 for the annualization of the fiscal year 2008 pay raise, and $657,000 for the anticipated fiscal year 2009 pay raise.

Need for Change

Funding for pay costs is critical for recruiting and retaining top level scientists and staff, conducting viable research programs, and carrying out ARS' mission. Absorption of these costs reduces the number of scientists and support personnel essential for conducting the agency's research programs. If pay costs are not fully funded, ARS will be unable to fill critical positions and will have to reduce spending for much needed laboratory equipment, supplies, and other materials.

b) An increase of $1,843,000 for research on **Applied Genomics to Enhance Livestock Production**.

Need for Change

One of today's major industry challenges is to improve animal efficiency while simultaneously reducing the negative environmental impacts of production. Providing feed nutrients makes up a majority of the total cost of livestock and poultry production. For example, in beef production less than 20 percent of the consumed nutrients are converted into desired products. The incomplete and inefficient utilization of nutrients has adverse effects on both production efficiency and

environmental degradation. Long term sustainability of livestock and poultry production systems requires minimizing the impact of production on the environment (i.e., minimizing the "environmental footprint" of production). Additionally, livestock producers now compete with other interests – particularly the rapidly growing biofuels sector of the U.S. economy – for feed sources, especially corn grain. It is imperative to develop solutions to address these inefficiencies to ensure the continued economic competitiveness of America's animal agriculture industries.

The productivity of the American livestock industry is largely the result of long-term research on genetic improvement conducted over the past 75 years coupled with the successful application of quantitative genetic theory to commercial populations. While significant genetic change has been achieved in output measures such as growth rates, meat yields, and meat quality, little change has been achieved in traits directly impacting the cost of production, such as energy utilization efficiency and reproductive rate. Additionally, traits related to animal well-being and disease resistance have received limited attention in genetic improvement programs. In recent years, these issues have been elevated to the highest priority as consumer demands have evolved to animal welfare in production systems.

Until the past decade it was almost impossible to directly study the genes responsible for variations in economically important traits. The relatively new field of molecular genetics and genomics has expanded opportunities to meet this challenge. The genomics field has developed rapidly over the past 20 years, largely in response to the perceived potential to improve 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 four years, ARS has successfully worked with other Federal partners through an Interagency Working Group on Domestic Animal Genomics to facilitate the development of public domain high resolution DNA sequence maps of the bovine (cattle), porcine (swine), and chicken genomes. These sequence assemblies, complemented with a host of other new genetic tools being developed from them, have finally positioned the livestock research community to begin acquiring a full understanding of important genes, including their biological functions and regulation in the biological system, and how they interact with changes in the production environment.

It is imperative that U.S. research efforts in animal genomics be expanded to capitalize upon the significant investment in the availability of genome sequences and associated tools and reagents. The future of the U.S. livestock industry directly depends on the ability to compete in evolving global markets, which is in turn directly depends on continuing to enhance the efficiency, quality, and safety of U.S. production systems and reducing their impact on the environment.

Outcomes

"Functional genomics" will be used in an initial application of the cattle and swine genome sequences and related research tools to identify genes that influence feed efficiency and to determine their physiological roles in nutrient utilization. This information will be used to enhance nutrient utilization efficiency and will also provide considerable insight into potential solutions for the growing human obesity problem in the United States. The microorganisms present in the digestive system will be evaluated to identify microbes with genetic ability to digest the degradable portion of the cell walls present in forage and grain.

The proposed research will result in new systems for obtaining animal penotypic (physical characteristic) information for the complex traits contributing to nutrient use efficiency in 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, swine, sheep and gut microbial genes and their regulation. By exploring gene expression underlying nutrient efficiency, in different environments and at different stages of the animal life cycle, it will be possible to precisely match optimal animal genotypes to differing production environments.

The primary outcome of this research will be cattle, swine, and sheep germplasm that is more nutritionally efficient and environmentally friendly. However, a number of other outcomes are expected that will facilitate improved precision of animal management and well-being, including the development of new drug treatments and probiotics, improved management practices that enhance animal well-being in production systems, and opportunities to increase resistance to stress.

The proposed research supports Performance Measure 2.2.2 - Develop new technologies, tools, and information contributing to improved precision animal production systems to meet current and future food animal production needs of diversified consumers, while simultaneously minimizing the environmental footprint of production systems and enhancing animal well-being.

Means to Achieve Change

- **Identifying and Characterizing the Function of Genes that Affect Efficiency of Nutrient Use in Cattle, Swine, and Sheep** ($1,513,000). ARS will:
  - -- Develop novel and efficient methods for measuring phenotypes for maintenance energy requirements, efficiency of nutrient use, nutrient partitioning (for maintenance, growth, and reproduction), and environmental footprints.
  - -- Identify functional genes influencing efficiency of nutrient use and related traits.
  - -- Elucidate interactions among functional genes influencing these traits across differing production systems and environments using proteomics and metabolomics approaches.
  - -- Contribute to the development of the genome sequence and haplotype map of the sheep.

- **Using Meta-Genomics to Elucidate the Means for Improved Efficiency of Nutrient Use and Environmental Sustainability of Livestock** ($330,000). ARS will:
  - -- Initiate whole genome sequencing of pooled DNA gut contents of the gastrointestinal tract of cattle, swine, and sheep (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 to lower environmental footprints of livestock production.

c) A decrease of $17,457,000 in ongoing research programs, laboratories, or locations to provide savings to finance higher priority research initiatives.

Need for Change

Research projects under this program activity have been identified for termination given that they are: (1) nonpriority, Congressionally-added earmarks; (2) considered by the Administration to be of lesser priority; (3) duplicative or can be accomplished more effectively elsewhere; or (4) can be more efficiently implemented with less overhead costs at another location. The savings achieved from these terminations will be redirected to finance the higher priority agricultural research initiatives identified in the FY 2009 Budget, will improve program and operational efficiencies, and will serve to restrain Federal spending.

AL, Auburn, Catfish Genome
AL, Auburn, Vaccines and Microbe Control for Fish Health
AR, Pine Bluff, Aquaculture Fisheries Center
AR, Stuttgart, Aquaculture Initiatives, Harbor Branch Oceanographic Institute
FL, Brooksville, Evaluation of Beef Cattle Germplasm for the Subtropics of the United States
GA, Athens, Role of the Adipose Tissue-Brain-Pituitary Axis in Growth and Reproduction
HI, Hilo, Tropical Aquaculture Feeds
MD, Beltsville, Animal Biosciences and Biotechnology Laboratory
MI, East Lansing, Avian Disease and Oncology Laboratory
NE, Clay Center, Characterization and Use of Genetic Variation in Sheep

Crop Production

ARS is proposing under this program area a net decrease of $9,620,000. This includes pay costs, and new and expanded research initiatives totaling $5,489,000, and decreases totaling $15,109,000.

a) An increase of 3,032,000 for **FY 2009 Pay Costs**, which includes $785,000 for the annualization of the fiscal year 2008 pay raise, and $2,247,000 for the anticipated fiscal year 2009 pay raise.

Need for Change

Funding for pay costs is critical for recruiting and retaining top level scientists and staff, conducting viable research programs, and carrying out ARS' mission. Absorption of these costs reduces the number of scientists and support personnel essential for conducting the agency's research programs. If pay costs are not fully funded, ARS will be unable to fill critical positions and will have to reduce spending for much needed laboratory equipment, supplies, and other materials.

b) An increase of $1,677,000 for research on **Crop Genetic Improvement.**

Need for Change

Production of specialty crops 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, and land, and from losses due to biotic (i.e., diseases, pests, weeds) and abiotic (i.e., droughts, 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.

New, more efficient specialty crop production systems and superior crop varieties are needed. The demands placed on the national specialty 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.

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 new genes into breeding stock; and breeding superior new specialty crop cultivars more rapidly for producers. ARS is uniquely suited for leading this research because of its integrated combination of unrivaled specialty crop germplasm collections; its strong highly productive, longstanding 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 research will enable ARS to improve the genetic resources and cultivars of specialty crops for the benefit of U.S. seed companies, producers, processors, and consumers. ARS will breed nutritious fruits and vegetables for the fresh, organic, and lightly processed food markets.

Higher quality specialty crops will be bred with greater resistance to pests and diseases that are more water efficient.

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. New genomics technologies will result in reduced dependence on synthetic pesticides by improving biological resistance. There will also be reduced inputs of energy, fertilizers, and irrigation water; and improved competitiveness of the U.S. specialty crop industry through increased crop productivity, production efficiency, and product quality.

The proposed research supports Performance Measure 2.2.3 - Expand, maintain, and protect our genetic resource base, increase our knowledge of genes, genomes, and biological processes, and provide economically and environmentally sound technologies that will improve the production efficiency, health, and value of the Nation's crops.

Means to Achieve Change

- **Specialty Crop Genetic Improvement** ($732,000). ARS will:
  - -- Initiate or expand applied genetics/genomics and breeding programs that improve disease and nematode resistance, enhance yield, and add value added traits in high value fruit and vegetable crops.
  - -- Breed vegetable varieties that combine resistance to insects, nematodes, and pathogens with desirable horticultural and culinary traits while maintaining or increasing yield to provide consumers with desirable selections of healthy and affordable foods.

- **Systematics of Invasive and Emerging Plant Pathogenic Fungi** ($945,000). ARS will:
  - -- Initiate or expand phylogenetic studies of plant pathogenic fungi of economic or regulatory importance.
  - -- Use molecular and morphological characteristics to identify, describe, and analyze phylogenetic relationships of plant pathogenic fungi.

c) An increase of $780,000 for research on **Colony Collapse Disorder of Honey Bees**.

Need for Change

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

New research will work to determine the causes of CCD and develop the means for mitigating its impact. Since bees depend on learning and memory for foraging for maintenance of colony homeostasis, any factors that effect these cognitive functions, will be the focus of this research. Bee viruses and pesticides that act as neurotoxins are particularly of interest. Program thrusts will address urgent and high priority items in the Federal Interagency CCD Action Plan.

Outcomes

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

The proposed research supports Performance Measure 2.2.3 - Expand, maintain, and protect our genetic resource base, increase our knowledge of genes, genomes, and biological processes, and provide economically and environmentally sound technologies that will improve the production efficiency, health, and value of the Nation's crops.

Means to Achieve Change

- **Determine the Role of Pathogens and Other Stress Factors in CCD and Develop the Means for Mitigating their Effects** ($450,000). ARS will:
  - -- Isolate and characterize the impacts of pathogens implicated in CCD.
  - -- Determine immunity mechanisms with which bees resist parasites and pathogens (e.g., viruses, bacteria, nosema).
  - -- Evaluate how environmental stress factors interact with parasites and pathogens to cause bee losses.
  - -- Develop strategies for reducing pathogen loads in honey bee breeding stock.
  - -- Develop molecular diagnostics for monitoring pathogens and bee health.
  - -- Enact a diagnostic for APHIS to detect viruses in imported bee stock.

- **Develop Artificial Diet-Based Systems for Increasing Pollination of Specialty Crops Impacted by CCD** ($330,000). ARS will:
  - -- Determine the nutritional value of pollen in specialty crops as it impacts bee susceptibility to CCD.
  - -- In combination with the Tucson pollen substitute diet, use recently isolated pheromones to stimulate brood rearing and extend worker longevity.

d) A decrease of $15,109,000 in ongoing research programs, laboratories, or locations to provide savings to finance higher priority research initiatives.

Need for Change

Research projects under this program activity have been identified for termination given that they are: (1) nonpriority, Congressionally-added earmarks; (2) considered by the Administration to be of lesser priority; (3) duplicative or can be accomplished more effectively elsewhere; or (4) can be more efficiently implemented with less overhead costs at another location. The savings achieved from these terminations will be redirected to finance the higher priority agricultural research initiatives identified in the FY 2009 Budget, will improve program and operational efficiencies, and will serve to restrain Federal spending.

AR, Little Rock, Sorghum Research
DC, Washington, U.S. National Arboretum, Education Unit (downsize programs/operations)
DC, Washington, U.S. National Arboretum Gardens Unit (downsize programs/operations)
GA, Watkinsville, Southern Piedmont Conservation Research
KS, Manhattan, Karnal Bunt
MD, Beltsville, Molecular and Morphological Systematics of Plant Pathogenic Fungi
ME, Orono, New England Plant, Soil, and Water Research Laboratory
MI, East Lansing, Sugarbeet and Bean Research
MN, Morris, Soil Management Research
MN, St. Paul, Wild Rice
OH, Wooster, Corn and Soybean Research
OK, Lane, Genetics and Production Research
SC, Charleston, Genetic Improvement of Southern Peas and Peppers

SC, Charleston, Genetic Improvement of Sweetpotato and Snap Bean for Multiple Pest Resistance
TX, Bushland, Sorghum Research
TX, Lubbock, Sorghum Cold Tolerance
TX, Weslaco, Kika de le Garza Subtropical Agricultural Research Center
WA, Pullman, Land Management and Water Conservation Research

Food Safety

ARS is proposing under this program area a net increase of $1,267,000. This includes pay costs, and new and expanded research initiatives totaling $8,498,000, and decreases totaling $7,231,000.

a) An increase of $1,477,000 for **FY 2009 Pay Costs**, which includes $384,000 for the annualization of the fiscal year 2008 pay raise, and $1,093,000 for the anticipated fiscal year 2009 pay raise.

Need for Change

Funding for pay costs is critical for recruiting and retaining top level scientists and staff, conducting viable research programs, and carrying out ARS' mission. Absorption of these costs reduces the number of scientists and support personnel essential for conducting the agency's research programs. If pay costs are not fully funded, ARS will be unable to fill critical positions and will have to reduce spending for much needed laboratory equipment, supplies, and other materials.

b) An increase of $7,021,000 for **Food Safety Research**.

Need for Change

Consumption of fresh fruits and vegetables continues to grow in the United States, however, the trend towards a more healthy diet has coincided with an increased number of deaths and foodborne illnesses associated with produce contaminated with enteric pathogens such as *E. coli* O157:H7 and *Salmonella*. In fact, produce associated outbreaks have now surpassed those from all other foods, including beef, poultry and seafood. Equally troubling is that more people are affected since the average size of these outbreaks is larger than outbreaks from other foods. Produce outbreaks have been documented from both domestically grown and imported produce during the past 10 years, although in the past five years domestically grown associated outbreaks have far surpassed imports. In addition, foodborne illness has not been confined to the human food supply; dogs and cats across the country became ill after consuming pet food contaminated with gluten that was imported from China.

Understanding the recent outbreaks of *E. coli* O157:H7 in fresh lettuce and spinach and preventing their re-occurrence is of paramount importance to the health and well being of the general public, and to the economic viability of the U.S. produce industry. Apart from the impact on health and safety, the Nation's economy has been seriously affected 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.

A production agreement is currently being initiated by industry which will entail new best management practices (BMPs) for pathogen prevention and control in produce. The scientific knowledge to identify BMPs is lacking, but the industry must implement intuitive practices in the short term to regain consumer confidence. The Food and Drug Administration has announced new guidelines for the production of fresh produce, however, a critical problem is they are non-binding. ARS has the broad-based interdisciplinary expertise, in concert with its university, industry, and Federal agency partners, to address most if not all issues related to the contamination problem.

Data is being gathered on the antibiotic resistance of many foodborne and biosecurity pathogens; in many cases, an association has been found between antibiotic resistance and other microbial

characteristics, such as virulence, multi-drug-resistance (MDR), etc. We now know that some pathogens may possess genetic determinants that can be easily transferred into other foodborne pathogens and pathogens of biosecurity concern. These events, in turn, can dramatically transform the resistance status and/or virulence capacity of the recipient bacteria, thus significantly increasing their threat to national and international public health. A more complete understanding of the epidemiology, ecology, genetics, evolution, and genetic transfer mechanisms of these bacteria is required. We have begun to gather some knowledge in these areas from animal production practices, antibiotic treatment use, and the treatment of human illness, all of which have highlighted the critical need for this research. A mechanism is needed to process data more quickly and completely, which will significantly support identifying the source of human illness outbreaks. Data is critical for developing mathematical models that describe the total reservoir spectra, amplification sites, and ecological spread of antibiotic resistance. Analysis of these data will also more accurately establish introduction risks and provide estimates for the establishment and spread of microbiological genetic material carrying antibiotic resistance genes under different scenarios.

Outcomes

The proposed increase will facilitate an understanding of the fate and movement of enteric pathogens such as *E. coli* O157:H7 in vegetable and small fruit production fields and their surrounding environments. Field-based research is needed to identify pathogen sources, pathogen introduction mechanisms, and pathogen introduction and migration within agricultural settings and watersheds that supply production fields. The development of improved methods for the rapid and sensitive detection of pathogens in field samples will support research and assist with environmental and BMP monitoring. In addition, research will be conducted to develop an understanding of pathogen survival outside the natural host, which is critical for developing strategies to prevent produce contamination: The physical and genetic basis for the survival mechanisms of enteric pathogens in produce fields and surrounding point sources will be determined, as well as the ways in which human pathogens interact with physical matrices and other organisms within complex soil/water ecosystems. In the short-term, ARS' large strategic plant germplasm collection and extensive genetics/breeding expertise will facilitate the investigation of genetic lines resistant to harboring pathogens. In the longer-term, improved basic knowledge of pathogen introduction, transport, and survival mechanisms will lead to the development of pre and postharvest technologies for eradicating enteric pathogens in perishable produce from both conventional and organic producers. ARS will work with industry partners to evaluate and validate BMPs adopted by producers and processors for their effectiveness in pathogen abatement. The increase will allow advanced genetic technologies to become a core component in these efforts; research on pathogen genomics will provide critical information on understanding the genetic basis for pathogen survival, growth, uptake and attachment to plant tissue. Genomics will also allow for effective detection and fingerprinting, which is essential for source tracking and attribution.

Epidemiology, ecology and genetic studies of antibiotic resistance will reveal the mechanisms for the acquisition and development of MDR in foodborne pathogens and bacteria of biosecurity concern. Modeling will help identify data gaps, form testable hypotheses for further investigation, and focus ARS assessments of the source of pathogens responsible for human illness. Accurate models of antibiotic resistance spread will allow ARS to more accurately predict risk and determine antibiotic use patterns to identify environments and pathogens prone to the genetic development of antibiotic resistance. This will allow ARS to provide guidance and develop antibiotic use patterns that will support antibiotic use to the greatest extent possible for the longest period of time. These studies will also provide a critical tool—plasmid sequencing—for monitoring MDR in the environment, animals, and humans.

The proposed research supports Performance Measure 4.1.1. – Develop new technologies that assist ARS customers in detecting, identifying and controlling foodborne diseases that affect human health.

Means to Achieve Change

- **Developing and Validating Integrated Science-Based Management Practices to Prevent Preharvest Contamination of Produce, by Enteric Pathogens, and Developing Postharvest Intervention Strategies to Eliminate Any Pathogen Contamination** ($6,021,000). ARS will:
  - -- Determine how pathogens are introduced into the environment; determine their prevalence and levels of contamination in/on: water sources (rain, flooding, and irrigation) prior to and used during growing and harvest cycles; soil amendments (manure); farm animals; wildlife; produce handlers; visitors; and equipment.
  - -- Determine pathogen persistence and survival in the environment through studies on environmental factors; seasonality; production cycles; mechanism(s) of transference to edible plant surfaces; adjacent land use; buffer zones; water sources (irrigation); and fecal contamination by farm animals, wildlife, and other organisms (insects and protozoa).
  - -- Determine the role of epiphytic and soft rot microorganisms in pathogen internalization and/or attachment; and pathogen occurrence and movement.
  - -- Develop practices and tools to control and predict the fate and transport of pathogens.
  - -- Determine the role of harvesting methods, postharvest processing, and storage.
  - -- Develop innovative processing intervention strategies to assure and maintain postharvest safety and quality.
  - -- Conduct field studies to determine the prevalence, diversity, quantity colonization and survival of pathogens associated with crops produced conventionally and organically.

- **Researching Antibiotic Resistance** ($1,000,000). ARS will:
  - -- Elucidate the epidemiology, genomics, evolution and transfer of multi-drug resistance among both foodborne pathogens and pathogens of biosecurity concern.
  - -- Develop mathematical models for the spread of antibiotic resistance genes in different environments.
  - -- Utilize data for conducting risk assessment and developing use patterns that will result in the longest possible use of the drug.

c) A decrease of $7,231,000 in ongoing research programs, laboratories, or locations to provide savings to finance higher priority research initiatives.

Need for Change

Research projects under this program activity have been identified for termination given that they are: (1) nonpriority, Congressionally-added earmarks; (2) considered by the Administration to be of lesser priority; (3) duplicative or can be accomplished more effectively elsewhere; or (4) can be more efficiently implemented with less overhead costs at another location. The savings achieved from these terminations will be redirected to finance the higher priority agricultural research initiatives identified in the FY 2009 Budget, will improve program and operational efficiencies, and will serve to restrain Federal spending.

CA, Albany, Environmental and Genetic Factors Affecting Pathogen Persistence in Animal Waste
IA, Ames, Swine Odor and Manure Management Research
MD, Beltsville, Microbial Food Safety of Fresh and Fresh Cut Produce
NE, Clay Center, Prevention and Control of Shiga Toxigenic E. Coli in Livestock
NE, Clay Center, Prevention of Zoonotic Pathogen Transmission from Animal Manure to Human Food
PA, Wyndmoor, Validation of the Effect of Interventions and Processes on the Persistence of Pathogens

Livestock Protection

ARS is proposing under this program area a net decrease of $13,585,000. This includes pay costs, and new and expanded research initiatives totaling $5,584,000, and decreases totaling $19,169,000.

a) An increase of $986,000 for **FY 2009 Pay Costs**, which includes $257,000 for the annualization of the fiscal year 2008 pay raise, and $729,000 for the anticipated fiscal year 2009 pay raise.

Need for Change

Funding for pay costs is critical for recruiting and retaining top level scientists and staff, conducting viable research programs, and carrying out ARS' mission. Absorption of these costs reduces the number of scientists and support personnel essential for conducting the agency's research programs. If pay costs are not fully funded, ARS will be unable to fill critical positions and will have to reduce spending for much needed laboratory equipment, supplies, and other materials.

b) An increase of $4,598,000 for **Emerging, Zoonotic, and Foreign Animal Diseases**.

Need for Change

Recent breakthroughs in the field of immunology and genomics have provided revolutionary approaches for vaccine discovery research and the potential for eliminating some of the most devastating infectious diseases affecting animals and people, including arthropod-borne diseases. As a result of global warming, human overpopulation in environmentally sensitive geographical areas, and industrial expansion across the globe, emerging zoonotic diseases are surfacing as some of the most significant threats to public and animal health. In addition, the 21st century war on terrorism has elevated the critical need for biodefense vaccines to effectively mitigate the intentional release of biological weapons. The need to advance the discovery of new vaccines to protect people and animals has never been greater.

With the publication of *Critical Needs for Research in Veterinary Science* by the National Research Council of the National Academies, the need to prevent and control biological threats comes at an important time for advancing basic research in immunology and applying new discoveries to the development of vaccines specifically designed for control and eradication. By supporting vaccine discovery, immunology can directly improve the lives of millions of people worldwide, either by producing healthier animals and safer foods, or as a means to generate breakthroughs in preventive medicine.

The completion of animal genome projects may result in a fundamental paradigm shift in the way we approach animal health and biomedical research. Currently, the management and treatment of many animal diseases is limited to the use of traditional tools such as drugs, on-farm biosecurity systems, test and slaughter protocols, and the imposition of trade restrictions. Armed with animal genome sequences and genetic markers that correlate with disease traits, we are now in a position to identify the genetic variations that control disease outcomes. These new research tools offer unparalleled opportunities for understanding 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 research 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 in the next 10 to 15 years. The European Union has already moved forward in building coalitions to capitalize on these new tools. The 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 October 2007 entitled "Animal Genomics for Animal Health" to identify critical needs and opportunities for advancing the use of genomics in animal health research.

Arthropod-borne pathogens represent some of the most significant threats to livestock production and human health worldwide. As cultural practices and other factors change, pathogens adapt to those changes in ways that produce new threats. The transmission of pathogens between domestic

animals and wildlife presents some of the greatest challenges to our disease control programs. Some of the most pressing needs include the ability to rapidly detect, prevent, and eliminate diseases such as Tuberculosis, Brucellosis, Exotic Newcastle disease, Coccidiosis, Classical Swine Fever, Bovine Viral Diarrhea Virus, Porcine Circovirus-2, Exotic Bluetongue virus, and Rift Valley Fever Virus (RVFV). RVFV is just one example of a potentially devastating pathogen: it is transmitted to cattle and other ruminants by mosquitoes, but people can be infected by handling raw animal products, as well as from mosquito bites. If RVFV is introduced from Africa to the United States, its presence would result in abortion storms, the death of young animals, the imposition of strict safety standards for meat processing, and a direct threat to human life.

Scientific information to quickly and efficiently design effective Integrated Pest Management is a critical need. In 1999, the United States was caught unaware by West Nile virus, which quickly spread from its point of introduction to other parts of the Northeast. In the next four years, it spread across the entire country. Transmitted by a wide variety of mosquitoes, the economic, veterinary, and health consequences from the establishment of this virus are huge. Equines are now vaccinated across the country, the danger from all mosquito bites has been considerably elevated, thousands of infected citizens have become severely ill or have died, and many municipalities have been forced to develop and launch entirely new mosquito control programs.

The southern United States is free of babesiosis (cattle malaria), a serious cattle disease, as a result of activities between 1912 and 1940 that eradicated the *Boophilus* tick that transmitted the pathogen. Exclusion of the *Boophilus* tick from the United States probably saves the cattle industry more than one billion dollars per year in damages from babesiosis. In fact, cattle production might no longer be economically feasible in large parts of the southern United States if the *Boophilus* tick became reestablished. During the last five years, the system for preventing the reintroduction of the tick has suffered two major challenges: Mexican *Boophilus* populations are developing increased resistance levels to available toxicants, and growing populations of white tailed deer and feral exotic ungulates (imported for the trophy hunting industry) commonly carry *Boophilus* ticks across the Mexican border into the United States. The number of tick reintroductions in Zapata and other border counties in Texas has increased dramatically during 2005 and 2006; in one instance, infested Nilgai antelope found near Brownsville, Texas, resulted in the destruction of 35 animals and quarantine of 35,000 acres of pasture.

Outcomes

The last decade has witnessed the emergence and re-emergence of multiple infectious diseases of veterinary and human importance. These are caused by viral, bacterial, and protozoal pathogens, many of which pose difficult challenges for control. Zoonoses represent a significant portion of the emerging or re-emerging infectious diseases that are threatening our citizens and our public health systems; moreover, many zoonotic pathogens are also known as "select agents"—pathogens that could be used for bioterrorism or warfare. All these factors support the need for new, improved animal models in the study of zoonotic agents and their interaction within definitive and secondary hosts. Although a considerable amount of species specific data have been generated by individual investigators working with zoonotic agents in animal and human fields, further work is needed to clarify and identify both species specific and shared protective and/or pathogenic mechanisms.

The need for understanding immune mechanisms is especially applicable when zoonotic pathogens use common pathways to evade or subvert the immune systems of their animal and human hosts. Eucidating these common mechanisms enhances the applicability of the models to other pathogens that have evolved specific interactions with their animal hosts. Thus, zoonotic diseases offer unparalleled opportunities for testing the efficacy and safety of new human vaccine platforms where relevant animal challenge models exist. This includes, e.g., opportunities for the direct testing of several vaccine approaches in relevant animal models, the potential for reversion-to-virulence of an attenuated live vaccine, the tissue distribution of a recombinant viral vector vaccine, or, most importantly, the identification of correlates of protection and whether a novel vaccine platform will induce protective immunity.

Veterinary immunology research is paramount to the discovery of novel vaccines specifically designed for the control and eradication of zoonotic and foreign animal diseases. Research is targeted towards delivering highly efficacious vaccines that:

- -- prevent virus amplification in target hosts,
- -- prevent disease transmission,
- -- are efficacious in all target ruminant species,
- -- are efficacious in young animals,
- -- only require the administration of one dose,
- -- provide rapid immunity that lasts for one year,
- -- are safe (i.e., do not prompt a reversion to virulence in mammalian or vector hosts),
- -- are non-abortigenic,
- -- are safe in all target species,
- -- are pure vaccine,
- -- differentiate infected from vaccinated animals (DIVA)-compatible,
- -- are produced using manufacturing methods that results in a high number of doses,
- -- do not result in maternal antibody interference,
- -- are compatible with mass vaccination,
- -- have rapid speed of production and scale-up,
- -- are at a reasonable cost, and
- -- have short withdrawal period for food consumption.

Genomics (the sequencing and interpretation of genetic material in both host and pathogen) will be a key component of modern vaccine discovery. Understanding the genetics of susceptibility provides strategies for preventing infection, evaluating livestock breeds for resistance to infection, and developing animal models that serve the needs of both veterinary and human medicine. The explosion in new high throughput technologies arising from microbial genomics, the Human Genome Initiative, and the recent sequencing of two of the major livestock genomes (*Gallus domesticus* and *Bos taurus*) will enable the analysis of the genome transcriptome and proteome, and offer the opportunity to gain a better understanding of the molecular pathways underlying microbial pathogenesis, the host immune system, and host–pathogen interactions.

The integration of pathogen and host genomics in vaccine research—known as vaccinogenomics—is likely to revolutionize the way scientists approach the challenges of discovering and developing safe and effective vaccines. The availability of genomic tools provides unprecedented prospects for the rational design of highly effective human and veterinary vaccines. Identifying genes and genetic variations that influence the mechanisms of immune evasion, disease resistance, and vaccine responsiveness will fundamentally change vaccine discovery research and enable vaccinologists to design vaccines to control and eradicate pathogens in targeted human and animal populations. The establishment of animal genomic tools and animal lines with defined genetic backgrounds also provides opportunities for developing vaccines that perform under field conditions. The heterogeneity found in outbred livestock populations may also enable marker-assisted selection of good responders to vaccination. The availability of challenge models in animal health research provides unique opportunities for conducting studies to define genetic variations associated with disease susceptibility and understanding mechanisms of protective immunity.

The ability to rapidly detect specific zoonotic and foreign animal disease pathogens such as RVFV is a national priority. Since many of these diseases mimic several endemic diseases that lack readily available diagnostic tools, the proposed ARS research program will deliver validated diagnostic reagents that do not pose biological safety concerns and that can be used in several research projects, including early disease detection by the National Animal Health Laboratory Network; the development of safe internal controls to validate the performance of diagnostic test procedures across laboratories; enzyme-linked immunosorbent assay test kits that are not dependent on growing wild type virus as sources of antigen; commercial test kits that can be safely used in the field; and companion diagnostic tests to enable a DIVA (differentiating infected from vaccinated animals) control strategy.

ARS has a vigorous *Boophilus* research program in Kerrville, Texas, that is steadily making progress on acaricide resistance and the treatment of wild ungulates. They have invented the "4-poster" device that successfully treats a large part of the wild deer population with acaricide, but this device only offers a partial solution. Increased funding would accelerate development of an automatic collaring device that could deliver acaricidal collars to wild ungulates, or vaccinate them against the ticks. Funding would also result in more rapid development of new acaricides and resistance management techniques. This research will provide key tools necessary to protect the southern United States from one host ticks (*Boophilus*) and Texas cattle fever.

The proposed research supports Performance Measure 4.2.1 – Provide scientific information to protect animals, humans, and property from the negative effects of pests, infectious diseases, and other disease-causing entities; and Performance Measure 4.2.2 – Develop and transfer tools to the agricultural community, commercial partners, and government agencies to control or eradicate domestic and exotic diseases and pests that affect animal and human health.

Means to Achieve Change

- **Zoonotic Disease Intervention and Biodefense** ($796,000). ARS will:
  - -- Support research to discover innate immune modulators for the rapid onset of immunity.
  - -- Conduct comparative immunology studies to determine effective mechanisms of protection in target host species.
  - -- Support discovery research efforts in biomarkers (comparative correlates of protection) to support FDA's Animal Rule.

- **Genomics – A New Frontier in Vaccine Discovery** ($796,000). ARS will:
  - -- Determine additional host genetic factors and molecular mechanisms that control host pathogen interactions and disease outcome.
  - -- Support host profiling studies to identify gene expression signatures unique to specific pathogens and genetically disparate hosts.
  - -- Integrate genomics tools in vaccine clinical trials to identify animals that are poor or good responders to vaccination.

- **Evaluating Native Biting Insects as Transmitters of Foreign Animal Pathogens** ($496,000). ARS will:
  - -- Determine regionally what local vector species are likely to be important in the transmission of particular introduced pathogens.
  - -- Test individual vector species for their ability to transmit particular pathogens.
  - -- Quantify the risk from each biting insect as a vector of a particular pathogen.

- **Matching Trapping Technology with Potential Vectors of Foreign Animal Pathogens** ($295,000). ARS will:
  - -- Review existing methods for surveillance of each potential vector.
  - -- Test methods for consistency and sensitivity.
  - -- Develop risk thresholds of abundance.

- **Adapting Control Techniques to Integrated Pest Management of the Most Important Potential Vectors** ($295,000). ARS will:
  - -- Test strategies for emergency vector control in response to an introduction.
  - -- Identify gaps in existing tools for emergency vector control.

- **Developing Expression and Delivery Systems to Advance the Discovery of Diagnostics and Vaccines Specifically Designed for the Control and Eradication of RVFV or Other Emerging Pathogens** ($495,000). ARS will:
  - -- Identify RVFV determinants that modulate the immune response in target ruminant species.

- -- Develop direct and indirect diagnostic tests to enable the early detection of RVFV, including the differentiation of infected animals from vaccinated animals.
- -- Study the immunology of RVFV to discover surrogates of efficacy and protective immunogens that will lead to virus designed to prevent viral transmission to insect vectors.
- -- Develop animal models for major commodity livestock species, the models mimicking the immunology of relevant species for the purpose of veterinary and human vaccine development.
- -- Use genomics to discover new immunizing antigens for vaccine development to evaluate susceptibility of livestock to infection and evaluate animal models. Maintain liaison with the human vaccine development community.

- **Determining Risk, Vector Species, Diagnostics, and Integrated Control Methods for Potentially Introduced Animal Pathogens** ($496,000). ARS will:
  - -- Examine potential distribution, susceptibility of local vectors, and new diagnostic tools for exotic bluetongue virus.
  - -- Use vesicular stomatitis virus as a model to study receptors in the vector gut and physiology of transmission enhanced by vector saliva.
  - -- Determine the role of horses as amplifying hosts for Vesicular Stomatitis virus and compare the efficiency of black flies and *Culicoides* biting midges in viral transmission.
  - -- Determine the effect of selected counter-measures on the capacity of cattle and horses to serve as an amplifying host for Vesicular Stomatitis virus transmission.

- **Stopping the Reinvasion of Texas Cattle Fever** ($929,000). ARS will:
  - -- Finalize engineering of the automatic collaring device (i.e., optimize device for use on white tailed deer; adapt device for use on feral exotic ungulates; and integrate vaccination capability into the collaring device).
  - -- Work with academic partners to develop a new anti-tick vaccine that can be delivered effectively in one dose to prevent reinfestation by *Boophilus* ticks.
  - -- Expand research on acaricide resistence to develop new acaricides and resistance management strategies (i.e., analyze spatial distribution of genetics leading to resistance; work with industry to register new acaricides from existing toxicants; determine utility of new toxicants; and develop new tick control strategies like attract-and-kill baits).

c) A decrease of $19,169,000 in ongoing research programs, laboratories, or locations to provide savings to finance higher priority research initiatives.

Need for Change

Research projects under this program activity have been identified for termination given that they are: (1) nonpriority, Congressionally-added earmarks; (2) considered by the Administration to be of lesser priority; (3) duplicative or can be accomplished more effectively elsewhere; or (4) can be more efficiently implemented with less overhead costs at another location. The savings achieved from these terminations will be redirected to finance the higher priority agricultural research initiatives identified in the FY 2009 Budget, will improve program and operational efficiencies, and will serve to restrain Federal spending.

FL, Gainesville, Mosquito Trapping Research/West Nile Virus
FL, Gainesville, Termite Species in Hawaii
FL, Gainesville, Vector-Borne Diseases
LA, New Orleans, Formosan Subterranean Termite Research
MD, Beltsville, Lyme Disease 4 Poster Project (National Program)
MD, Beltsville, Poultry Diseases
MI, East Lansing, Avian Disease and Oncology Laboratory
NE, Lincoln, Origin, Development, and Population Genetics of Stable Flies Affecting Pastured and Confined Livestock

NY, Greenport, Animal Vaccines
WY, Laramie, Countermeasures to Control and Eradicate Rift Valley Fever (RVF)
WY, Laramie, Molecular Biology and Pathogenesis of Arboviruses
WY, Laramie, Vector Competence and Protection of U.S. Livestock and Wildlife from Arthropod–Borne Diseases
HQ, Animal Health Consortium

Crop Protection

ARS is proposing under this program area a net decrease of $7,297,000. This includes pay costs, and new and expanded research initiatives totaling $7,017,000, and decreases totaling $14,314,000.

a) An increase of $2,676,000 for **FY 2009 Pay Costs**, which includes $694,000 for the annualization of the fiscal year 2008 pay raise, and $1,982,000 for the anticipated fiscal year 2009 pay raise.

Need for Change

Funding for pay costs is critical for recruiting and retaining top level scientists and staff, conducting viable research programs, and carrying out ARS' mission. Absorption of these costs reduces the number of scientists and support personnel essential for conducting the agency's research programs. If pay costs are not fully funded, ARS will be unable to fill critical positions and will have to reduce spending for much needed laboratory equipment, supplies, and other materials.

b) An increase of $4,341,000 for research on **Crop Health Including Detection, Identification and Management of Emerging and Re-Emerging Soilborne Nematodes and Pathogens, Invasive Species, and Integrated Pest Management to Control Pests and Diseases**.

Need for Change

The emergence and spread of new and endemic crop diseases and invasive species pose severe problems that, if unchecked, will devastate U.S. agriculture. Their emergence and spread result from the modification of the environments that favor exotic pests, changes in crop management practices, genetic shifts in pest populations, and other processes that offer exotics an advantage for survival and spread.

To mitigate these threats requires increased research into safe and sustainable science- based integrated pest management tactics and technology transfer of the research to end users. It is critically important to identify new or unknown pests, determine their geographic origin, and to biologically characterize them. Accurate taxonomic identification including classification of such pests is essential. Pathogenicity studies and molecular markers are needed to discriminate pathogens. Host range testing of biological agents to control pests and pathogensis is also needed.

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

The USDA has vigorously responded to the methyl bromide challenge, that is, finding suitable alternatives to methyl bromide which is scheduled to be phased out. It has brought together agricultural and forestry leaders from private industry, academia, State governments, and the Federal government to assess the problem, formulate priorities, and implement research directed at providing solutions. ARS was assigned the lead in this process by redirecting funds from other programs to this area, and by implementing new research projects funded by additional Congressional appropriations.

Outcomes

The proposed research will minimize or prevent the establishment and spread of pests within the United States and limit economic losses from reduced yield and/or quality. Higher quality commodities and crops produced in the U.S. will be available for domestic consumption and international markets. New, rapid, and accurate detection and identification of unknown pests and 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.

The proposed research supports Performance Measure 4.2.3 – Develop control strategies based on fundamental and applied research to reduce losses caused by plant diseases, nematodes, arthropods, and weeds that are effective and affordable while maintaining environmental quality. Develop technically and economically feasible alternatives to preplant and postharvest use of methyl bromide; and Performance Measure 4.2.4 – Provide needed scientific information and technology that is environmentally acceptable to producers of agriculturally important plants in support of exclusion, early detection and eradication, control, and monitoring of invasive arthropods, weeds, nematodes, and pathogens; enhanced sustainability; and restoration of affected areas. Conduct biologically-based integrated and areawide management of key invasive species.

Means to Achieve Change

- **Identifying, Characterizing, Preventing, and Controlling Emerging Plant Diseases** ($1,614,000). ARS will:
  - -- Develop pathogen detection and improved diagnostic tests.
  - -- Characterize pathogens, biologically and molecularly, to better understand the epidemiology of the disease and its spread.
  - -- Conduct research on biochemical and physiological processes that operate in the pathogen as infection and disease progress.
  - -- Identify and monitor new races and biotypes of pathogens and conduct epidemiological studies to determine pathways.

- **Controlling Invasive Species Affecting Plants** ($1,114,000). ARS will:
  - -- Improve taxonomic knowledge of invasive species.
  - -- Detect, identify, and classify invasive arthropods.
  - -- Increase knowledge of vascular plants and fungi.
  - -- Characterize and analyze new and previously described invasive species.

- **Researching Integrated Pest Management** ($1,613,000). ARS will:
  - -- Compare methyl bromide soil fumigation with currently available alternative approaches in field trials that result in the generation of efficacy data on a regional scale.
  - -- Demonstrate the impact of different systems and IPM techniques for reducing pre-plant soil fumigation for annual, perennial, and nursery crops.
  - -- Evaluate the performance of alternative fumigants under controlled laboratory or small plot conditions where relationships among fumigant concentration, exposure time, environmental conditions, pest species, and growth stage need to be determined.
  - -- Evaluate the performance of alternative fumigants in the field and space fumigation, where factors such as chemical distribution, pest population density and distribution, pest interactions, and environmental and soil conditions influence efficacy.

c) A decrease of $14,314,000 in ongoing research programs, laboratories, or locations to provide savings to finance higher priority research initiatives.

Need for Change

Research projects under this program activity have been identified for termination given that they are: (1) nonpriority, Congressionally-added earmarks; (2) considered by the Administration to be of

lesser priority; (3) duplicative or can be accomplished more effectively elsewhere; or (4) can be more efficiently implemented with less overhead costs at another location. The savings achieved from these terminations will be redirected to finance the higher priority agricultural research initiatives identified in the FY 2009 Budget, will improve program and operational efficiencies, and will serve to restrain Federal spending.

CA, Parlier, Develop Postharvest Chemical and Non-Chemical Methyl Bromide Alternatives
CA, Salinas, Disinfest Lettuce of Insects through Postharvest Treatments and Preharvest Integrated Pest Management
DC, Washington, Biologically-Based Management Strategies for Control of Soil-Borne Pathogens
FL, Ft. Pierce, Vegetable Grafting for Resistance to Soil-Borne Disease
FL, Gainesville, Improving Efficacy of Fumigants by Promoting Uniform Dispersion in Soil and Minimizing Emissions to the Atmosphere
FL, Miami, Protection of Subtropical and Tropical Agricultural Commodities and Ornamentals from Exotic Insects
IL, Urbana, Invasive Weed Management Research
MD, Beltsville, Biological Control of Fusarium Wilt and Other Soil-Borne Plant Pathogenic Fungi
MD, Beltsville, Biological Technologies as Alternatives to Chemicals for Control of Soil-Borne Pathogens
MD, Beltsville, Biomedical Materials in Plants (Biotech Foundation)
MD, Beltsville, Potato Diseases
MN, St. Paul, Cereal Diseases
OH, Wooster, Corn and Soybean Research
OK, Lane, Genetics and Production Research
TX, Weslaco, Kika de le Garza Subtropical Agricultural Research Center
WA, Wenatchee, Sustainable Systems for Control of Soil-Borne Diseases in Tree Fruit Agroecosystems

Human Nutrition

ARS is proposing under this program area a net decrease of $5,860,000. This includes pay costs, and new and expanded research initiatives totaling $12,699,000, and decreases totaling $18,559,000.

a) An increase of $522,000 for **FY 2009 Pay Costs**, which includes $135,000 for the annualization of the fiscal year 2008 pay raise, and $387,000 for the anticipated fiscal year 2009 pay raise.

Need for Change

Funding for pay costs is critical for recruiting and retaining top level scientists and staff, conducting viable research programs, and carrying out ARS' mission. Absorption of these costs reduces the number of scientists and support personnel essential for conducting the agency's research programs. If pay costs are not fully funded, ARS will be unable to fill critical positions and will have to reduce spending for much needed laboratory equipment, supplies, and other materials.

b) An increase of $12,177,000 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. 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 and results in adverse impacts on work productivity, medical costs, and the U.S. economy. 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, they have never been tested as a complete package to determine if they result in the expected health benefits. Thus, to ensure the soundness of the *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.

The *Dietary Guidelines* are the foundation of the web-based *MyPyramid* tools that have registered over 80 million users to date. One of the tools, the MyPyramid Tracker, is designed to help individuals better understand the calories and nutrients they receive from foods and beverages. This personalization of nutrition information is one of the keys to changing food choice behaviors. In order to obtain optimal results from the MyPyramid Tracker, the food composition information it contains must be current and must parallel the marketplace with brand name information. Currently this is not the case. USDA's Standard Reference food composition database is designed for the nationwide population dietary survey and not for assessments by individuals. The provision of a new food composition database meeting the needs of the MyPyramid Tracker would give consumers a readily available tool to manage their food intake, and would support individuals in their efforts to maintain a healthy body weight.

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 and 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 of the healthful eating and physical activity patterns established in the *Dietary Guidelines* in preventing obesity in the U.S., with particular focus on preventing obesity in children. In addition to benefiting most Americans, the research will support USDA's nutrition assistance programs and the U.S. economy, which is burdened by direct

and indirect costs of obesity. Agricultural production and food industries will also have access to 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 National 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. Providing a new nutrient composition database to support the *MyPyramid* consumer tools will be key in helping individuals manage a healthy body weight.

The proposed research supports Performance Measure 5.2.1 - Monitor food consumption/intake patterns of Americans, including those of different ages, ethnicity, regions, and income levels, and measure nutrients and other beneficial components in the food supply. Provide the information in databases to enable ARS customers to evaluate the healthfulness of the American food supply and the nutrient content of the American diet; and Performance Measure 5.2.2 - Define the role of nutrients, foods, and dietary patterns in growth, maintenance of health, and prevention of obesity and other chronic diseases. Assess bioavailability and health benefits of food components. Conduct research that forms the basis for and evaluates nutrition standards and Federal dietary recommendations.

Means to Achieve Change

- **Conducting Efficacy and Translational Research on the *Dietary Guidelines* in Preventing Obesity in the Diverse American Population** ($9,717,000). 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 barrier and motivators for complying with the *Dietary Guidelines*, particularly among vulnerable populations such as children, low income people, and minority groups.

- **Developing a New Nutrient Database Incorporating Food Composition Data from the American Food Industry to Support the *MyPyramid* Food Tracker Module** ($2,460,000). ARS will:
  - -- Establish a Web-based database and software support system for automatic receipt and quality control evaluation of industry food composition data .
  - -- Enhance the ARS Food Link system for automated and rapid calculation of Pyramid servings from industry provided food composition information.

c) A decrease of $18,559,000 in ongoing research programs, laboratories, or locations to provide savings to finance higher priority research initiatives.

Need for Change

Research projects under this program activity have been identified for termination given that they are: (1) nonpriority, Congressionally-added earmarks; (2) considered by the Administration to be of lesser priority; (3) duplicative or can be accomplished more effectively elsewhere; or (4) can be more efficiently implemented with less overhead costs at another location. The savings achieved from these terminations will be redirected to finance the higher priority agricultural research initiatives identified in the FY 2009 Budget, will improve program and operational efficiencies, and will serve to restrain Federal spending.

AR, Little Rock, Delta Nutrition Initiatives
LA, New Orleans, Diet Nutrition and Obesity Research (Pennington)
LA, New Orleans, Phytoestrogen Research
MD, Beltsville, Metabolism of Vitamin A and Carotenoids
MD, Beltsville, Quantitative and Qualitative Assessment of Community-Based Nutrition Programs and Interventions
ND, Grand Forks, Dietary Cooper Requirements for Optimal Cardiovascular Function and Health
ND, Grand Forks, Micronutrient Roles in Physiology and Health
ND, Grand Forks, Mineral Intakes for Optimal Bone Development and Health
ND, Grand Forks, Mineral Utilization and Bioavailability in the 21st Century with Changing Diets and Agricultural Practices
ND, Grand Forks, Role of Dietary Selenium on Gene Expression, Cell Cycle and Molecular Mechanisms in Cancer Risk
HQ, Obesity Interventions (Nutricare)

Environmental Stewardship (Water Quality)

ARS is proposing under this program area a net decrease of $6,509,000. This includes pay costs, and new and expanded research initiatives totaling $8,727,000, and decreases totaling $15,236,000.

a) An increase of $948,000 for **FY 2009 Pay Costs**, which includes $245,000 for the annualization of the fiscal year 2008 pay raise, and $703,000 for the anticipated fiscal year 2009 pay raise.

Need for Change

Funding for pay costs is critical for recruiting and retaining top level scientists and staff, conducting viable research programs, and carrying out ARS' mission. Absorption of these costs reduces the number of scientists and support personnel essential for conducting the agency's research programs. If pay costs are not fully funded, ARS will be unable to fill critical positions and will have to reduce spending for much needed laboratory equipment, supplies, and other materials.

b) An increase of $7,779,000 in support of research on **Water Reuse in Agricultural Systems**.

Need for Change

Weather related disasters are quite common. One-half to two-thirds of U.S. counties have been designated as disaster areas in the past several years. There is an increasing awareness that droughts in one region of the Nation are linked to flooding in other regions through nature events like El Nino that alter regional climates. With an annual estimated cost to all sectors of society of 6 to 8 billion dollars per year, seasonal floods and droughts are perhaps the most devastating and costly events of nature. In addition to the natural annual fluctuations in water availability, the ever increasing human population and relocation of population to the traditionally water scarce West is exacerbating the existing challenge of ensuring an adequate quantity and quality of fresh water to meet human and ecosystem needs.

Agricultural access to an adequate and reliable water supply is threatened by the water supply needs of competing industries and interests. The most water common conflicts pit older, established uses such as agriculture and navigation against newer uses for recreational, industrial, and human uses.

Agriculture is the largest consumer of fresh water in the United States. For example, fruit and vegetable processors in California alone use over 62,000 acre feet of water per year in their operations that account for 43 percent of total water consumed annually in the Nation. The recent droughts across the United States and the increasing conflicts over the allocation of the limited fresh water supplies underscore the need for a better understanding of how to effectively and safely reuse water within agricultural systems. Long-term water supply, and nutrient, pathogen, and salinity issues are critical to the sustainability of agriculture producers and food processors.

In order to implement a coherent and comprehensive water scarcity and water reuse strategy agricultural producers, processors, and water suppliers need a well coordinated approach to detect, monitor, quantify, and predict the water available for reuse. When the water quality does not meet existing use standards, new technologies are required to cost effectively improve water quality so that it can be used in agricultural systems for the sustainable production of food, feed, fiber, and fuel.

Outcomes

The proposed research will provide the means for extending the use of water for agricultural production while also improving the health and function of the Nation's streams, rivers, and lakes. This research is expected to produce new technologies, and support individual and institutional responses that would reduce economic and social costs of water scarcity and food safety concerns when waste water is utilized to produce agricultural products. By developing new technologies and methodologies to use non-potable water in the production of food, feed, and fiber, agricultural producers can support urban centers in cost effective waste water treatment and improve the environment. This research will provide innovative ways to reduce the increasing demand for fresh waters by providing a safe and efficient alternative source of water for agricultural production. The research will also result in new technologies and methodologies to reduce salinity and other pollutants in waste water from agricultural production and processing facilities.

The proposed research supports Performance Measure 6.1.1 – Develop technology and practices to reduce the delivery of agricultural pollutants by water on farms and ranches and quantify the environmental benefit of conservation practices in watersheds.

Means to Achieve Change

- **Developing Criteria for the Application of Waste Water** ($2,203,000). ARS will:
  -- Develop tools to assist with land application site selection and management of waste waters to minimize land degradation and off-site pollution potential.

- **Developing Water Reuse Best Management Practices** ($2,176,000). ARS will:
  -- Develop best management practices for reusing waste water and managing saline waste streams from agricultural food processing plants and production systems.

- **Utilizing Waste Water to Mitigate Drought** ($3,400,000). ARS will:
  -- Develop technologies and management systems to safely reuse waste water and low quality water as a means of producing turf, horticultural, nursery, and specialty crops in an environmentally and economically sustainable manner.

c) A decrease of $15,236,000 in ongoing research programs, laboratories, or locations to provide savings to finance higher priority research initiatives.

Need for Change

Research projects under this program activity have been identified for termination given that they are: (1) nonpriority, Congressionally-added earmarks; (2) considered by the Administration to be of lesser priority; (3) duplicative or can be accomplished more effectively elsewhere; or (4) can be

more efficiently implemented with less overhead costs at another location. The savings achieved from these terminations will be redirected to finance the higher priority agricultural research initiatives identified in the FY 2009 Budget, will improve program and operational efficiencies, and will serve to restrain Federal spending.

AZ, Maricopa, Predicting Interactive Effects of Carbon Dioxide, Temperature, and Other Environmental Factors on Agricultural Productivity
AZ, Maricopa, Remote Sensing for Crop and Water Management in Irrigated Agriculture
CA, Brawley, Water Management Research Laboratory
CA, Parlier, Water Management to Improve Productivity and Protect Water Quality
CA, Riverside, Decision Support Tools and Databases for Optimal Management of Chemically-Affected Soils
FL, Brooksville, Optimizing Forage-Based Cow-Calf Operations to Improve Sustainability of Beef Cattle Agriculture and Water Quality Protection and Management
FL, Miami, Water Management Evaluation in Regions with High Water Table
GA, Dawson, Water Use Reduction
MS, Oxford, Seismic and Acoustic Technologies in Soils Sedimentation Laboratory
OH, Columbus, Source Water Protection Initiatives
OH, Coshocton, North Appalachian Experimental Watershed Research
PA, University Park, Pasture Systems and Watershed Management Research
TX, Bushland, Irrigation Management and Automation for Increased Water Use Efficiency
TX, Lubbock, Managing Limited Irrigation and Rainfall for Crop Production in Semi-Arid Environments
TX, Weslaco, Kika de le Garza Subtropical Agricultural Research Center
WA, Pullman, Land Management and Water Conservation Research

Environmental Stewardship (Air/Soil Quality; Global Climate Change)

ARS is proposing under this program area a net decrease of $10,671,000. This includes pay costs totaling $1,513,000, and decreases totaling $12,184,000.

a) An increase of $1,513,000 for **FY 2009 Pay Costs**, which includes $391,000 for the annualization of the fiscal year 2008 pay raise, and $1,122,000 for the anticipated fiscal year 2009 pay raise.

Need for Change

Funding for pay costs is critical for recruiting and retaining top level scientists and staff, conducting viable research programs, and carrying out ARS' mission. Absorption of these costs reduces the number of scientists and support personnel essential for conducting the agency's research programs. If pay costs are not fully funded, ARS will be unable to fill critical positions and will have to reduce spending for much needed laboratory equipment, supplies, and other materials.

b) A decrease of $12,184,000 in ongoing research programs, laboratories, or locations to provide savings to finance higher priority research initiatives.

Need for Change

Research projects under this program activity have been identified for termination given that they are: (1) nonpriority, Congressionally-added earmarks; (2) considered by the Administration to be of lesser priority; (3) duplicative or can be accomplished more effectively elsewhere; or (4) can be more efficiently implemented with less overhead costs at another location. The savings achieved from these terminations will be redirected to finance the higher priority agricultural research initiatives identified in the FY 2009 Budget, will improve program and operational efficiencies, and will serve to restrain Federal spending.

AL, Auburn, Improved Crop Production Practices
CO, Akron, Central Great Plains Research Station
CO, Akron, Dryland Production
GA, Watkinsville, Southern Piedmont Conservation Research
IA, Ames, Swine Odor and Manure Management Research
IL, Urbana, Invasive Weed Management Research
MD, Beltsville, Biomediation Research
MD, Beltsville, Medicinal and Bioactive Crops
ME, Orono, New England Plant, Soil, and Water Research Laboratory
MN, Morris, Soil Management Research
MS, Mississippi State, Waste Management and Forage Research
MS, Oxford, Medicinal and Bioactive Crops
PA, University Park, Pasture Systems and Watershed Management Research
PA, Wyndmoor, Arbuscular Mycorrhizal Fungi (Rodale Institute)
TX, Lubbock, Cotton Production and Processing Research
WA, Pullman, Land Management and Water Conservation Research

Environmental Stewardship (Range/Grazing Lands)

ARS is proposing under this program area a net decrease of $5,754,000. This includes pay costs totaling $1,159,000, and decreases totaling $6,913,000.

a) An increase of $1,159,000 for **FY 2009 Pay Costs**, which includes $300,000 for the annualization of the fiscal year 2008 pay raise, and $859,000 for the anticipated fiscal year 2009 pay raise.

Need for Change

Funding for pay costs is critical for recruiting and retaining top level scientists and staff, conducting viable research programs, and carrying out ARS' mission. Absorption of these costs reduces the number of scientists and support personnel essential for conducting the agency's research programs. If pay costs are not fully funded, ARS will be unable to fill critical positions and will have to reduce spending for much needed laboratory equipment, supplies, and other materials.

b) A decrease of $6,913,000 in ongoing research programs, laboratories, or locations to provide savings to finance higher priority research initiatives.

Need for Change

Research projects under this program activity have been identified for termination given that they are: (1) nonpriority, Congressionally-added earmarks; (2) considered by the Administration to be of lesser priority; (3) duplicative or can be accomplished more effectively elsewhere; or (4) can be more efficiently implemented with less overhead costs at another location. The savings achieved from these terminations will be redirected to finance the higher priority agricultural research initiatives identified in the FY 2009 Budget, will improve program and operational efficiencies, and will serve to restrain Federal spending.

AR, Booneville, Center for Agroforestry
AR, Booneville, Dale Bumpers Small Farms Research Center
AR, Booneville, Endophyte Research
MO, Columbia, Mid-West/Mid-South Irrigation
ND, Mandan, Northern Great Plains Research Laboratory
ND, Mandan, Precision Agriculture Research
PA, University Park, Pasture Systems and Watershed Management Research

Library and Information Services

ARS is proposing under this program area a net decrease of $3,424,000. This includes pay costs, and new and expanded initiatives totaling $1,265,000, and decreases totaling $4,689,000.

a) An increase of $265,000 for **FY 2009 Pay Costs**, which includes $69,000 for the annualization of the fiscal year 2008 pay raise, and $196,000 for the anticipated fiscal year 2009 pay raise.

Need for Change

Funding for pay costs is critical for recruiting and retaining top level scientists and staff, conducting viable research programs, and carrying out ARS' mission. Absorption of these costs reduces the number of scientists and support personnel essential for conducting the agency's research programs. If pay costs are not fully funded, ARS will be unable to fill critical positions and will have to reduce spending for much needed laboratory equipment, supplies, and other materials.

b) An increase of $1,000,000 for the **Continued Improvement and Expansion of Products and Services Delivered by the National Agricultural Library (NAL)**.

Need for Change

The National Agricultural Library (NAL), the largest agricultural library in the world, was established by Congress in 1862 as the primary agricultural information resource for the Nation. NAL has two legislative mandates: 1) to serve as one of four national libraries and 2) to serve as USDA's library, located in Beltsville, Maryland, and Washington, DC. NAL's unique, comprehensive collection of more than five million items and its staff of experts constitute the Nation's fundamental base of agricultural knowledge and institutional history. The NAL collection has been designated a USDA historical asset, with an estimated replacement value of more than $420 million (2006 estimate).

NAL seeks to provide the highest level of customer service by meeting or exceeding customer expectations for the delivery of quality agricultural information. NAL serves as the focal point for a national network of State Land-Grant and U.S. Department of Agriculture field libraries. Customers worldwide including researchers, educators, policymakers, information providers, agricultural producers, students, and the general public have access to the NAL's extensive Web-based information services; AGRICOLA (AGRICultural On-Line Access), an online catalog and index to the agricultural literature; and NAL's expert librarians and subject specialists. In FY 2006, there were more than 93 million direct customer service transactions, an increase in volume of more than 400 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. NAL is leading the development of a National Digital Library for Agriculture (NDLA). AGRICOLA is the premier free-of-charge finding tool for agricultural information with over 4.5 million items cited and many thousands of links to online full-text. Digitop (Digital Desk Top Library for USDA) provides desktop access to digital information for USDA staff worldwide. Authoritative Web portals including www.nutrition.gov and www.invasivespeciesinfo.gov are delivered on behalf of agencies within and USDA. AgNIC (Agriculture Network Information Center) unifies delivery of agricultural data and information on Web sites of its alliance members; in FY 2007 more than 180 million hits were recorded on the AgNIC sites. NAL's work in collecting, preserving for perpetuity, and ensuring permanent access to agricultural information is fundamental to the continued well-being and growth of U.S. agriculture and agricultural development worldwide.

Outcomes

NAL customers will be provided with agricultural information and services unavailable elsewhere. Functioning as their central point of information and national digital library, NAL will support the efforts of researchers, policymakers, the business community, partner institutions, educators, and other interested parties. As a Federal repository of many valuable publications, including historical documents, unique scientific journals, and other collections, NAL will continue to be a treasured national asset in great demand by the Federal government, scientists, research institutions, and U.S. citizens.

The proposed increases support Performance Measure 2.1 – The services and collections of the National Agricultural Library continue to meet the needs of its customers; and Performance Measure 2.2 - The National Agricultural Library and partners implement the National Digital Library for Agriculture.

Means to Achieve Change

- **Improving Information Services for Veterinary Practitioners** ($500,000). ARS will:
  -- Expand a new Web portal developed in 2007 to serve the information needs of veterinary medicine practitioners, in collaboration with the American Veterinary Medical Association, the National Library of Medicine, USAIN (United States Agricultural Information Network) and other partners.
  -- Acquire more journals, books, other information products and staff to support expanded veterinary medicine information services.

- **Increasing Content and Scope of the NAL Collection and Digitop** ($300,000). ARS will:
  -- Broaden and deepen the NAL print and digital information collections.

- **Collaborative Creation of Digital Content for AgSpace, the NAL Digital Repository, and AgNIC, with Land-Grant Universities and Other Agricultural Institutions** ($200,000). ARS will:
  -- Fund projects with Land-Grant Universities and other agricultural institutions to convert important printed publications into digital publications, post them on the Web, and assure their permanent preservation.

c) A decrease of $4,689,000 in ongoing operations or activities to provide savings to finance higher priority research initiatives.

Need for Change

ARS is proposing the termination of selected ongoing programs or activities within the Library and Information Services. The programs and activities are not research oriented, and as such, are marginal to ARS' core mission. The savings achieved from these terminations will be redirected to finance the higher priority agricultural research initiatives identified in the FY 2009 Budget, and will serve to restrain Federal spending.

MD, Beltsville, Animal Welfare Information Center (NAL)
MD, Beltsville, National Center for Agricultural Law (NAL)
MD. Beltsville, NAL (downsize programs/operations)

AGRICULTURAL RESEARCH SERVICE

Geographic Breakdown of Obligations and Staff Years
2007 Actual and Estimated 2008 and 2009

Location	2007 Amount	2007 Staff Years	2008 Amount	2008 Staff Years	2009 Amount	2009 Staff Years
ALABAMA, Auburn	$8,693,677	62	$8,707,000	62	$5,734,000	62
ALASKA, Fairbanks	5,261,183	33	5,419,000	33	5,419,000	33
ARIZONA						
Maricopa	9,458,856	77	9,474,000	77	10,066,000	89
Tucson	3,973,263	42	4,016,000	42	4,930,000	52
Total	13,432,119	119	13,490,000	119	14,996,000	141
ARKANSAS						
Booneville	4,239,337	21	5,030,000	21	1,714,000	21
Fayetteville	1,610,847	13	1,576,000	13	1,576,000	13
Little Rock	8,648,594	14	5,584,000	14	1,680,000	14
Pine Bluff	839,138	7	937,000	7	440,000	6
Stuttgart	7,716,458	70	7,755,000	70	6,224,000	70
Total	23,054,374	125	20,882,000	125	11,634,000	124
CALIFORNIA						
Albany	39,002,000	281	38,718,000	281	38,777,000	284
Davis	11,535,412	82	10,332,000	82	14,577,000	123
Parlier	11,160,433	95	11,415,000	95	11,427,000	96
Riverside	5,748,736	47	5,627,000	47	5,330,000	47
Salinas	4,842,034	51	4,758,000	51	4,760,000	51
Shafter	1,387,696	16	1,425,000	16	1,425,000	16
Total	73,676,311	572	72,275,000	572	76,296,000	617
COLORADO						
Akron	2,017,496	25	1,989,000	25	1,302,000	25
Fort Collins	15,165,256	146	15,339,000	146	15,387,000	149
Total	17,182,752	171	17,328,000	171	16,689,000	174
DELAWARE						
Newark	2,065,256	15	2,030,000	15	2,030,000	15
DISTRICT OF COLUMBIA						
National Arboretum	11,685,302	78	11,549,000	78	9,644,000	78
Headquarters Federal Administration	78,685,618	513	74,919,000	513	75,035,000	500
Total	90,370,920	591	86,468,000	591	84,679,000	578
FLORIDA						
Brooksville	1,350,432	12	1,310,000	12	--	--
Canal Point	2,783,481	34	2,840,000	34	2,840,000	34
Fort Lauderdale	2,932,460	30	2,469,000	30	2,469,000	30
Fort Pierce	11,959,837	96	10,830,000	96	10,832,000	96
Gainesville	14,008,260	130	12,995,000	130	11,569,000	130
Miami	4,471,244	48	4,352,000	48	3,789,000	48
Winter Haven	2,518,616	24	2,467,000	24	2,467,000	24
Total	40,024,330	374	37,263,000	374	33,966,000	374

AGRICULTURAL RESEARCH SERVICE

Geographic Breakdown of Obligations and Staff Years
2007 Actual and Estimated 2008 and 2009

Location	2007 Amount	2007 Staff Years	2008 Amount	2008 Staff Years	2009 Amount	2009 Staff Years
GEORGIA						
Athens	27,928,016	265	27,798,000	265	23,926,000	265
Byron	3,493,459	36	3,581,000	36	3,581,000	36
Dawson	4,237,790	44	4,395,000	44	3,768,000	44
Griffin	2,267,632	23	2,180,000	23	2,180,000	23
Tifton	9,894,091	97	9,443,000	97	10,018,000	109
Total	47,820,989	465	47,397,000	465	43,473,000	477
HAWAII, Hilo	12,722,160	79	10,477,000	79	9,443,000	79
IDAHO						
Aberdeen	5,899,657	54	5,931,000	54	5,587,000	54
Boise	2,104,832	25	2,075,000	25	2,075,000	25
Dubois	2,234,851	23	2,104,000	23	2,104,000	23
Kimberly	3,392,205	38	3,502,000	38	3,502,000	38
Total	13,631,545	140	13,612,000	140	13,268,000	140
ILLINOIS						
Peoria	35,241,980	283	37,728,000	283	34,270,000	283
Urbana	5,776,199	44	5,236,000	44	4,180,000	44
Total	41,018,179	327	42,964,000	327	38,450,000	327
INDIANA, W. Lafayette	7,608,333	73	7,554,000	73	7,554,000	73
IOWA, Ames	48,550,600	445	47,873,000	445	48,673,000	488
KANSAS, Manhattan	9,940,574	79	10,093,000	79	9,606,000	79
KENTUCKY						
Bowling Green	2,610,434	16	2,553,000	16	2,553,000	16
Lexington	2,624,161	18	2,599,000	18	2,599,000	18
Total	5,234,595	34	5,152,000	34	5,152,000	34
LOUISIANA						
Baton Rouge	3,135,150	32	3,043,000	32	2,329,000	32
New Orleans	31,407,753	211	32,192,000	211	24,868,000	211
Total	34,542,903	243	35,235,000	243	27,197,000	243
MAINE, Orono	2,986,006	30	2,808,000	30	652,000	26
MARYLAND						
Beltsville	144,037,417	1,028	139,482,000	1,028	132,055,000	1,024
Frederick	5,315,931	50	5,302,000	50	5,302,000	50
Total	149,353,348	1,078	144,784,000	1,078	137,357,000	1,074
MASSACHUSETTS, Boston	15,759,386	10	15,331,000	10	15,331,000	10
MICHIGAN, East Lansing	4,676,876	39	4,816,000	39	--	--

AGRICULTURAL RESEARCH SERVICE

Geographic Breakdown of Obligations and Staff Years
2007 Actual and Estimated 2008 and 2009

Location	2007 Amount	2007 Staff Years	2008 Amount	2008 Staff Years	2009 Amount	2009 Staff Years
MINNESOTA						
Morris	2,873,185	32	2,758,000	32	--	--
St. Paul	7,038,723	58	6,288,000	58	5,720,000	58
Total	9,911,908	90	9,046,000	90	5,720,000	58
MISSISSIPPI						
Mississippi State	9,199,812	79	9,122,000	79	7,109,000	79
Oxford	13,923,916	100	13,347,000	100	12,922,000	100
Poplarville	5,005,206	37	4,971,000	37	4,971,000	37
Stoneville	37,568,487	299	37,607,000	299	37,644,000	297
Total	65,697,420	515	65,047,000	515	62,646,000	513
MISSOURI, Columbia	8,609,408	75	8,622,000	75	8,003,000	75
MONTANA						
Miles City	3,492,434	28	3,271,000	28	3,271,000	28
Sidney	4,890,488	50	4,993,000	50	4,993,000	50
Total	8,382,922	78	8,264,000	78	8,264,000	78
NEBRASKA						
Clay Center	19,387,151	129	19,202,000	129	20,583,000	149
Lincoln	5,904,641	63	5,790,000	63	4,960,000	63
Total	25,291,792	192	24,992,000	192	25,543,000	212
NEW MEXICO						
Las Cruces	6,018,441	52	5,912,000	52	5,912,000	52
NEW YORK						
Geneva	3,993,083	33	3,525,000	33	3,525,000	33
Greenport	5,443,191	28	5,188,000	28	3,733,000	28
Ithaca	11,726,417	52	10,414,000	52	10,414,000	52
Total	21,162,692	113	19,127,000	113	17,672,000	113
NORTH CAROLINA						
Raleigh	8,896,604	82	8,613,000	82	8,613,000	82
NORTH DAKOTA						
Fargo	14,713,905	121	15,211,000	121	15,211,000	121
Grand Forks	9,034,201	57	9,139,000	57	--	--
Mandan	3,828,935	39	3,825,000	39	3,336,000	39
Total	27,577,041	217	28,175,000	217	18,547,000	160
OHIO						
Columbus	1,500,538	16	1,464,000	16	794,000	16
Coshocton	1,317,999	15	1,304,000	15	--	--
Wooster	4,930,934	46	4,942,000	46	4,023,000	46
Total	7,749,471	77	7,710,000	77	4,817,000	62

AGRICULTURAL RESEARCH SERVICE

Geographic Breakdown of Obligations and Staff Years
2007 Actual and Estimated 2008 and 2009

Location	2007 Amount	2007 Staff Years	2008 Amount	2008 Staff Years	2009 Amount	2009 Staff Years
OKLAHOMA						
El Reno	5,390,854	51	5,225,000	51	5,225,000	51
Lane	2,102,268	20	2,053,000	20	--	--
Stillwater	3,913,440	35	3,811,000	35	3,811,000	35
Woodward	1,573,789	17	1,606,000	17	1,606,000	17
Total	12,980,351	123	12,695,000	123	10,642,000	103
OREGON						
Burns	2,559,379	22	2,531,000	22	2,531,000	22
Corvallis	12,793,705	118	11,312,000	118	11,312,000	118
Pendleton	1,945,832	18	1,918,000	18	1,929,000	19
Total	17,298,915	158	15,761,000	158	15,772,000	159
PENNSYLVANIA						
University Park	4,687,811	41	4,411,000	41	--	--
Wyndmoor	33,745,071	240	34,335,000	240	34,348,000	241
Total	38,432,882	281	38,746,000	281	34,348,000	241
SOUTH CAROLINA						
Charleston	4,267,149	45	4,340,000	45	4,344,000	45
Clemson	2,337,103	25	2,317,000	25	2,317,000	25
Florence	4,007,341	37	4,046,000	37	4,046,000	37
Total	10,611,593	107	10,703,000	107	10,707,000	107
SOUTH DAKOTA						
Brookings	4,006,689	39	3,968,000	39	2,884,000	39
TEXAS						
Beaumont	1,386,984	16	1,397,000	16	1,397,000	16
Bushland	6,733,689	46	7,284,000	46	6,862,000	46
College Station	16,132,517	154	15,752,000	154	15,789,000	156
Houston	14,487,395	8	13,750,000	8	13,750,000	8
Kerrville	5,251,481	48	6,157,000	51	6,322,000	57
Lubbock	8,957,423	91	8,733,000	91	7,326,000	91
Temple	3,601,654	36	3,494,000	36	3,494,000	36
Weslaco	10,085,102	110	10,018,000	110	--	--
Total	66,636,244	509	66,585,000	512	54,940,000	410
UTAH, Logan	8,539,188	84	8,469,000	84	8,469,000	84
WASHINGTON						
Prosser	3,934,422	32	3,242,000	32	3,242,000	32
Pullman	16,067,048	142	15,889,000	142	14,135,000	142
Wapato	4,596,313	55	4,344,000	55	4,344,000	55
Wenatchee	2,081,417	20	2,036,000	20	2,039,000	20
Total	26,679,201	249	25,511,000	249	23,760,000	249
WEST VIRGINIA						
Beaver	7,297,128	59	7,264,000	59	7,264,000	59
Kearneysville	6,790,746	71	6,802,000	71	6,802,000	71
Leetown	6,947,741	33	7,118,000	33	7,118,000	33
Total	21,035,615	163	21,184,000	163	21,184,000	163

AGRICULTURAL RESEARCH SERVICE

Geographic Breakdown of Obligations and Staff Years
2007 Actual and Estimated 2008 and 2009

Location	2007 Amount	2007 Staff Years	2008 Amount	2008 Staff Years	2009 Amount	2009 Staff Years
WISCONSIN, Madison	14,186,307	114	14,017,000	114	14,017,000	114
WYOMING						
Cheyenne	2,169,663	21	2,252,000	21	2,252,000	21
Laramie	3,124,498	28	3,279,000	28	--	--
Total	5,294,161	49	5,531,000	49	2,252,000	21
PUERTO RICO						
Mayaguez	2,831,070	34	2,794,000	34	2,794,000	34
OTHER COUNTRIES						
Argentina,						
Buenos Aires	599,134	--	537,000	--	537,000	--
France, Montpellier	3,099,952	3	3,092,000	3	2,821,000	3
Panama,						
Panama City	548,351	3	--	--	--	--
Total	4,247,437	6	3,629,000	3	3,358,000	3
Extramural and Funds						
Administered from						
Headquarters-Held Funds	34,729,386	--	36,050,000	--	25,902,000	--
Repair & Maintenance						
of Facilities	17,635,339	--	17,526,000	--	17,526,000	--
Funds included for Homeland						
Security	[35,704,000]	--	[35,454,000]	--	[64,346,000]	--
Unobligated Balance	5,169,958	--	--	--	--	--
Subtotal, Available						
or Estimate	1,147,218,452	8,511	1,120,635,000	8,511	1,021,891,000	8,300
Miscellaneous Fees	-11,057,614	--	--	--	--	--
Rescission	--	--	7,903,000	--	--	--
Emergency Supplemental for						
Avian Influenza	-4,129,411	--	--	--	--	--
Transfer from Office						
of Congressional Relations	-128,000	--	--	--	--	--
Transfer from U. S. Department						
of State	-2,959,000	--	--	--	--	--
Transfer to Office of Ethics	--	--	406,000	--	--	--
Pay Costs	--	--	--	--	15,125,000	--
Total, Available or Estimate	1,128,944,427	8,511	1,128,944,000	8,511	1,037,016,000	8,300

EXHIBIT 12

AGRICULTURAL RESEARCH SERVICE
Salaries and Expenses

Classification by Objects
2007 Actual and Estimated 2008 and 2009

		2007	2008	2009
Personnel Compensation:				
Headquarters		$62,303,952	$64,033,000	$63,874,000
Field		482,599,383	495,990,000	494,762,000
11	Total personnel compensation	544,903,335	560,023,000	558,636,000
12	Personnel benefits	146,375,657	152,144,000	152,282,000
13	Benefits for former personnel	2,006,760	0	0
	Total pers. comp. & benefits	693,285,752	712,167,000	710,918,000
Other Objects:				
21	Travel and transportation of persons	17,650,968	17,128,000	16,717,000
22	Transportation of things	1,009,765	989,000	808,000
23.1	Rent payments to GSA	6,500	0	0
23.2	Rental payments to others	1,151,419	1,128,000	922,000
23.3	Communications, utilities and misc. charges	48,024,538	44,647,000	35,003,000
24	Printing and reproduction	1,949,458	1,904,000	1,466,000
25.1	Advisory and assistance services	1,241,668	1,216,000	1,086,000
25.2	Other services	8,460,669	4,721,000	3,701,000
25.3	Purchases of goods and services from Government Accounts	6,043,437	5,911,000	4,834,000
25.4	Operation and maintenance of facilities	46,480,011	39,277,000	30,793,000
25.5	Research and development contracts	149,766,330	139,429,000	109,312,000
25.6	Medical care	173,706	170,000	139,000
25.7	Operation and maintenance of equipment	8,614,025	8,429,000	6,892,000
25.8	Subsistence and support of persons	673,761	657,000	537,000
26	Supplies and materials	92,520,677	85,160,000	66,765,000
31	Equipment	43,196,002	39,351,000	30,851,000
32	Land and structures	6,205,470	5,997,000	4,904,000
41	Grants, subsidies, and contributions	15,594,338	14,500,000	11,368,000
	Total other objects	448,762,742	410,614,000	326,098,000
Total direct obligations		1,142,048,494	1,122,781,000	1,037,016,000
Position Data:				
Average Salary, ES positions		$142,585	$148,863	$147,338
Average Salary, GS positions		$65,562	$68,449	$67,748
Average Grade, GS positions		10.4	10.4	10.4

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 (Goal 2); Enhance Protection and Safety of the Nation's Agriculture and Food Supply (Goal 4); Improve the Nation's Nutrition and Health (Goal 5); and Protect and Enhance the Nation's Natural Resource Base and Environment (Goal 6). A brief summary of the agency's current research activities and selected accomplishments that address the Department's Goals as well as ARS' Library and Information Services Management Initiative are detailed below.

All of ARS' research programs have been assessed with the Office of Management and Budget (OMB) Program Assessment Rating Tool (PART). The PART findings and improvement plans are detailed at the end of this exhibit.

***New Products/Product Quality/Value Added* (Goal 2)**

Current Activities:

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

Selected Examples of Recent Progress:

Biodiesel from inexpensive grease. Most biodiesel is produced from refined vegetable oils. The high cost of these oils can make biodiesel production unprofitable. Greases are lower cost feedstocks, but their high free fatty acid (FFA) content makes them difficult to use in a conventional biodiesel plant. In collaboration with a university partner, ARS developed immobilized acid catalysts that are highly efficient in esterifying FFAs to biodiesel. This novel technology will expand the production of biodiesel fuels from greases and other inexpensive, second use fats and oils.

Detection of wheat kernels with hidden insect infestations. Although grain is inspected for insect infestations upon shipping and receiving, infested samples sometimes go undetected. Many methods for detecting infested wheat have been developed but none has seen widespread use due to their expense or inaccuracy. ARS engineers at Manhattan, Kansas, modified a simple laboratory roller mill system to measure and analyze the electrical conductance of wheat as it was crushed. This facilitated detection of wheat kernels with live insects hidden inside of them. The equipment is inexpensive and can inspect a one kilogram sample in less than two minutes. This should help grain handlers and millers detect grain that is infested, and take action before the insects increase and damage more grain. This new technology is currently being transferred to a major cereal manufacturer.

New corn oil with health promoting nutraceuticals. Most corn to ethanol biorefineries are based on dry milling. Almost all dry mill corn refineries use hexane, a hazardous organic solvent, to extract the oil rich corn germ as a co-product. By utilizing ethanol rather than hexane, ARS produced oil containing levels of lutein and zeaxanthin (beneficial phytonutrients) which were more than 100 times higher than found in commercial corn oil. Because of the significant health benefits, such an oil could sell for a higher price, returning more co-product value to the producer.

Release of a new flavorful tomato variety. Tomato lines are evaluated for flavor, color, and horticultural characteristics. ARS researchers at Winter Haven, Florida, and a University of Florida tomato breeder developed "Flora Lee," a new, flavorful, high lycopene tomato variety.

High protein whey snack product. Texturized whey protein is a new patented ingredient developed by ARS scientists at Wyndmoor, Pennsylvania, using shear or extrusion processing. The process alters the functionality of the whey protein isolate and whey protein concentrates allowing them to be used to fortify a wide variety of food products without changing, and in many cases, improving the functional properties of the food. A Cooperative Research and Development Agreement partner and licensee opened a processing plant to manufacture whey protein enriched snacks which are currently being marketed nationwide. This research provides a healthy new snack product for consumers, and increases market opportunities for dairy products.

Biobased metalworking lubricant commercialized. Biobased aluminum hot rolling lubricant formulations were developed by ARS researchers at Peoria, Illinois. A collaborating company implemented the biobased formulations on four hot mills in four different plants. The company has also implemented biobased lubricants for other metalworking operations, such as lathing and sawing. The company found the biobased lubricants have superior performance and are cost competitive if not cheaper than the current commercial lubricants.

***Livestock Production* (Goal 2)**

Current Activities:

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

Selected Examples of Recent Progress:

National Animal Germplasm Program enhances genetic security. The security of U.S. animal genetic resources was significantly increased in the past year. Samples in the National Animal Germplasm Program collection at Fort Collins, Colorado, increased from 297,758 to 355,000, a 19 percent increase. The collection contains germplasm and tissue samples from 8,263 (a 12 percent increase) animals from 26 livestock, poultry, and aquatic species; 119 breeds; and 110 unique within breed lines. In addition to collecting samples, the repository released 1,866 samples enabling research in quantitative trait loci, discovery, impacting the genetic distancing of cattle and sheep breeds. Sufficient germplasm has been collected on 28 (a 12 percent increase) livestock or fish populations so that they can be reconstituted if necessary.

First national genetic evaluations of U.S. dairy cattle including crossbreds. Because of increased interest in crossbreeding by dairy producers, evaluations were developed and implemented by the ARS Animal Improvement Programs Laboratory in Beltsville, Maryland, to estimate the genetic merit of 19 million U.S. dairy cattle, regardless of breed. For the first time, genetic evaluations for crossbreds based on information from both parents were made available to dairy producers for use in making breeding decisions. Because evaluations are available for more animals, evaluation accuracy for purebred relatives has increased as well. Another benefit of multi-breed evaluations is that genetic differences among breeds can be measured and used to improve production efficiency and health of dairy populations.

Development of a panel of DNA markers for parentage and animal identification in swine. The swine industry required a panel of single nucleotide polymorphism markers for parentage and animal identification to reduce the cost and improve the reliability of these DNA tests. Highly informative genetic

markers, developed at ARS' Clay Center, Nebraska, were selected and tested on a large group of pigs selected from the industry by the National Swine Registry to represent purebred Duroc, Hampshire, Landrace, and Yorkshire germplasm populations. Sixty markers that were sufficient for these industry applications remained in the final panel. In cooperation with Sequenom Incorporated, these markers were then grouped together so that the information could be obtained in an economical manner using the Sequenom MassArray system. This panel has been provided to the U.S. swine industry.

Worldwide and genomewide assessment of poultry biodiversity indicates large loss of alleles in commercial lines. Following decades of intense selection primarily for meat or egg production, and competition that has reduced the poultry industry to a few multi-national firms, the question has arisen as to whether sufficient genetic diversity exists to address future needs (e.g., new or emerging diseases). To survey extant biodiversity of commercial poultry, an extensive collection (2,580 unique individuals) of commercial pure lines, experimental chickens, and standard breeds were assembled, genotyped with 3,072 genetic markers equally spaced throughout the chicken genome, and analyzed for loss of alleles by the ARS Avian and Disease Oncology Laboratory in East Lansing, Michigan. Results revealed that individual commercial breeding lines have lost 70 percent or more genetic diversity, of which only 25 percent can be recovered by combining all stocks of commercial poultry. However, modern agricultural practices do not appear to be the primary source of this allele loss, as the majority of the alleles were lost prior to the formation of the current industry. These results emphasize the need for concerted national and international efforts to preserve chicken biodiversity.

Feeding distillers' grains to cattle has no detrimental effects on the quality of beef. As corn prices increase and ethanol production increases, distillers' grains are gaining widespread use in finishing cattle diets. The effects of various levels of distillers' grains in cattle diets on the quality of meat are largely unknown. U.S. Meat Animal Research Center (Clay Center, Nebraska) scientists evaluated the quality of meat from cattle fed 0, 15, 25, 40 percent distillers' grains on an as fed basis. There was no effect of any level of distillers' grains on tenderness, juiciness, or beef flavor intensity. These results indicate cattle feeders can take advantage of the economic benefits of feeding their cattle distillers' grains without affecting meat quality.

Disinfection in recirculating fish culture systems. Pathogens and other microbial populations can accumulate and compromise fish health in fish culture systems that recirculate water. Scientists at the Conservation Fund's Freshwater Institute, Shepherdstown, West Virginia, determined the requirements necessary to achieve full flow disinfection of recycled water using ozonation followed immediately by ultraviolet irradiation. The entire recirculating flow could be effectively disinfected when the ozone dose was controlled in a feed-back loop using probes that measured either dissolved ozone concentration or oxidation reduction potential. Thus, combining ozone with ultraviolet irradiation in a recirculating system can prevent the accumulation of most fish pathogens and significantly reduce the risk of spreading fish disease. These findings will be used to produce more biosecure aquatic production systems that sustain healthier and more growth promoting environments.

Accelerated maturation of catfish broodstock. A major difficulty in genetic selection of channel catfish is that most fish do not reproduce until they are three years old. If sexual maturation could be accelerated, then fish could be spawned earlier and the process of selection for desirable characteristics would be more rapid. At the Catfish Genetics Research Unit, Stoneville, Mississippi, groups of channel catfish were held in outside ponds, in indoor tanks maintained at a constant 26 centrigrade, or under a cycled temperature regime of four months at 26 centrigrade and two months at 12 centrigrade. The fish held indoors were the largest, but had the poorest spawning performance; fish from the four to two month cycled group had over 50 percent spawning success compared to only 2 spawns (less than 15 percent) for the pond raised fish. These data suggest it is possible to decrease the time to sexual maturation by exposing fish to shortened annual cycles and that annual temperature cycles, are more important in determining puberty than the size of the fish.

Crop Production **(Goal 2)**

Current Activities:

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

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

Selected Examples of Recent Progress:

Crop genetic diversity conserved and made accessible to breeders and researchers. Genetic resources are critical for continued progress in plant breeding, and are increasingly important for plant genomics research. During 2007, the genebanks in the ARS National Plant Germplasm System (NPGS) added more than 8,000 new samples, including several hundred new species, to their collections so that the NPGS now conserves more than 483,000 samples from more than 12,700 plant species. Some of these new samples were acquired from successful collection trips to 12 nations. Demand for these samples continues to increase, with more than 150,000 samples distributed last year.

Providing new genetic resources to protect corn from genetic vulnerability. Corn is the most widely grown crop in the United States, but it has a narrow genetic base. An expanded genetic base is needed to provide protection from new diseases and pests. ARS scientists at Ithaca, New York; Raleigh, North Carolina; and Columbia, Missouri, have produced over 5,000 diverse maize lines which are the largest set of mapping lines for complex trait dissection of any species. The ARS researchers supported by the National Science Foundation have DNA genotyped the lines to produce basic genetic maps with a total of 18 million data points. Developmental and agronomic traits have been determined for the lines in six environments. This project will provide an unparalleled understanding of the number, location, and positive alleles of genes that can be mined for crop improvement.

Release of citrus rootstocks resistant to Diaprepes Root Weevil. A complex disease and insect problem, the Phytophthora Diaprepes Disease Complex (PDC), has destroyed thousands of acres of Florida citrus. Two promising new hybrid citrus rootstocks with field tolerance to PDC and good fruit productivity were developed by the USDA citrus breeding program and released in 2007 for commercial use. These new rootstocks exhibit dramatic differences in their effects on fruit tree size, and provide a wide range of management options for commercial producers. The rootstocks, US-802 and US-897, fill much needed niches for vigorous and dwarfing rootstocks, with field tolerance to PDC. There is large commercial interest in Florida in these new citrus rootstocks.

Release of high fiber sugarcane varieties for application to the biofuel efforts. With an ever increasing interest in sugarcane as an energy crop, sugarcane breeders around the world are being called on to develop so-called energy cane cultivars to be used primarily as a fuel source while continuing to genetically improve sugarcane primarily as a sucrose source. Commercially released high fiber canes for energy crop purposes have not heretofore been available in the United States. Together with the Louisiana State University AgCenter, St. Gabriel, Louisiana, ARS scientists in Houma, Louisiana, released three high fiber

sugarcane varieties that excel in total solids accumulation. This will allow an emerging energy crop industry to have a choice of varieties – namely a very high fiber, low sugar variety; a high fiber, moderate sugar variety; and a traditional moderate fiber, high sucrose sugarcane – available to satisfy individual interests and regional constraints.

Root Knot Nematode resistant cotton germplasm released. Cotton cultivars with host plant resistance would provide the ideal means for controlling Root Kot Nematode, a major pest of cotton. But breeders require germplasm incorporating not only host plant resistance, but also superior agronomic and fiber qualities. ARS researchers at Starkville, Mississippi, released six germplasm lines combining high levels of resistance to Root Knot Nematode with good agronomic and fiber properties. Most of the major cotton seed breeding companies have already requested and received seeds of these lines for use in their breeding programs.

Tucson bee diet goes into commercial production. Honey bee colony population growth and survival depends on nectar and pollen from flowering plants which might be unavailable due to weather or the movement of colonies for pollination. To provide nutrition when flowering plants are unavailable, ARS scientists in Tucson, Arizona, formulated a supplemental protein diet. The Tucson bee diet is comparable to naturally collected pollen in attractiveness to bees, consumption rates, and in stimulating colony growth. The diet is an important component in addressing the impact of poor nutrition on colony health and in preventing colony collapse disorder brought on by insufficient amounts of pollen in the hive.

A new way to lessen damage from small hive beetles in honey bee colonies. Small hive beetles (*Aethina tumida)* began appearing in U.S. hives during the past 15 to 20 years and now infest bee colonies throughout the East. Scientists in Gainesville, Florida, have developed an apparatus and attractant to help beekeepers protect their honey bees. The researchers believe these traps will solve the problem for small scale beekeepers who make up 60 percent of the industry. These small scale beekeepers tend their hives daily and clean their traps frequently. For large scale beekeepers who maintain up to several thousand hives, researchers hope to develop a new trap requiring less management. If perfected, this trap could be a boon to the bee industry in Florida, which is a common overwintering destination for commercial bee colonies. A patent for the trap was filed in March 2005. Researchers hope to apply the same principle to reduce populations of Varroa mites, another significant pest in honey bee hives.

Spray deposition on wheat heads enhanced. Fusarium Head Blight (FHB) is a major disease of wheat and barley in several small grain production areas in the United States; it is managed by the application of fungicides. Although aerial application of fungicides provides a rapid method of response to a FHB outbreak, optimized methods are needed to maximize spray deposition on wheat heads. ARS scientists in College Station, Texas, conducted definitive aircraft spray deposition trials using conventional hydraulic nozzles, electrostatic nozzles, and rotary atomizers. They determine that hydraulic nozzles set at the lowest spray rate and largest droplet size along with electrostatic spray nozzles resulted in maximum spray deposits on wheat heads. This research provides guidance for aerial fungicide applications that will increase deposition on wheat heads to maximize disease control, while minimizing off target deposition and potential adverse environmental impacts.

Food Safety **(Goal 4)**

Current Activities:

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

regulatory agencies will have a significant impact on monitoring public health and development of threat-based risk assessment programs.

Livestock Protection **(Goal 4)**

Current Activities:

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

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

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

Selected Examples of Recent Progress:

The risk of low pathogenic Avian Influenza viral strains becoming virulent. The use of reverse genetics to make Avian Influenza viruses with a specific sequence has proven to be a valuable tool in examining how these viruses cause disease in poultry. From 1994 to 2006 low pathogenic H7N2 Avian Influenza viruses circulated in the live bird markets of the Northeast United States. There has been considerable concern that these viruses might change or mutate to the virulent form of the virus. Using reverse genetics techniques, ARS scientists at the Southeast Poultry Research Laboratory, Athens, Georgia, have taken a representative H7N2 virus and genetically changed the virus to try and understand the minimum number of nucleotide changes needed for the virus to become virulent. The results of this study showed that the virus needed insertions of amino acids at a key site in the virus, the cleavage site, to become virulent, and simple mutations at the cleavage site by themselves would not make the virus virulent. This study has improved our understanding of how Avian Influenza viruses become virulent and will help us understand risks of low pathogenic viruses changing to the highly pathogenic form in the future.

Forecasted Rift Valley Fever outbreak. Mosquito-borne diseases pose a significant threat to the health of animals and people. One of these diseases, Rift Valley Fever (RVF), causes high mortality and abortion in domestic animals, and significant fever, meningoencephalitis, hemorrhage, and mortality in humans. To prevent potential introduction of this disease into the United States, it is important that we detect and respond to outbreaks in natural settings in Africa and the Middle East. ARS scientists have discovered a method, using global and local climate and vegetation development information, to forecast this disease well before it occurs. In late 2006, an early warning of an impending RVF outbreak was issued to national and international agricultural and public health officials three months before a large outbreak occurred in four countries in the Horn of Africa. This outbreak affected thousands of people and hundreds of thousands of domestic animals dramatically impacting the economy of these countries. This alert resulted in increased national and international surveillance and dramatically enhanced the RVF control response for the first time in history reducing the impact of the disease and protecting other countries from becoming affected by the disease. This research product will become the standard model for predicting RVF and will

be used as a template for new research to develop similar models for the United States for other important mosquito-borne diseases.

Medicated molasses for control of cattle fever ticks. Maintenance of the cattle fever tick quarantine zone along the Texas-Mexico border is critical to protecting the U.S. cattle industry against these ticks and the disease agent causing Texas fever that they transmit. ARS scientists demonstrated that pastured cattle fed liquid molasses containing ivermectin resulted in serum concentrations of the drug sufficient to control all of the fever ticks feeding on the animals. This technology, if used strategically in the Cattle Fever Tick Eradication Program, in combination with other technologies should enable continued control of outbreaks of this serious pest that continues to be reintroduced across the Rio Grande and into the U.S. The use of ivermectin medicated molasses offers the potential of minimizing the cost of the current method of gathering and dipping cattle at two week intervals for six to nine months, or vacating cattle from pastures.

Cooking poultry meat inactivates Avian Influenza Virus. HPAI viruses can be present in the meat of infected poultry and pose a potential health risk. Research at the Southeast Poultry Research Laboratory, Athens, Georgia, showed that cooking was effective in killing an H5N1 HPAI virus. Two additional HPAI viruses (H5N2 Pennsylvania/83 and H5N2 Texas/04) were tested for thermal inactivation in naturally or artificially infected meat. Cooking at 70 degrees centigrade or 73.9 degrees centrigrade (165 degrees fahrenheit) were effective at killing the viruses in less than one minute. This study further demonstrates that proper cooking of poultry using the FSIS' Salmonella standards would be effective at killing HPAI viruses.

Areawide integrated management of the Formosan Subterranean Termite (FST). The FST is a termite that can live either in the ground, in living trees, or in buildings with no connection to the ground. It is a particularly aggressive pest of wood and living trees in the Southern U.S. During 2007, integrated pest management of this invasive pest was developed using the French Quarter of New Orleans as a test, resulting in 76 percent reduction in FST activity within a 15 block area. The key to these dramatic reductions has been thorough monitoring for activity, followed by aggressive treatment using bait stations. This program uses a minimum of insecticide and does not require major structural alteration. The program will be expanded to other areas with FST activity, providing the Southeastern U.S. with a method for controlling this threat.

Crop Protection **(Goal 4)**

Current Activities:

ARS research on crop protection is directed toward epidemiological investigations to understand pest and disease transmission mechanisms, and to identify and apply new technologies that increase our understanding of virulence factors and host defense mechanisms.

Currently, ARS' research priorities include: 1) identification of genes that convey virulence traits in pathogens and pests; 2) factors that modulate infectivity, gene functions, and mechanisms; 3) genetic profiles that provide specified levels of disease and insect resistance under field conditions; and 4) mechanisms that facilitate the spread of pests and infectious diseases.

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

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

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

Selected Examples of Recent Progress:

Immunoassays for biothreat toxins. There is a need for rapid, sensitive assays for biothreat agents that can be used to detect intentionally contaminated foods. ARS scientists at Albany, California, designed new monoclonal antibodies for type A botulinum neurotoxin and ricin, and then used them to develop a new immunoassay with sufficient sensitivity to detect subtoxic levels of these toxins in various foods. The availability of new test tube assays with sufficient sensitivity to detect subtoxic levels in foods will help maintain the safety of the U.S. food supply.

Pathogen control in cattle feedlots. Pathogen contaminated manure accumulates at the feedlot pen surface and can serve as a source for additional contamination in the cattle production environment. ARS scientists at Clay Center, Nebraska, evaluated if any essential oils and related compounds could control pathogens on cattle feedlot pen surfaces. Field studies showed that the prevalence of E. coli O157:H7 prevalence in pen surface could be reduced by 99.9 percent with linalool containing thymol. These findings indicate that pen feedlot surfaces can be treated to reduce the pathogen load in the cattle production environment, reducing the likelihood of potentially contaminating additional cattle, cattle hides, and runoff.

Salmonella on almonds. The California almond industry, which is the largest supplier of almonds in the world, has been affected by two international and one national outbreak of Salmonellosis. Propylene oxide (PPO) is the only effective dry treatment to decontaminate raw kernels. However, these treated kernels cannot be exported to foreign countries due to a lack of standards about PPO residue levels. ARS scientists at Albany, California, have developed an infrared, heat-based technology that is at least as efficacious as fumigation in the decontamination of raw kernels. It involves a one hour instead of a five day process to achieve a 99.99999 percent reduction in Salmonella levels per kernel. The Almond Board of California, which presently mandates a 99.99 percent reduction, has shown an interest in commercially developing this nonchemical intervention process.

Subtyping of Listeria monocytogenes. The CDC PulseNet Task Force requested the development and validation of DNA sequence-based methods for subtyping Listeria monocytogenes for use in outbreak detection and epidemiological investigations. In addition, the recent Listeria monocytogenes risk assessment completed by the FDA, FSIS, and CDC identified significant gaps in knowledge regarding subtype prevalence and cited as critical, the need for methods to determine the virulence potential of individual strains as FSIS transitions to a risk-based monitoring program. In response, ARS scientists at Peoria, Illinois, developed and validated the first single-nucleotide-polymorphism-based subtyping assay for the group of Listeria monocytogenes strains most commonly associated with human illness. Studies demonstrated that the multi-locus genotyping assay provided high discriminatory power and differentiated groups relevant to epidemiological investigations. In addition, the technology provided for the identification of specific virulence attenuated subtypes that could be used to document epidemic and virulence attenuated subtypes in ready-to-eat meat products. Implementation of this technology by

Selected Examples of Recent Progress:

ARS areawide partnership demonstration program to manage *Melaleuca quinquenervia* in Florida is successfully completed. Melaleuca is seen as one of the Florida Everglades ecosystem's worst enemies, causing as much as $168 million in environmental losses each year. In 2001, ARS created The Areawide Management and Evaluation of Melaleuca (TAME Melaleuca) project. The purpose of the project was to promote areawide Melaleuca management on both public and private lands and to demonstrate integration of biological control into other current management strategies which have included traditional controls such as spraying the pest trees with herbicides or cutting them down and applying herbicides to the remaining stumps. Three highly effective bio-control agents were incorporated into the approach: the Melaleuca Leaf Weevil, an aphid-like psyllid, and the Melaleuca Bud Gall Fly, all of which are self perpetuating and self disperse. ARS scientists have distributed over 800,000 insects which expedited the saturation of the biological control agents throughout the Melaleuca range. The University of Florida extension office has distributed the agents through the mail or directly to those who visit the extension office. To complete the outreach and technology transfer, the team produced a series of brochures on Melaleuca and biological control, a user's manual, an informational video, a Web site, and held technology transfer workshops for both professional land managers and for homeowners. Surveys have shown that 85 percent of program participants are using the biological control agents. The Melaleuca has almost disappeared from public lands as a result of the integrated effort.

Providing and understanding Yellow Dwarf Virus resistance in wheat. Yellow Dwarf Virus disease is caused by a collection of viruses, one of which is Cereal Yellow Dwarf Virus (CYDV). Working in partnership with Purdue University researchers, ARS scientists at West Lafayette, Indiana, have integrated a very high level of resistance to CYDV into commercial wheat varieties. Recent results have proven that this resistance is primarily due to a block in movement, and a reduced feeding ability of the aphid insect that carries this virus from plant to plant. This combined resistance to the virus and the insect vector is extremely effective in the field. This resistance is now being used by wheat breeders worldwide because it is so effective.

New African Stem Rust of Wheat is virulent. A new Wheat Stem Rust Mutant, Ug99, has appeared in East Africa that threatens global production. ARS researchers at the Cereal Disease Laboratory, St. Paul, Minnesota, determined that Ug99 can now overcome the wheat resistance gene, Sr24. The detection of Sr24 virulence is significant because this resistance gene is widely used in breeding of U.S. wheat, as well as many other major wheat production regions. Accurate assessment of Ug99 virulence is critical for cereal breeders who are developing genetic resistance to the new African Stem Rust Mutant.

Specialty crop pesticide research. The IR-4 program, a cooperative Federal-State-industry effort, designs and coordinates field-based research to generate the data needed to extend existing pesticide registrations to include one or more specialty crops. In 2006, ARS contributed data toward the registration of uses for 73 floral and nursery crops and 33 pesticides, and contributed data from earlier years for tolerances on 37 food crops and 23 pesticides. In addition, ARS established 275 pesticide/nursery and floral crop combinations in field trials at seven locations.

***Human Nutrition* (Goal 5)**

Current Activities:

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

Four specific areas of research are currently emphasized: 1) nutrition monitoring and the food supply, e.g., a national diet survey and the food composition databank; 2) dietary guidance for health promotion and disease prevention, i.e., specific foods, nutrients, and dietary patterns that maintain health and prevent disease; 3) prevention of obesity and related diseases, including research as to why so few of the population do not follow the *Dietary Guidelines for Americans*; and 4) life stage nutrition and metabolism, in order to better define the role of nutrition in pregnancy, growth of children, and for healthier aging.

Selected Examples of Recent Progress:

Zinc levels in blood predict pneumonia in elderly. A study of 617 people over 65 years old living in 33 nursing homes was conducted to determine if vitamin E supplements prevented pneumonia, one of the leading causes of death in this population. While vitamin E had small effects, subjects with normal blood zinc levels had decreased incidence (by almost half) and duration of pneumonia, needed fewer antibiotics, and had reduced total mortality. This study, conducted by ARS scientists in Boston, Massachusetts, suggests that many elderly could benefit from diets higher in zinc and/or zinc supplements.

Rebuilding bone strength in young women. For years it has been thought that insufficient calcium intake during adolescence elevated a woman's risk for bone fracture during the post-menopausal years. ARS scientists in Grand Forks, North Dakota, demonstrated in female animals that the damaging effects of a severe calcium deficiency on bone structure and strength during adolescence could be completely reversed by adequate calcium nutrition during the early adult years. This finding suggests that young women with inadequate calcium intake during the teen years may be able to rebuild their bones by increasing consumption of calcium rich foods in early adulthood. Animal products are the primary source of unfortified, calcium rich foods. ARS scientists in Houston, Texas, reported that it is possible to increase the calcium bioavailability of plant foods by reducing the formation of calcium oxalate content in plants. This has important implications since plants are the major calcium source for much of the world's population.

Maternal overweight programs obesity in offspring. Observational studies indicate a link between obesity in mothers and development of overweight in children. Due to interaction of genetics and environment, it is almost impossible to establish causal relationships in human studies. ARS researchers in Little Rock, Arkansas, used an animal model to find that obese females gave birth to normal weight offspring but the progeny were much more susceptible to becoming overweight in later life than offspring from normal weight mothers. These results may partially explain the rapid increase in obesity seen in the U.S. over the last 30 years. This animal model may make it possible to test biological mechanisms and dietary interventions relatively quickly.

Environmental Stewardship **(Goal 6)**

Current Activities:

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

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

agriculture in adapting to changes in atmospheric composition and climatic variations are also important components of ARS' research program.

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

Selected Examples of Recent Progress:

Assessment of nitrogen losses provide the basis for a nitrogen trading tool. Nitrogen losses from agriculture have a negative impact on groundwater, air, and surface water quality. There is considerable interest in providing financial incentives through nitrogen credits to encourage producers to reduce nitrogen losses to the environment. ARS scientists from Ft. Collins, Colorado, defined the concept of reduced losses of nitrogen at the field level based on management practices that reduce nitrogen inputs, make more efficient use of nitrogen, and prevent nitrogen losses. ARS scientists generated and transferred to the Natural Resources Conservation Service (NRCS) data sets of predicted nitrogen losses for thousands of soil and management practice combinations using the Nitrogen Loss and Environmental Assessment Package model and field data from Colorado, Ohio, and Virginia. NRCS and ARS have worked together to develop a prototype Nitrogen Trading Tool that can predict nitrogen losses across a range of soils, climate, crops, and management practices. With further improvements this tool will be used to select the most appropriate management practice(s) for nitrogen loss reduction for a given situation, and to provide the basis for nitrogen credit trading.

Stover harvest strategy affects bioenergy feedstock quantity, quality, and sustainability. Crop residue has been identified as a near term source of biomass, however, additional research is needed to develop sustainable management practices. ARS scientists from Ames, Iowa, studied four harvest scenarios using a single pass grain and residue combine. Leaving the lower 40 to 50 centimeters of each plant and collecting only the cobs and upper plant parts provided the best biofuels feedstock in terms of water content and mineral ash. This technique left a reasonable amount of surface cover to protect the soil against wind and water erosion. Replacement value of the macro-nutrients (nitrogen, phosphorus, potassium) removed in the stover was estimated at $5 per ton. Harvesting the lower portion of the plant added very little dry matter, slowed harvest efficiency, increased nutrient replacement costs, increased transportation and storage costs, and decreased surface soil protection. This information will contribute to the development of a decision tool to predict appropriate stover harvest for bioenergy production and maintenance of soil productivity.

Second generation swine wastewater treatment system provides environmentally superior technology at a lower cost. New legislation in North Carolina promotes replacement of old lagoon technology with new environmentally superior technology. ARS scientists from Florence, South Carolina, and industry cooperators have designed and demonstrated a second generation system for swine wastewater treatment that is more economical than earlier versions. The system, installed at a 5,150 head finishing operation, removed 97.7 percent of total suspended solids, 99.6 percent of biological oxygen demand, 96.1 percent of nitrogen, 97.4 percent of ammonia, 94 percent of phosphorus, 99.9 percent of odor causing compounds, and 99.9 percent of pathogen indicators. Animal health and productivity was improved, mortality decreased 57 percent, daily weight gain increased 11 percent, and feed conversion improved by 5.4 percent. These results show that this alternative wastewater treatment technology can have significant positive impacts on livestock production and the environment.

Recycling industrial products to improve soil and water quality. Degraded soils result in reduced crop yields; require greater inputs of fertilizer, water and energy; and pose a greater threat to the environment than high quality soils. ARS scientists from several locations (West Lafayette, Indiana; Oxford, Mississippi; Tifton, Georgia; and University Park, Pennsylvania) have demonstrated that flue gas

desulfurization (FGD) gypsum, generated by removal of sulfur dioxide from the flue gases of coal-fired power plants can improve soil chemical and physical properties. They have demonstrated that application of FGD gypsum to soil improves soil structure resulting in greater infiltration and storage of rainwater. These results show that a low-cost material like FGD gypsum can enable farmers to increase crop production while improving soil and water quality.

Fresh market onion production aided by cover crops. Lack of soil organic matter in hot arid climates limits agricultural production and sustainability. To enhance soil organic matter, scientists at the Kika de la Garza Subtropical Agricultural Research Center in Weslaco, Texas, have used a combination of cow pea and sorghum cover crops to increase soil organic matter by 52 percent and 61percent. This not only increased total nitrogen in the soil, but also improved soil tilth so the onions could easy be mechanically transplanted with less need for follow-up labor. As a result, yields were increased 60 to 80 percent, and there was an increase in the percentage of large market onions. This achievement is important because it demonstrates that improved soil quality can also be translated into increased onion yield and quality.

Vegetative buffers help reduce nutrients in soil and groundwater. Vegetative buffers are often used to reduce pollutant exports in waters draining from agricultural fields. Effective vegetative buffers require grass species that can capture nutrients before they run off the surface or leach to groundwater. ARS scientists at Columbia, Missouri, in collaboration with scientists at the University of Missouri, conducted a field study using five grass species (orchardgrass, tall fescue, smooth bromegrass, timothy, and switchgrass) and a bare ground control. All the grass species except timothy reduced nitrate concentrations in shallow groundwater by about 99 percent compared to the bare ground control. Overall, switchgrass, smooth bromegrass, and tall fescue were the most suitable for use in vegetative buffers because of their superior ability to reduce soil nitrate and nutrient leaching. These findings provide important information to improve the design of vegetative buffers, increasing their effectiveness in nutrient removal.

A conservation management package to reduce fuel costs when sub-soiling. Soil compaction limits the productivity of many soils found in the Southeastern United States, so periodic in-row sub-soiling helps loosen the soil beneath plants to promote root growth and maximize crop yields. However, the cost of the sub-soiling operation has become even more expensive with rapidly escalating fuel prices. Research at the USDA-ARS Soil Dynamics Laboratory at Auburn, Alabama, has shown that the amount of fuel required for sub-soiling can be decreased by as much as 54 percent by proper selection of sub-soil shanks, appropriate selection of tillage depth, operating at the proper soil moisture conditions, using winter cover crops, and controlling vehicle traffic. These practices can help the conservation practice of in-row sub-soiling to be economically used as a valuable part of an overall conservation agricultural system.

Managing the risks to pasture productivity and farm profitability during droughts. An important avenue for new farmers to enter agriculture is through pasture-based dairy, because it requires a lower initial investment. With global climate change, weather variability is becoming more common and pasture-based dairy producers in the Northeastern U.S. need new strategies for managing the risk of drought. ARS scientists at University Park, Pennsylvania, evaluated the use of more complex mixtures of forage plants in pastures instead of the traditional grass monoculture or mixture of just two species (a grass and a clover). They found that combinations of six species produced the most forage in good years and increased economic returns per cow by more than $100 per year during dry years. They also found that alternate six species combinations of using a variety of different forage species responded differently to local variations in climate, soils and other conditions. This information provides producers with optional strategies for managing climatic risks and farm profitability.

Biennial tillage maximizes carbon storage in corn/soybean systems in the upper Midwest. Climate change and soil quality considerations mandate identification of farming systems that favor retention and buildup of soil carbon, while maintaining profitability. ARS scientists from St.Paul, Minnesota, conducted long-term tillage trials and found that the system resulting in greatest carbon storage in corn/soybean rotations was one with biennial tillage (chisel plowing in the fall following corn harvest, with no-tillage following soybeans). This system also produces the highest overall yields. These results demonstrated that a tillage

practice of intermediate intensity was able to accumulate more soil carbon compared to both more intensive and less intensive tillage, have important implications for scientists and policymakers involved in the development of strategies for minimizing the contribution of agriculture in the upper Midwest to atmospheric carbon dioxide levels.

Implications of extreme precipitation events for grassland carbon balance. Climate change driven by increasing atmospheric carbon dioxide is causing measurable changes in precipitation patterns. Most climate change scenarios predict that precipitation patterns for North America will be characterized by larger precipitation events separated by longer dry periods. These changes may differentially affect the processes controlling uptake and release of carbon from terrestrial ecosystems and alter carbon sequestration on grasslands and other ecosystems. Scientists at Temple, Texas, together with university collaborators found that more extreme precipitation patterns (longer intervals between events combined with larger events) shifted grasslands toward greater net uptake of carbon and made carbon fluxes less responsive to variation in event size. More extreme precipitation regimes thus may reinforce increases in grassland carbon sequestration. Benefits of greater carbon storage on grasslands likely will be offset by reductions in forage quantity and quality. This information will benefit conservation planners and policymakers.

Library and Information Services (Management Initiative)

Current Activities:

The National Agricultural Library (NAL) has statutory mandates to identify, collect, preserve in perpetuity, and provide access to quality information relevant to agriculture; serve as one of five national libraries; serve as USDA's library; provide leadership in developing and operating a comprehensive agricultural library and information network; and provide specialized information services through NAL information centers, reference and research services, and programs such as the Agriculture Network Information Center (AgNIC). The Library, which delivered 90 million direct customer service transactions in FY 2007, serves a large and broad customer base, including such audiences as policymakers, researchers, agricultural specialists, farmers, members of the library, educational and agribusiness sectors, food stamp recipients, and the general public. Recently, NAL, with partners in the land-grant university and agricultural information service communities, has initiated development of the National Digital Library for Agriculture (NDLA). Specific efforts are directed toward achieving two goals: 1) continuing to meet the needs of its customers, and 2) implementing the NDLA.

Selected Examples of Recent Progress:

AgSpace: the National Agricultural Library's Digital Repository and the National Agricultural Library – Digital Repository (NAL-DR). The publishing industry is undergoing a fundamental transition from print publications to digital content. In response to these trends, the Library began deploying systems and procedures to capture, store, and preserve digital information content, for long-term access, through two initiatives in FY 2007. NAL-DR http://naldr.nal.usda.gov provides full text online access to publications, primarily by USDA authors, either digitized by NAL or by institutional NAL's partners. In FY 2007, over 279,000 pages have been added to the NAL-DR database, with all documents hyper-linked to Agricultural Online Access (AGRICOLA) for easy access. Three organizations have provided funds to NAL for new publication digitization projects: the Bean Improvement Cooperative, the USDA Agricultural Marketing Service, and the World's Poultry Science Association. The second initiative, AgSpace, http://agspace.nal.usda.gov/ is currently focused on collecting journal articles which are authored by USDA employees. Once deposited in AgSpace, the articles are accessible by AGRICOLA hyperlinks. These links are permanent and unbreakable, and can be inserted in publications, Web pages, and other applications to retrieve the full text article content. Articles are being added at the rate of about 900 per month and as of November 15, 2007, 5,169 were available for access.

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. AGRICOLA now focuses on indexing information that directly supports the operations of NAL and serves customer needs for access to relevant information. AGRICOLA's scope now concentrates on USDA publications, 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 continues to serve as the search tool to access NAL's collections and as the search portal to the National Agricultural Library Digital Repository (NALDR) and to AgSpace.

AgNIC. The AgNIC Alliance (www.agnic.org) consists of 63 partner institutions that implemented improved Web services through the application of sophisticated Web software; completed existing digital content building projects; explored additional projects to enrich the array of digital resources available and develop content for the National Digital Library for Agriculture (NDLA); continued AgNIC outreach by developing publications and presentations; continued to develop further partnerships with international organizations; continued to increase AgNIC membership and subject coverage; and continued work with the Leadership Council on Agricultural Information and Outreach to plan the development of future services and capabilities for the land-grant system and NAL.

NAL Information Centers. The **Alternative Farming Systems Information Center (AFSIC)** and the **Rural Information Center** merged in FY 2007 and are now jointly managed by the AFSIC Coordinator. The Centers continue to serve their customers while sharing expertise, experience, and resources for enhanced customer services. Information products were produced on various topics including: tracing evolution of organic/sustainable agriculture; aquaculture; funding resources for sustainable agriculture research; retirement communities in rural America; services for citizens; alternatives to waste disposal; sustainable viticulture; and starting a small business. The **Water Quality Information Center** products include: an ephemeral gully erosion bibliography; and for the Conservation Effects Assessment Program series: "Wetland in Agricultural Landscapes and Environmental Effects of Conservation Practices on Grazing Lands." The International Bibliographic Information on Dietary Supplements staff collaborated with McCormick Spice Company to produce custom searches of dietary supplements. The FDPIR (Food Distribution Program on Indian Reservations) Nutrition Talk was launched. The Women, Infants, and Children (WIC) Works Resource System added new modules, "Feeding Infants: Nourishing Attitudes and Techniques," to the WIC Learning Online. See www.nal.usda.gov/wicworks for full details. The new modules highlight information from the newly revised USDA Food and Nutrition Service publication, "Infant Nutrition and Feeding: A Guide for Use in the WIC and Commodity Supplement Food (CSF) Programs." The **Food Safety Information Center** revamped the Food Safety Education and Training Materials database. Staff finalized a survey to learn about the information needs of the Food Safety Research Information Office (FSRIO) targeted audience. The survey will also collect feedback from the users on FSRIO's products and services. The **National Invasive Species Information Center (NISIC)** continued to enhance and expand information and services on the www.invasivespeciesinfo.gov Web site, including a Web-based education module and a "My Stories" series produced in cooperation with the University of Arizona. NISIC staff also developed a prototype Web site for the Federal Interagency Committee for Invasive Terrestrial Animals and Pathogens (ITAP); as well as a secure collaborative workspace using the ARS SharePoint application; and staff participated in strategic planning workshops for ITAP. **Animal Welfare Information Center (AWIC)** staff conducted specialized on-site and external workshops (University of Virginia, Thomas Jefferson University, Wyeth Pharmaceuticals, Virginia Commonwealth University, George Washington University) in alternatives searching and participated in several meetings, including the 6th World Congress. AWIC workshops were revamped in response to participant feedback and now include interactive breakout sessions. AWIC information products were produced on such topics as: care and welfare of cats, ferrets, horses, and rabbits; avian influenza; animal welfare audits and certifications programs; disposal of dead production animals; Johne's disease; and a Web resource on animal images and video materials for educational purposes.

InfoFarm. In FY 2007, NAL launched a Web blog, "InfoFarm" - http://weblogs.nal.usda.gov/infofarm/ in an effort to stimulate conversation among NAL staff with USDA partners and the communities engaged in

agriculture worldwide. The intention is to provide a human, personal voice; give a fresh glimpse into what NAL does; and give NAL an opportunity to hear directly from customers.

NAL's Special Collections. 2007 is the 300th anniversary of the birth of Carl Linnaeus, father of taxonomy. To acknowledge this occasion, NAL's Special Collections staff updated a bibliography of NAL items by and about Linnaeus. Numerous resources in the NAL collection relating to Linnaeus were identified and are being cataloged, increasing researcher access to the unique collections at NAL with more than 300 relevant items.

International Activities. NAL hosted the XI Meeting of the Agricultural Library and Information Services Task Force of Procinorte (LibraryProci). Procinorte is a cooperative program in agricultural research and technology that facilitates collaborations among the three countries of the Inter-American Institute for Cooperation on Agriculture's Northern Region (Canada, Mexico, and the United States). The Library Proci is one of four task forces within Procinorte and includes representatives from the Canadian Agricultural Library, Universidad Autónoma Agraria Antonio Narro (UAAAN), Strengthen the Network of Mexican Agricultural Libraries, and the Sistema de Información Agrícola para las Américas. The overarching goal of the Library Proci is to facilitate cooperative interactions that improve access to agricultural information within the northern region. Among the agreements reached is that ARS' Collections Services Branch and UAAAN will exchange document delivery services for the translation of NAL document delivery Web pages into Spanish. NAL staff conducted extensive briefings with Dr. Sunil Goria, one of USDA's Foreign Agricultural Service's 2007 Borlaug Fellows. The briefings included an extensive showcase of the many Web-based tools and resources developed and/or used by NAL staff in creating the NAL Web presence. Dr. Goria is working on the development of the Indian National Digital Library for Agriculture. Through participation in the fellowship greater coordination and interoperability is expected for the respective digital library programs.

PART Findings/Improvement Plan

A PART analysis of ARS' New Products/Product Quality/Value Added research programs was conducted. The program was rated "Moderately Effective." ARS took the following actions to improve the performance of the programs:

- Conducted an independent, external Retrospective Panel Review of the programs during FY 2007.
- Used Congressional earmarks, add-ons, and pass-through funds to address Administration goals and submit them to the Office of Scientific Quality Review for independent external peer review to ensure quality.
- Re-evaluated the criteria that the agency uses to determine out-year targets for project quality, for the purpose of establishing more ambitious targets.

A PART analysis of ARS' Livestock/Crop Production research programs was conducted. The program was rated "Moderately Effective." ARS took the following actions to improve the performance of the programs:

- Conducted an independent, external Retrospective Panel Review of the programs during FY 2007.
- Used Congressional earmarks, add-ons, and pass-through funds to address Administration goals and submit them to the Office of Scientific Quality Review for independent external peer review to ensure quality.
- Re-evaluated the criteria that the agency uses to determine out-year targets for project quality, for the purpose of establishing more ambitious targets.

A PART analysis of ARS' Food Safety research program was conducted. The program was rated "Moderately Effective." ARS took the following actions to improve the performance of the programs:

- Conducted an independent, external Retrospective Panel Review of the programs during FY 2007.
- Monitored the long-term measures to document the actual use of research outputs/outcomes (i.e., knowledge and technologies).
- Used Congressional earmarks, add-ons, and pass-through funds to address Administration goals and submit them to the Office of Scientific Quality Review for independent external peer review to ensure quality.
- Re-evaluated the criteria that the agency uses to determine out-year targets for project quality, for the purpose of establishing more ambitious targets.

A PART analysis of ARS' Livestock/Crop Protection research programs was conducted. The program was rated "Moderately Effective." ARS took the following actions to improve the performance of the programs:

- Conducted an independent, external Retrospective Panel Review of the programs during FY 2007.
- Monitored the long-term measures to document the actual use of research outputs/outcomes (i.e., knowledge and technologies).
- Used Congressional earmarks, add-ons, and pass-through funds to address Administration goals and submit them to the Office of Scientific Quality Review for independent external peer review to ensure quality.
- Re-evaluated the criteria that the agency uses to determine out-year targets for project quality, for the purpose of establishing more ambitious targets.

A PART analysis of ARS' Human Nutrition research programs was conducted. The program was rated "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 took the following actions to improve the performance of the programs:

- Developed a new Human Nutrition National Program Action Plan during FY 2007 to improve the program's effectiveness during the next five year program cycle.
- Conducted an independent, external Retrospective Panel Review of the programs during FY 2007.
- Monitored the long-term performance measures to document the actual use of research outputs/outcomes (i.e., new knowledge and technologies).
- Re-evaluated the criteria that the agency uses to determine out-year targets for project quality, for the purpose of establishing more ambitious targets.

A PART analysis of ARS' Environmental Stewardship research program was conducted. The program was rated "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 took the following actions to improve the performance of the programs:

- Conducted an independent, external Retrospective Panel Review of the programs during FY 2007.
- Monitored the long-term performance measures to document the actual use of research outputs/outcomes (i.e., new knowledge and technologies).
- Used Congressional earmarks, add-ons, and pass-through funds to address Administration goals, and submitting them to the Office of Scientific Quality Review for an independent, external peer review to ensure quality.
- Re-evaluated the criteria that the agency uses to determine out-year targets for project quality, for the purpose of establishing more ambitious targets.

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, [$47,082,000,] $13,220,000, to remain available until expended.

AGRICULTURAL RESEARCH SERVICE

Analysis of Change in Appropriation

BUILDINGS AND FACILITIES - CURRENT LAW

Appropriations Act, 2008		$47,082,000
Budget Estimate, 2009		13,220,000
Decrease in Appropriations		-$33,862,000
Adjustments in 2008:		
Appropriations Act, 2008	$47,082,000	
Rescission under P.L. 110-161 a/	-330,000	
Adjusted Base for 2008		$46,752,000
Budget Estimate, 2009		13,220,000
Decrease over adjusted 2008		-$33,532,000

a/ The amount is rescinded pursuant to Division A, Title VII, Section 752 of P.L. 110-161.

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

Item of Change	2008 Actual	Changes	2009 Estimated
California: Center for Advanced Viticulture and Tree Crop Research, Davis	$1,870,000	-$1,870,000	
U. S. Agricultural Research Center, Salinas	1,870,000	-1,870,000	
Connecticut: Center of Excellence for Vaccine Research, Storrs	1,870,000	-1,870,000	
District of Columbia: U. S. National Arboretum	695,000	-695,000	
Florida: U. S. Agricultural Research Service Laboratory, Canal Point	521,000	-521,000	
Hawaii: U. S. Pacific Basin Agricultural Research Center, Hilo	1,738,000	-1,738,000	
Aquaculture Facility, Hagerman (Billingsley Creek)	695,000	-695,000	
Georgia: Biocontainment Laboratory and Consolidated Poultry Research Facility, Athens	2,780,000	+10,440,000	13,220,000
Illinois: National Center for Agricultural Utilization Research, Peoria	1,870,000	-1,870,000	
Kentucky: Animal Waste Management Research Laboratory, Bowling Green	1,390,000	-1,390,000	
Forage Animal Production Laboratory, Lexington	2,085,000	-2,085,000	
Louisiana: ARS Sugarcane Research Laboratory, Houma	1,870,000	-1,870,000	
Mississippi: Biotechnology Laboratory, Lorman	1,390,000	-1,390,000	
South Central Poultry Research Laboratory, Starkville	1,390,000	-1,390,000	
Jamie Whitten Delta States Research Center, Stoneville	2,780,000	-2,780,000	
Missouri: National Plant & Genetics Security Center, Columbia	2,086,000	-2,086,000	
Montana: Animal Bioscience Facility, Bozeman	1,870,000	-1,870,000	
Nebraska: Systems Biology Research Facility, Lincoln	1,390,000	-1,390,000	
New York: Center for Grape Genomics, Geneva	1,870,000	-1,870,000	
Ohio: Greenhouse Production Research, Toledo	1,870,000	-1,870,000	
Texas: U. S. Livestock Insects Laboratory, Kerrville	1,390,000	-1,390,000	
Utah: ARS Agricultural Research Center, Logan	5,561,000	-5,561,000	
Washington: ARS Research Laboratory, Pullman	1,870,000	-1,870,000	
West Virginia: Appalachian Fruit Laboratory, Kearneysville	1,529,000	-1,529,000	
Wisconsin: Dairy Forage Agricultural Research Center, Prairie du Sac	2,502,000	-2,502,000	
Total Available	$46,752,000	-$33,532,000	$13,220,000

AGRICULTURAL RESEARCH SERVICE
BUILDINGS AND FACILITIES
Proposed Rescission from Unobligated Balances
Budget Estimate, 2009

NAME & LOCATION	AMOUNT
Center for Advanced Viticulture & Tree Crop Research	
Davis, CA	-7,024,300
San Joaquin Valley Agricultural Science Center	
Parlier, CA	-788,200
U. S. Salinity Laboratory	
Riverside, CA	-14,400
U. S. Agricultural Research Center	
Salinas, CA	-6,564,700
Subtropical Horticultural Research Center	
Ft. Pierce, FL	-100
U.S. Pacific Basin Agricultural Research Center	
Hilo, HI	-1,054,600
Advanced Genetics Laboratory	
Aberdeen, ID	-200
Aquaculture Facility	
Hagerman, ID (Billingsley Creek)	-990,000
Animal Waste Management Research Laboratory	
Bowling Green, KY	-2,970,000
Forage Animal Production Laboratory	
Lexington, KY	-3,960,000
Sugarcane Research Laboratory	
Houma, LA	-1,238,600
Northeast Marine Cold Water Aquaculture Research Center	
Orono/Franklin, ME	-1,995,000
Avian Disease & Oncology Laboratory	
East Lansing, MI	-63,200
Soil & Water Laboratory	
Morris, MN	-2,600
Cereal Disease Laboratory	
St. Paul, MN	-71,500

AGRICULTURAL RESEARCH SERVICE
BUILDINGS AND FACILITIES
Proposed Rescission from Unobligated Balances
Budget Estimate, 2009

NAME & LOCATION	AMOUNT
National Plant & Genetics Security Center	
Columbia, MO	-8,371,900
Biotechnology Laboratory (Alcorn State University)	
Lorman, MS	-1,571,500
South Central Poultry Research Laboratory	
Starkville, MS	-4,950,000
Animal Bioscience Facility	
Bozeman, MT	-3,960,000
Jornada Experimental Range Management Research Laboratory	
Las Cruces, NM	-28,300
Human Nutrition Research Center	
Grand Forks, ND	-263,000
Grape Genetics Research Center	
Geneva, NY	-6,564,700
Center for Health-Based Crop Genomics	
Ithaca, NY	-6,564,700
Greenhouse Production Research (University of Toledo)	
Toledo, OH	-1,584,000
Plant Stress Laboratory	
Lubbock, TX	-900
Kika de la Garza Subtropical Agricultural Research Laboratory	
Weslaco, TX	-18,500
ARS Research Laboratory	
Pullman, WA	-6,564,700
TOTALS	**-67,179,600**

AGRICULTURAL RESEARCH SERVICE

Project Statement - Current Law
(On basis of appropriation)

	2007 Actual Amount	2008 Estimated Amount	Increase or Decrease	2009 Estimated Amount
Total Obligations.....	$98,893,401	$105,400,000	-$60,680,000	$44,720,000
Unobligated Balances:				
Available Start of Year.....	-262,846,806	-162,940,864	58,653,000	-104,293,000
Unobligated Balance				
Permanently Reduced..... 1/			67,200,000	67,200,000
Expiring.....	1,012,541			
Available End of Year.....	162,940,864	104,293,290	-98,705,000	5,593,000
Total Available or Estimate.....	0	46,752,426	-33,532,000	13,220,000
Rescission.....	0	+329,574		
Total Available or Estimate.....	$0	$47,082,000		

1/ The attached table reflects a cancellation of the unallocated balance of $67.2 million in the Buildings and Facilities account as an offset to assist the Department in reaching its target.

Justification for Increases and Decreases

Buildings and Facilities

a) An increase of $13,220,000 (an addition of $10,440,000 over the FY 2008 funding level) to complete the necessary funding 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, Food Safety and Inspection Service, Food and Drug Administration, and the Centers for Disease Control and Prevention 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 Biological Safety Laboratory (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 Biocontainment Laboratory and Consolidated Poultry Research Facility is $207 million. In FY 2008, ARS received $2.8 million toward the planning and designing of the new facility. In FY 2009, the agency is requesting an additional $13.2 million to complete the planning and design phase.

AGRICULTURAL RESEARCH SERVICE
Building & Facilities

Classification by Objects
2007 Actual and Estimated 2008 and 2009

		2007	2008	2009
Other Objects:				
25.2	Other services	71,305,381	71,000,000	44,000,000
25.4	Operation and maintenance of facilities	24,550,027	31,000,000	0
31	Equipment	2,117,827	2,400,000	0
32	Land and structures	920,166	1,000,000	720,000
Total B & F obligations		98,893,401	105,400,000	44,720,000

EXHIBIT 14

Agricultural Research Service
Status of Construction Projects as of January 2008

Status of research facilities authorized or funded in prior years and reported as uncompleted in the 2008 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.

Future buildings: Facilities budget requests are based on the broader context of overall facility needs and an assessment of USDA priorities within Administration goals.

Location and Purpose	Year	Amount of Funds Provided	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 and
Research Center	2002 Construction	3,800,000	2 are complete. The designs for Phases 3, 4, and 5 are complete.
(R&D Facility)	Total	11,289,220	Redesign of Phase 3 was completed in the 2nd Quarter, FY 2007 to allow portions of Phases 3 and 4 construction to be awarded in the 4th Qtr FY 2007 .
California, Davis	2004 Planning and Design	$2,684,070	Pre-design was completed in the 2nd Quarter, FY 2007. Lease
Center for Advanced	2005 Construction	2,976,000	agreement with University is in progress.
Viticulture and Tree Crop Research	2006 Construction	3,588,750	
	2008 Construction	1,869,819	
	Total	11,118,639	
California, Salinas	2004 Planning and Design	$4,473,450	Design was completed in the 2nd Quarter, FY 2007.
Agricultural Research Station	2005 Planning and Design	2,976,000	
	2006 Construction	3,588,750	
	2008 Construction	1,869,819	
	Total	12,908,019	
Connecticut, Storrs	2008 Planning and Design	$1,869,819	$2.7 million is needed to fully fund design effort.
Center of Excellence for	Total		

Location and Purpose	Year	Amount of Funds Provided	Description
District of Columbia	2000 Planning and Design	$500,000	Construction of the 6 Phase modernization of the Research and
U.S. National Arboretum	2001 Design & Construction	3,322,674	Development Facility is in progress. Construction of Phases 1 and
	2002 Design & Construction	4,600,000	2 are complete. The designs for Phases 3, 4, and 5 are complete.
	2003 Design & Construction	1,688,950	Redesign of Phase 3 was completed in the 2nd Quarter, FY 2007
	2008 Construction	695,100	to allow portions of Phases 3 and 4 construction to be
	Total	10,806,724	awarded in the 4th Qtr FY 2007.
Florida, Canal Point	2008 Planning and Design	$521,325	Funding will be used for planning and design.
Agricultural Research Service Lab	Total		
Georgia, Athens	1992 Planning	$400,000	Pre-design was completed 1st Qtr 2007.
Southeast Poultry Research	1993 Construction	677,000	
Laboratory	2008 Planning and Design	2,780,400	
	Total	3,857,400	
Hawaii, Hilo	1999 Planning and Design	$4,500,000	Design of Phases 1 and 2 is complete. Construction of Phase 1
U.S. Pacific Basin	2000 Construction	4,500,000	was completed in the 3rd Quarter, FY 2007. Repackaged design
Agricultural Research	2001 Construction	4,989,000	to allow for construction for some elements within the available
Center	2002 Construction	3,000,000	funding scheduled for completion in the 4th Qtr 2008.
	2003 Design & Construction	2,980,500	
	2004 Construction	4,831,326	
	2005 Construction	2,976,000	
	2006 Construction	3,588,750	
	2008 Construction	1,737,750	
	Total	33,103,326	
Idaho, Hagerman	2005 Planning and Design	$992,000	Lease agreement is in place. Pre-design was completed in the 3rd
Aquaculture Facility	2006 Construction	990,000	Quarter, FY 2007.
	2008 Construction	695,100	
	Total	2,677,100	
Illinois, Peoria	2000 Construction Design	$1,800,000	The modernization of the Chemical Wing was completed in 3
National Center for	2002 Construction	6,500,000	segments. Central Wing design is complete and construction will
Agricultural	2004 Construction	2,684,070	be accomplished in 2 phases.
Utilization Research	2005 Construction	2,976,000	
(Central Wing)	2006 Construction	3,588,750	
	2008 Construction	1,869,819	
	Total	19,418,639	

Location and Purpose	Year	Amount of Funds Provided	Description
Iowa, Ames	2001 Design & Construction	$8,980,200	The accelerated plan for the completion of the modernization of
National Centers for	2002 Design & Construction	40,000,000	ARS/APHIS animal facilities is in progress. The status of major
Animal Health	2002 Construction	50,000,000	components of the modernization are as follows:
	2002 APHIS Transfers	15,753,000	-Phase 1 Lab/Office (APHIS) was completed in FY 2004.
	(Supplemental)	(14,081,000)	-Large Animal BSL-3Ag facilities construction was completed
	(Other Transfers)l	(1,672,000)	in the 2nd Quarter, FY 2007.
	2002 Construction	25,000,000	-Central Utility Plant & Infrastructure, Phase 1 and 2
	2003 Construction	32,785,500	construction is complete. Phase 3 construction is scheduled for
	2003 Construction	110,000,000	completion in the 1st Qtr, 2009.
	2005 Construction	121,024,000	-Construction of the Consolidated Laboratory Facility is
	2006 Construction	58,212,000	scheduled for completion in the 1st Quarter, FY 2009.
	Total	461,754,700	-Low Containment Large Animal Facility construction will be completed in the 1st Qtr of 2009.
Kentucky Bowling Green	2005 Planning and Design	$2,281,600	
Animal Waste Management	2006 Construction	2,970,000	Pre-design is complete. Design for the Headhouse/Greenhouse
Research Laboratory	2008 Construction	1,390,200	was awarded 4th Quarter, FY 2007 with scheduled completion 3rd
	Total	6,641,800	Qtr of FY 2008. Lease agreement is in place.
Kentucky, Lexington	2005 Planning and Design	$2,976,000	Pre-design is complete. Lease agreement is in progress. Design
Forage Animal	2006 Construction	3,960,000	awarded in the 4th Quarter, FY 2007 for completion 3rd Qtr
Research Laboratory	2008 Construction	2,085,300	FY2008.
	Total	9,021,300	
Louisiana, Houma	2004 Planning and Design	$1,342,035	Pre-design is complete. Design completed 4th Quarter, FY 2007.
Sugarcane Research	2005 Construction	2,976,000	Repackaged completed design to allow for construction of some
	2006 Construction	3,588,750	elements within the available funding scheduled for completion in the
	2008 Construction	1,869,819	2nd Qtr 2008. Construction award scheduled for 3rd Qtr 2008.
	Total	9,776,604	
Louisiana, New Orleans	1998 Planning and Design	$1,100,000	Pre-design for the long-term restoration of facilities was
Southern Regional	1999 Modernization	6,000,000	completed in the 2nd Quarter, FY 2007. Design was awarded 4th
Research Center	2000 Modernization	5,500,000	Qtr 2007 and is scheduled for completion in the 3rd Quarter, FY
(Industrial Wing)	2006 Supplemental (design)	4,900,000	2008.
	2006 Supplemental (construction)	20,000,000	
	Total	37,500,000	

Location and Purpose	Year	Amount of Funds Provided	Description
Maine, Orono/Franklin	2001 Planning and Design	$2,494,500	Construction of all facilities at Franklin (Pump House, Storage
National Cold Water Marine	2002 Construction	3,000,000	Tanks, Lab/Office/Tank Bldg.) is complete.
Aquaculture Center	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	
Maryland, Beltsville	1988 Design & Construction	$5,750,000	2001 Funds:
Beltsville Agricultural Research	1989 Design & Construction	6,100,000	- Construction of the Beltsville Human Nutrition Research Center
Center, (BARC)	1990 Design & Construction	9,860,000	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 was
	1994 Design & Construction	19,700,000 **	completed 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 complete.
	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	1998 Design & Construction	$2,500,000	The continuing renovation of the NAL building is in progress,
National Agricultural	1999 Design & Construction	1,200,000	including: replacement of the computer room HVAC and fire
Library	2001 Design & Construction	1,766,106	suppression systems; completion of chiller replacement and brick
	2002 Construction	1,800,000	repairs of three building elevations; and 14th floor window
	2003 Design & Construction	1,490,250	replacements.
	2004 Design & Construction	894,690	
	Total	9,651,046	
Michigan, East Lansing	1992 Planning	$250,000	Design for this multi-phased facility modernization is complete.
Avian Disease and	1993 Planning	212,000	
Oncology Laboratory	1998 Planning and Design	1,800,000	
	Total	2,262,000	

**Appropriated under USDA Rental Payments Account

Location and Purpose	Year	Amount of Funds Provided	Description
Mississippi, Lorman	2006 Planning and Design	1,980,000	A lease agreement with Alcorn State University for the new facility is in progress. Pre-design awarded 1st Qtr FY 2008 with scheduled completion in 3rd Qtr FY 2008.
Biotechnology Laboratory	2008 Planning and Design	1,390,200	
Alcorn State University	Total	3,370,200	
Mississippi, Poplarville	2002 Design	$800,000	Construction of the Headhouse/Greenhouse was awarded in the 4th Quarter, FY 2007and is scheduled for completion in the 3rd Quarter, FY 2008.
Thad Cochran Southern	2003 Construction	9,140,200	
Horticultural Laboratory	2006 Supplemental	4,300,000	
		$14,240,200	
Mississippi, Starkville	2005 Planning and Design	$2,976,000	Lease agreement is in place. Design was completed in the 1st Quarter, FY 2008.
Poultry Science	2006 Construction	4,950,000	
Research Facility	2008 Construction	1,390,200	
	Total	9,316,200	
Mississippi, Stoneville	2004 Construction	$4,831,326	Design is complete. Construction of Phase 1 of the multi-phased Center modernization is scheduled for completion in the 4th Quarter, FY 2008.
Jamie Whitten Delta	2005 Construction	2,976,000	
States Research Center	2008 Construction	2,780,400	
	Total	10,587,726	
Missouri, Columbia	2004 Planning and Design	$2,415,663	Pre-design is complete. Design is scheduled for completion in the 2nd Quarter, FY 2008.
National Plant and	2005 Construction	4,960,000	
Genetics Security	2006 Construction	3,687,750	
	2008 Construction	2,085,300	
	Total	13,148,713	
Montana, Bozeman	2005 Planning and Design	$1,984,000	Pre-design is complete. Lease agreement is in place. Conceptual design awarded in the 4th Quarter, FY 2007.
Animal BioScience Facility	2006 Construction	3,960,000	
	2008 Construction	1,869,819	
	Total	7,813,819	
Montana, Sidney	1998 Planning and Design	$606,000	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 4th Quarter, FY 2008.
Northern Plains Agricultural	1999 Construction	7,300,000	
Research Laboratory	2004 Planning, Design and Construction	2,505,132	
	Total	10,411,132	
Nebraska, Lincoln	2008 Planning and Design	$1,390,200	$2 million is required to fund a conceptual design.
Systems Biology Research Facility	Total		
New York, Geneva	2004 Planning and Design	$2,415,663	Design was completed in the 4th Quarter, FY 2007.
Grape Genetics	2005 Construction	2,976,000	
	2006 Construction	3,588,750	
	2008 Construction	$1,869,819	
	Total	$10,850,232	

Location and Purpose	Year	Amount of Funds Provided	Description
New York, Ithaca	2004 Planning and Design	$3,847,167	Design is scheduled for completion in the 2nd Quarter, FY 2008.
Crop-based Health Genomics	2005 Construction	2,976,000	
	2006 Construction	3,588,750	
	Total	10,411,917	
Ohio, Toledo	2005 Planning and Design	$1,984,000	Pre-design is complete. Design awarded in the 4th Qtr of FY 2007 with scheduled completion in the 4th Qtr FY 2008. Lease agreement is in place.
University of Toledo	2006 Construction	1,584,000	
	2008 Construction	1,869,819	
	Total	5,437,819	
Oklahoma, El Reno	2004 Construction	$2,147,256	Construction was completed in the 2nd Quarter, FY 2007.
Grazinglands Research Lab	Total		
Oklahoma, Woodward	2002 Planning and Design	$1,500,000	Phases 1 and 2 of the three-phased construction project are complete.
Southern Plains Range	2003 Construction	7,948,000	
Research Station	2005 Construction	2,976,000	
	Total	12,424,000	
Pennsylvania, Wyndmoor	1997 Construction	$4,000,000	Modernization of the Center is being accomplished in nine phases, with construction of Phases 1 through 7 are completed. Design for Phases 8 and 9 is complete.
Eastern Regional Research Center	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 and Phase 2A (Headhouse) is complete. Phase 2B (Greenhouse) construction was awarded in the 2nd Quarter, FY 2007 and is scheduled for completion in the 3rd Qtr FY 2008.
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	
Texas, Kerrville	2008 Planning and Design	$1,390,200	$7 million will be used to complete a conceptual design.
Knipling Bushland Lab	Total		

Location and Purpose	Year	Amount of Funds Provided	Description
Utah, Logan	2008 Planning and Design	$5,560,800	$2.5 million will be used to complete a conceptual design.
Agricultural Research Center	Total		
Washington, Pullman	2004 Planning and Design	$3,936,636	Lease agreement with University is in place. Conceptual design is complete.
ARS Research Lab	2005 Construction	2,976,000	
	2006 Construction	3,588,750	
	2008 Construction	1,869,819	
	Total	12,371,205	
West Virginia, Kearneysville	2003 Planning and Design	$471,913	Construction of Phases 1 and 2 (immediate laboratory repairs and renovation) was completed in the 3rd Quarter, FY 2007. The construction of the Greenhouse was completed the 1st Quarter, FY 2008.
Appalachian Fruit Lab	2004 Construction	1,789,380	
	2005 Construction	3,608,896	
	2006 Construction	2,024,550	
	2008 Construction	1,529,220	
	Total	9,423,959	
West Virginia, Leetown	2002 Design & Construction	$2,200,000	Construction is scheduled for completion in the 3rd Quarter, FY 2008.
National Center for Cool	2006 Construction	891,000	
and Cold Water Aquaculture	Total	$3,091,000	
(Broodstock Facility)			
Wisconsin, Marshfield	2003 Planning, Design		Design of Phase 1 and Phase 2 are complete. Phase 1 (Nutrient Lab) construction is scheduled for completion in the 3rd Qtr, FY 2008. Phase 2 construction (Animal Holding Facility) was awarded in the 4th Qtr, FY 2007.
Nutrient Management	and Construction	$2,980,120	
Laboratory	2004 Construction	3,668,229	
	2005 Construction	4,860,800	
	2006 Construction	7,920,000	
	Total	19,429,149	
Wisconsin, Prairie du Sac	2008 Planning and Design	$2,502,360	$2.1 million will be used to complete a conceptual design.
Dairy Forage Agriculture Research	Total		
Center			

***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 Objective	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: Expand domestic market opportunities.	New Products/ Product Quality/ Value Added	Key Outcome 2: Technologies to enable dramatic increases in the sustainable production of bioenergy, increased energy security, and reduced energy costs for the agricultural sector. Technologies leading to new and improved foods, fibers, and biobased products that expand agricultural markets and provide new and improved products for consumers here and abroad.
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: Increase the efficiency of domestic agricultural production and marketing systems.	Livestock/Crop Production	Key Outcome 2: Information and technology producers can use to compete more economically in the marketplace.
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 the scientific knowledge to reduce the incidence of foodborne illnesses in the U.S.	Food Safety	Key Outcome 4: Reduction in foodborne illness associated with the consumption of meat, poultry, and egg products.

USDA Strategic Goal/Objective	Agency Strategic Goal	Agency Objective	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: Reduce the number, severity, and distribution of agricultural pest and disease outbreaks.	Livestock/Crop Protection	Key Outcome 4: The knowledge the Nation needs for a secure agricultural production system and healthy food supply.
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 eating habits and lifestyles.	Human Nutrition	Key Outcome 5: Eating habits more consistent with *Dietary Guidelines for Americans.*
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: Enhance watersheds' capacities to deliver safe and reliable fresh water.	Environmental Stewardship (Water Quality)	Key Outcome 6: Safe, abundant, and reliable water 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: Improve soil and air quality to enhance crop production and environmental quality.	Environmental Stewardship (Air/Soil Quality; Global Climate Change)	Key Outcome 6: Enhanced crop production and improved environmental quality.

USDA Strategic Goal/Objective	Agency Strategic Goal	Agency Objective	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: Conserve and use pasture and range lands efficiently.	Environmental Stewardships (Range/Grazing Lands)	Key Outcome 6: Pasture and range land management systems that enhance economic viability and environmental services.
USDA Management Initiative: Expand Electronic Government	**Management Initiative 7(1):** Provide Agricultural Library and Information Services to USDA and the Nation	Objective 7.1: Ensure provision and permanent access of quality agricultural information for USDA, the Nation, and the global agricultural community via the National Agricultural Library.	Library and Information Services	Key Outcome 7(1): Agricultural information which meets the needs of customers.
USDA Management Initiative: Improve Real Property Management	**Management Initiative 7(2):** Provide Adequate Federal Facilities Required to Support the Research Mission of ARS	Objective 7.2: Provide for the construction/modernization of new and/or replacement laboratories and facilities, built in a timely manner and within budget.	Buildings and Facilities	Key Outcome 7(2): Laboratories and facilities which meet the needs of ARS' scientists.

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)

	2007 Actual		2008 Estimate		Increase	2009 Budget	
	Amount	Staff Years	Amount	Staff Years	or Decrease	Amount	Staff Years
Strategic Objective 2.1:							
Product Quality/Value Added	$105,373,479	924	$105,063,000	924	-$+7,438,000	$97,625,000	904
Total, Strategic Objective 2.1	**$105,373,479**	**924**	**$105,063,000**	**924**	**-+7,438,000**	**$97,625,000**	**904**
Strategic Objective 2.2:							
Livestock Production	85,085,369	493	84,835,000	493	-14,728,000	70,107,000	453
Crop Production	201,240,795	1,590	200,649,000	1,590	-9,620,000	191,029,000	1,564
Total, Strategic Objective 2.2	**286,326,164**	**2,083**	**285,484,000**	**2,083**	**-24,348,000**	**261,136,000**	**2,017**
Strategic Objective 4.1:							
Food Safety	104,748,033	819	104,495,000	819	+1,267,000	105,762,000	822
Total, Strategic Objective 4.1	**104,748,033**	**819**	**104,495,000**	**819**	**+1,267,000**	**105,762,000**	**822**
Strategic Objective 4.2:							
Livestock Protection	86,751,842	547	82,399,000	547	-+13,585,000	68,814,000	510
Crop Protection	197,018,048	1,403	196,032,000	1,403	-7,297,000	188,735,000	1,383
Total, Strategic Objective 4.2	**283,769,890**	**1,950**	**278,431,000**	**1,950**	**-+20,882,000**	**257,549,000**	**1,893**
Strategic Objective 5.2:							
Human Nutrition	85,665,996	290	85,339,000	290	-+5,860,000	79,479,000	285
Total, Strategic Objective 5.2	**85,665,996**	**290**	**85,339,000**	**290**	**-+5,860,000**	**79,479,000**	**285**
Strategic Objective 6.1							
Environmental Stewardship	65,669,695	527	65,476,000	527	-6,509,000	58,967,000	509
Total, Strategic Objective 6.1	**65,669,695**	**527**	**65,476,000**	**527**	**-6,509,000**	**58,967,000**	**509**
Strategic Objective 6.2							
Environmental Stewardship	86,871,073	842	86,615,000	842	-10,671,000	75,944,000	813
Total, Strategic Objective 6.2	**86,871,073**	**842**	**86,615,000**	**842**	**-10,671,000**	**75,944,000**	**813**
Strategic Objective 6.3							
Environmental Stewardship	70,631,422	644	70,423,000	644	-5,754,000	64,669,000	629
Total, Strategic Objective 6.3	**70,631,422**	**644**	**70,423,000**	**644**	**-5,754,000**	**64,669,000**	**629**
Management Initiative							
National Agricultural Library	23,671,637	148	21,783,000	148	-3,424,000	18,359,000	144
Repair & Maintenance	17,635,339	--	17,526,000	--	--	17,526,000	--
Management Initiative	**41,306,976**	**148**	**39,309,000**	**148**	**-3,424,000**	**35,885,000**	**144**
Collaborative Research	**2,959,000**	--	--	--	--	--	--
Miscellaneous Fees	**8,726,766**	--	--	--	--	--	--
Funds Included for Homeland Security	[35,704,000]	--	[33,495,000]	--	[+57,229,000]	[90,724,000]	--
Unobligated Balance	**5,169,958**	--	--	--	--	--	--
Total, Available	**1,147,218,452**	**8,227**	**1,120,635,000**	**8,227**	**-83,619,000**	**1,037,016,000**	**8,016**
Miscellaneous Fees	-11,057,614	--	--	--			
Emergency Supplemental for Avian Influenza	-4,129,411	--	--	--			
Emergency Supplemental for Hurricane Relief	--	--	--	--			
Transfer from Office of the Secretary	--	--	--	--			
Transfer from Office of Congressional Relations	-128,000	--	--	--			
Transfer from U. S. Department of State	-2,959,000	--	--	--			
Transfer to DA, Office of Ethics			406,000 a/				
Rescission/Across the Board Reduction	--	--	7,903,000	--			
Total, Available	**1,128,944,427**	**8,227**	**1,128,944,000**	**8,227**			

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

a/ Beginning in 2008, the Department will transfer and consolidate all Ethics activities under the Office of Ethics in Departmental Administration (DA). On a comparable basis, the full annual cost of the activity is $406,000 in 2009.

Selected Accomplishments Expected at the FY 2009 Proposed Resource Level

New Products/Product Quality/Value Added **(Goal 2)**

- Develop new crop varieties and agronomic systems that enable the sustainable high yield production of cellulosic biomass for biorefining to energy and coproducts.
- Develop new technologies that integrate feedstock refining or preprocessing conversion and product recovery processes.
- Generate higher value coproducts from current low value production byproducts.
- Develop new biobased products.
- Develop technologies leading to new value added products from crops and crop residues.
- Develop new value added products from animal byproducts.
- Genetically modify cereal seed components for novel/enhanced uses.

Livestock Production **(Goal 2)**

- Continue to build populations stored in the National Animal Germplasm Program.
- Use the completed chicken, cattle, and swine genome sequences to identify novel genes impacting the efficiency of nutrient utilization and adaptation to the production environment.
- Use the chicken and cattle haplotype maps to evaluate the efficacy of whole genome selection to facilitate genome enabled improvement while developing the haplotype map for swine.
- Use metagenomics to initially screen the rumen microflora in cattle.
- Develop genome sequence resources for the sheep, rainbow trout, and catfish species.
- Apply a computer decision support system for crop and animal production that reduces production risks/issues.
- Apply biocontrol technologies to crop plants to enhance disease resistance.

Crop Production **(Goal 2)**

- Apply new genomic tools to accelerate the genetic improvement of "specialty crops," for superior product quality.
- Test whether new breeding strategies or genetic engineering methods based on knowledge of gene function and expression enhance the effectiveness of crop improvement programs.
- Maintain USDA germplasm collections in a healthy, secure, and easily accessible form.
- Distribute germplasm for research purposes.
- Expand collections of crop genetic stocks important to genomic research.
- Increase crop genetic resource regeneration, and maintenance capacity and activity.
- Secure more wild relatives of crops in gene banks.

Food Safety **(Goal 4)**

- Make significant improvements to previously developed food animal surveillance and epidemiology programs.
- Use microarrays 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 2008 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 food pathogens.
- 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 **(Goal 4)**

- Identify genes that convey specific disease resistance traits.
- Characterize gene functions/mechanisms responsible for disease resistance traits.
- Implement an integrated emerging zoonotic research program 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.
- Develop methods for treating wild ungulates to suppress tick vectors of Lyme Disease and Texas Cattle Fever.
- Combine newly discovered attractants into fire ant bait.
- Identify the genetic location for insertion of genes to make male only screwworm flies.
- Discover and develop new diagnostic platforms for priority animal diseases.
- Discover and transfer new technologies for protection of animals from priority diseases; animals/humans from biting arthropods; and property from structural pests.

Crop Protection **(Goal 4)**

- Develop genomic approaches to control crop diseases, such as Soybean Rust.
- 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.
- Eleven systems which increase knowledge of the ecology, physiology, epidemiology, and molecular biology of 15 emerging diseases, 10 invasive insects, and 5 invasive weeds will be incorporated into pest risk assessments.

Human Nutrition **(Goal 5)**

- Provide updates to the National Nutrient Database.
- Provide reports from the "What We Eat in America" survey.
- Conduct research and publish findings on requirements/bioavailability of nutrients and their role in promoting health/preventing obesity.
- Publish findings on community/individual nutrition intervention strategies.
- Evaluate dietary patterns useful for preventing obesity.
- Examine the interaction of dietary intake with genetic predisposition for promoting health.
- Release data from dietary supplement database.
- Publish research on normal growth and aging processes that affect nutrient requirements.
- Conduct research on metabolism that impacts nutritional status.
- Conduct research on immunology that interacts with nutritional status.
- Publish research on development of analytical methods for food composition and metabolism of nutrients.

Environmental Stewardship **(Goal 6)**

- Develop one method to conserve water and reuse degraded water to mitigate the impacts of drought and enhance water availability.
- Develop one tool to evaluate environmental risks and cost effectiveness associated with the selection and placement of various conservation practices.

- Develop at least one tool to assist with land application site selection and management of wastewater to minimize land degradation and potential off-site pollution.
- Develop at least one technique to evaluate, improve, or restore stream corridors and/or riparian ecosysems.
- Develop one decision tool to predict carbon sequestration in soil.
- Develop one management practice and/or control technology to reduce particulate matter emissions from agricultural operations.
- Develop one cost effective practice and/or strategy to restore degraded range lands.
- Develop one methodology and/or technology to measure and monitor pasture and range land health.
- Develop one environmentally acceptable practice or technology to control invasive weeds.

Library and Information Services **(Management Initiative)**

- Continue to expand and improve services on customers' usage and satisfaction.
- Continue to develop partnerships and content for the National Digital Library for Agriculture.

Means/Strategies to Achieve Accomplishments/Performance Targets

In its 2009 budget request, ARS is proposing to terminate numerous research projects, redirecting its research to achieve its performance targets. The proposed terminations and redirections are detailed in the "Justification of Increases and Decreases" exhibit.

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 Performance Outcomes and Measures:

Objective 2.1: Expand Domestic Market Opportunities.

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

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

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

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

- Outcome: Information and technology producers can use to compete more economically in the marketplace.

- Perf. Measure #3: Develop systems and technologies to reduce production costs and risks while enhancing natural resource quality.

- Perf. Measure #4: Develop new technologies, tools, and information contributing to improved precision animal production systems to meet current and future food animal production needs of diversified consumers, while simultaneously minimizing the environmental footprint of production systems and enhancing animal well-being.

- Perf. Measure #5: Expand, maintain, and protect our genetic resource base, increase our knowledge of genes, genomes, and biological processes, and provide economically and environmentally sound technologies that will improve the production efficiency, health, and value of the Nation's crops.

Key Performance Targets:

Performance Measure	2005 Actual	2006 Actual	2007 Target	2008 Target	2009 Target
Measure #1					
a. Units	•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 refining or preprocessing, conversion, and product recovery processes. •Generate higher value coproducts from current low value production byproducts.	•Develop new crop varieties and agronomic systems that enable the sustainable, high yield production of cellulosic biomass for biorefining to energy and co-products. •Develop new technologies that integrate feedstock refining or preprocessing, conversion, and product recovery processes. •Generate higher value coproducts from current low value production byproducts.	•Develop new crop varieties and agronomic systems that enable the sustainable, high yield production of cellulosic biomass for biorefining to energy and co-products. •Develop new technologies that integrate feedstock refining or preprocessing, conversion, and product recovery processes. •Generate higher value coproducts from current low value production byproducts.
b. Dollars ($)	$13,868,000	$14,415,000	$14,405,000	$14,363,000	$13,635,000
Measure #2					
a. Units	•Developed new value-added products from animal byproducts. •Developed new biobased products. •Genetically modified cereal seed components for novel/enhanced uses.	•Developed technologies leading to new value-added products from crops and crop residues. •Developed new value-added products from animal byproducts. •Developed new biobased products. •Genetically modified cereal seed components	•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	•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	•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

Performance Measure	2005 Actual	2006 Actual	2007 Target	2008 Target	2009 Target
		for novel/enhanced uses.	for novel/enhanced uses.	for novel/enhanced uses.	for novel/enhanced uses.
b. Dollars ($)	$90,764,000	$92,031,000	$90,968,000	$90,700,000	$83,990,000
Measure #3					
a. Units	• Agricultural production system strategies for crops were deployed that defined best management practices; user-friendly decision models were tested to determine cost effective inputs for specific enterprises. • Experiments were deployed that expanded knowledge of the fundamental biological control mechanisms that regulate seed constituent composition for several economically important crops. •Characterized products of important genes that influence productivity/ product quality in plants.	•Developed a single cropping practice that demonstrates how agriculture can be cost effective and compatible with natural resources. •Developed integrated disease management strategies and tools (chemical, cultural, resistant/tolerant varieties, biological control).	•Develop a computer decision support system for crop and animal production that reduces production risks/losses. •Apply novel genomics information to crop plants to enhance disease resistance, product quality, and other important traits.	•Apply a computer decision support system for crop and animal production that reduces production risks/losses. •Apply biocontrol technologies to crop plants to enhance disease resistance.	•Apply a computer decision support system for crop and animal production that reduces production risks/losses. •Apply biocontrol technologies to crop plants to enhance disease resistance.
b. Dollars ($)	$75,665,000	$77,382,000	$77,324,000	$77,097,000	$66,663,000
Measure #4					
a. Units	• Characterized germplasm for traits of economic/behavioral importance of cattle, poultry, swine, and fish.	•Reached targeted levels of stored germplasm in the National Animal Germplasm Program to declare dairy, beef, swine, and sheep populations secure.	•Reach targeted levels of stored germplasm in the Animal National Germplasm Program to declare goat and aquaculture populations secure.	•Continue to build populations stored in the National Animal Germplasm Program. •Use the completed chicken, cattle, swine,	•Continue to build populations stored in the National Animal Germplasm Program. •Use the completed chicken, cattle, and

Performance Measure	2005 Actual	2006 Actual	2007 Target	2008 Target	2009 Target
	•Developed a genomics paradigm using microarrays/ bioinformatics technology that identified genes responsible for nutrient conversion, animal adaptation to the production environment, and disease reduction in cattle, poultry, and fish. •Completed a minimum 6X draft sequence/ annotation of the cattle genome; initiated same for swine. •Tested the ability to incorporate a major gene group with beneficial traits into food animals. •Developed methods to ensure long-term survival of cryopreserved germplasm of food animals.	•Used the completed chicken and cattle genome sequences to fine map economically important genes influencing meat and milk quality reproduction, and growth. Initiate the swine genome sequencing project. •Identified and characterized genes that affect disease resistance, stress, and other important characteristics affecting the biosecurity of food animal populations. •Increased number of cryopreserved specimens by 10%.	•Characterize cattle 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 efficiency of nutrient utilization and adaptation to the production environment, including rumen and gut microorganisms. •Complete haplotype maps of the cattle and chicken genomes. •Incorporate traits in trout that improve their ability to use feed that contains a higher proportion of grain. •Identify and characterize genes that affect disease resistance, stress, and other important characteristics affecting the biosecurity of food animal populations.	and catfish genome sequences to identify novel genes impacting efficiency of nutrient utilization and adaptation to the production environment. •Complete haplotype maps of the cattle and chicken genomes. •Transfer improved catfish germplasm to the U.S. catfish industry.	swine genome sequences to identify novel genes impacting efficiency of nutrient utilization and adaptation to the production environment. •Use the chicken and cattle haplotype maps to evaluate the efficacy of whole genome selection to facilitate genome enabled improvement while developing the haplotype map for swine. •Use metagenomics to initially screen the rumen micrflora in cattle. •Develop genome sequence resources for sheep, rainbow trout, and catfish species.

Performance Measure	2005 Actual	2006 Actual	2007 Target	2008 Target	2009 Target
			•Increase number of cryopreserved specimens by 10%.		
b. Dollars ($)	$84,055,000	$85,143,000	$85,085,000	$84,835,000	$70,107,000
Measure #5					
a. Units	•Deployed genetic tools/ technologies that facilitated the identification of plant genes associated with quantitative trait loci that affect important agronomic or horticultural traits. •Developed genetic tools/genomic data/bioinformatic systems to accelerate the progress of genetic enhancement of important crop plants. •Deployed genetic strategies to characterize genetic diversity among accessions of genetic resources in several germplasm collections of agronomically important crop species; deployed improved bioinformatic systems to document/ disseminate/information/ materials on these germplasm collections.	•Characterized the structure, function, and mode of action for genes of major crops which are key to determining product quality and resistance to abiotic and biotic stresses. •Applied genetic tools/ genomic data/ bioinformatics systems to accelerating the genetic enhancement of important crop plants for product quality and resistance to abiotic and biotic stresses. •Maintained USDA germplasm collections in a healthy, secure, and easily accessible form. •Distributed germplasm for research purposes.	•Test whether genetic tools/genomic data/ bioinformatics systems developed for major crop plants and model plants are applicable to "specialty crops." •Initiate research to devise methods for more precisely manipulating (traditional breeding and/or genetic engineering) the function and expression of genes of major crops which are key to determining product quality and resistance to abiotic and biotic stresses. •Maintain USDA germplasm collections in a healthy, secure, and easily accessible form. •Distribute germplasm for research purposes. •Expand collections of crop genetic stocks key to genomic research.	•Apply new genomic tools to accelerate the genetic improvement of "specialty crops" for superior product quality. •Test whether new breeding strategies or genetic engineering methods based on knowledge of gene function and expression enhance the effectiveness of crop improvement programs. •Maintain USDA germplasm collections in a healthy, secure, and easily accessible form. •Distribute germplasm for research purposes. •Expand collections of crop genetic stocks key to genomic research. •Increase crop genetic resource regeneration, and maintenance capacity and activity.	•Apply new genomic tools to accelerate genetic improvement of 'specialty crops' for superior product quality. •Test whether new breeding strategies or genetic engineering methods based on knowledge of gene function and expression enhance the effectiveness of crop improvement programs. •Maintain USDA germplasm collections in a healthy, secure, and easily accessible form. • Distribute germplasm for research purposes. •Expand collections of crop genetic stocks key to genomic research. •Increase crop genetic resource regeneration, and maintenance capacity and activity.

Performance Measure	2005 Actual	2006 Actual	2007 Target	2008 Target	2009 Target
	•Maintained USDA germplasm collections in a healthy, secure, and easily accessible form. •Distributed germplasm for research purposes.		•Increase crop genetic resource regeneration, and maintenance capacity and activity. •Secure more wild relatives of crops in gene banks. •Enhance capacity to manage key crop digital images.	•Secure more wild relatives of crops in gene banks.	•Secure more wild relatives of crops in gene banks.
b. Dollars ($)	$121,084,000	$124,000,000	$123,917,000	$123,552,000	$124,366,000

Notes: (1) ARS changed its performance measures last year which has impacted and skewed the dollar distribution for some performance measures.
(2) Space considerations preclude including 2004 data.

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

Key Performance Outcomes and Measures:

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

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

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

- Outcome: The knowledge the Nation needs for a secure agricultural production system and healthy food supply.
- Perf. Measure #2: Provide scientific information to protect animals, humans, and property from the negative effects of pests, infectious diseases, and other disease-causing entities.
- Perf. Measure #3: Develop and transfer tools to the agricultural community, commercial partners, and government agencies to control or eradicate domestic and exotic diseases and pests that affect animal and human health.
- Perf. Measure #4: Develop control strategies based on fundamental and applied research to reduce losses caused by plant diseases, nematodes, arthropods, and weeds that are effective and affordable while maintaining environmental quality. Develop technically and economically feasible alternatives to preplant and postharvest use of methyl bromide.
- Perf. Measure #5: Provide needed scientific information and technology that is environmentally acceptable to producers of agriculturally important plants in support of exclusion, early detection and eradication, control, and monitoring of invasive arthropods, weeds, nematodes, and pathogens; enhanced sustainability; and restoration of affected areas. Conduct biologically-based integrated and areawide management key invasive species.
- Perf. Measure #6: Provide environmentally sound fundamental and applied scientific information and technologies to action agencies, producers, exporters, and importers of commercially important plant and animal products in support of exclusion, early detection, and eradication of quarantine pests and pathogens that can impede foreign trade.

Key Performance Targets:

Performance Measure	2005 Actual	2006 Actual	2007 Target	2008 Target	2009 Target
Measure #1					
a. Units	•Identified/quantified three sources of pathogens affecting food producing animals. •Developed two intervention strategies that reduced colonization/shedding of pathogens in animals used for food. •Determined two ways which food safety is affected by manure handling practices/utilization. •Determined two ways anti-microbial resistance is acquired/transmitted/ maintained in food producing animals. •Developed four information technology/ strategies to help control mycotoxins of fungal origin in crops and their food products. •Developed one information technology/strategy to control toxins of plant origin in food products.	•Developed food animal surveillance and epidemiology programs, together with other USDA agencies to assure early detection of epizootic pathogens and antibiotic resistance. •Used microarrays to elucidate the means for improved control of food pathogens in the preharvest stage. •Used fungal genomics to identify improved control strategies for mycotoxins during crop production. •Determined the relationship between persistence of antibiotic resistance and increased pathogenicity of microorganisms of concern in one host pathogen system. •Fine tuned previously identified strategies to improve their effectiveness in controlling mycotoxins of fungal origin in crops and their food products.	•Make significant improvements to previously developed food animal surveillance and epidemiology programs. •Use microarrays to elucidate two 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. •Work with a livestock producing group to implement a program to decrease the incidence of antibiotic resistance. •Transfer a previously identified mycotoxin control strategy to private industry. •Develop strategies to control toxins of plant origin in food products.	•Make significant improvements to previously developed food animal surveillance/ epidemiology programs. •Use microarrays 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.	•Make significant improvements to previously developed food animal surveillance/ epidemiology programs. •Use microarrays 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 2008 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.

Performance Measure	2005 Actual	2006 Actual	2007 Target	2008 Target	2009 Target
	•Developed four methodologies that have regulatory, industry, or research use for the detection/quantification of microorganisms/ chemicals of food safety concern. •Developed six intervention strategies for improving microbial safety of foods. •Elucidated three food production/processing issues that identify critical control points leading to the design of alternative intervention strategies. •Developed two sets of data/microbial models for risk assessment.	•Developed strategies to control toxins of plant origin in food products. •Developed sampling systems and protocols for various food systems to detect intentional contamination. •Developed rapid systems for target amplification to detect pathogens in foods. •Developed detection and processing intervention systems for chemical or biological contamination of liquid egg products. •Developed models to provide simulations of the distribution of bio-security agents in foods.	•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 biosecurity agents in foods.	•Develop sampling systems/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 biosecurity agents in foods. •Develop an innovative low cost, opto-electronic portable imaging device for food safety and food biosecurity use.	•Develop strategies to control toxins of plant origin in food products. •Develop sampling systems/protocols for food systems to detect intentional contamination. •Develop rapid systems for target amplification to detect food pathogens. •Develop detection and processing intervention systems for chemical or biological contamination of liquid egg products. •Develop models to provide simulations of the distribution of bio-security agents in foods. •Develop an innovative low cost, optoelectronic portable imaging device for food safety and food biosecurity use.
b. Dollars ($)	$102,662,000	$104,632,000	$104,748,000	$104,495,000	$105,762,000
Measure #2					
a. Units	•Identified genes that convey specific disease resistance traits.	•Implemented an integrated emerging zoonotic research program (BSE) in pathogenesis,	•Implement an integrated emerging zoonotic research program (BSE) in pathogenesis,	•Identify genes that convey specific disease-resistance traits.	•Identify genes that convey specific disease-resistance traits.

Performance Measure	2005 Actual	2006 Actual	2007 Target	2008 Target	2009 Target
				based on biological and genetic studies. •Develop antigenic and genetic targets of cattle ticks for development of anti-tick vaccines in cattle.	•Combine newly discovered attractants into fire ant bait. •Identify genetic location for insertion of genes to make male screwworm fly.
b. Dollars ($)	$53,011,000	$61,580,000	$58,661,000	$54,391,000	$40,400,000
Measure #3					
a. Units	•Discovered genetic profiles that convey protective immunity against infectious diseases/parasites. •Completed the bench validation of four new diagnostic tests.	•Identified genes that are markers for individual cattle and their progeny who are poor hosts for ticks and the horn fly. •Identified and released new pathogens and predators of imported fire ants based on biological and genetic studies. •Developed antigenic and genetic targets of cattle ticks for development of anti-tick vaccines in cattle. •Completed the bench validation of four new diagnostic tests.	•Complete the bench validation of four new diagnostic tests.	•Discover and develop new diagnostic platforms for priority animal diseases. •Discover and transfer new technologies for protection of animals and humans from biting arthropods. •Discover and transfer new technologies for protection of animals from priority diseases. •Discover and transfer new technologies for protection of property from structural pests.	•Discover and develop new diagnostic platforms for priority animal diseases. • Discover and transfer new technologies for protection of animals and humans from biting arthropods. •Discover and transfer new technologies for protection of animals from priority diseases. •Discover and transfer new technologies for protection of property from structural pests.
b. Dollars ($)	$25,478,000	$28,098,000	$28,091,000	$28,008,000	$28,414,000
Measure #4					
a. Units	•Eleven systems were developed which increase knowledge of the ecology, physiology, epidemiology, and	•Eleven systems were developed which increase knowledge of the ecology, physiology, epidemiology, and	•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.	•Develop genomic approaches to control crop diseases, such as soybean rust.

Performance Measure	2005 Actual	2006 Actual	2007 Target	2008 Target	2009 Target
	•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 role innate/adaptive immunity plays in controlling viral/ bacterial/parasitic/mixed infections. •Identified/evaluated new adjuvant technologies and vaccine delivery systems.	diagnostics, and intervention. •Implemented a technology driven vaccinology research program for control and eradication of biological threat agents.	diagnostics, and intervention. •Implement a technology driven vaccinology research program for control and eradication of biological threat agents. •Discover genetic rofiles 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 who 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.	•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 who are poor hosts for ticks and the horn fly. •Identify and release new pathogens and predators of imported fire ants	•Characterize gene functions/mechanisms responsible for disease-resistance traits. •Implement an integrated emerging zoonotic research program (BSE) in pathogenesis, diagnostics, and intervention. •Implement a technology driven vaccinology research program for control and eradication of biological threat agents. •Discover genetic profiles that convey protective immunity against infectious diseases/parasites. •Develop control programs for invasive drug-resistant nematodes, protozoa, and pests of livestock and poultry. •Develop methods for treating wild ungulates to suppress tick vectors of Lyme disease and Texas cattle fever.

Performance Measure	2005 Actual	2006 Actual	2007 Target	2008 Target	2009 Target
	molecular biology of 10 emerging diseases, 10 invasive insects, and 5 invasive weeds, which were incorporated into pest risk assessments.	molecular biology of 10 emerging diseases, 10 invasive insects, and 5 invasive weeds, which were incorporated into pest risk assessments.			
b. Dollars ($)	$68,848,000	$70,095,000	$78,807,000	$78,169,000	$70,272,000
Measure #5					
a. Units	•Ten integrated pest management approaches and six diagnostic molecular assays to detect/identify emerging diseases/pests were validated and incor-porated into detection, early eradication, and control programs. •Ten biologically-based integrated control/ management strategies and 11 knowledge-based strategies were made available in support of producers.	•Conducted research to control sudden oak death, tamarisk (salt cedar) and other weeds, emerald ash borer, yellow starthistle, Asian longhorned beetle, and lobate lac scale. •Improved taxonomic knowledge of invasive species. Characterized pathogens and identified key pathways of infection.	•Provide information on emerging diseases and invasive species that will enhance identification and detection and control. •Characterize pathogens and invasive species, and determine key events in disease development and infection processes and determine possible control measures.	•Provide information on emerging diseases and invasive species that will enhance identification and detection. •Characterize pathogens and invasive species, and determine key events in disease development and infection processes.	•Provide information on emerging diseases and invasive species that will enhance identification and detection. •Characterize pathogens and invasive species, and determine key events in disease development and infection processes.
b. Dollars ($)	$103,904,000	$107,410,000	$78,807,000	$78,575,000	$78,823,000

Performance Measure	2005 Actual	2006 Actual	2007 Target	2008 Target	2009 Target
Measure #6					
a. Units	•Breeding strategies were developed and new varieties (with insect/ disease resistance) released to crop producers.	•Developed production systems with new insect/ disease resistant releases that decrease pesticides use by 15%.	•Eleven systems will increase knowledge of the ecology, physiology, epidemiology, and molecular biology of 15 emerging diseases, 10 invasive insects, and 5 invasive weeds, which will be incorporated into pest risk assessments.	•Eleven systems will increase knowledge of the ecology, physiology, epidemiology, and molecular biology of 15 emerging diseases, 10 invasive insects, and 5 invasive weeds, which will be incorporated into pest risk assessments.	•Eleven systems will increase knowledge of the ecology, physiology, epidemiology, and molecular biology of 15 emerging diseases, 10 invasive insects, and 5 invasive weeds, which will be incorporated into pest risk assessments.
b. Dollars ($)	$20,249,000	$21,648,000	$39,404,000	$39,288,000	$39,640,000

Notes: (1) ARS changed its performance measures last year which has impacted and skewed the dollar distribution for some performance measures.
(2) Space considerations preclude including 2004 data.

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

Key Performance Outcomes and Measures:

Objective 5.2: Promote Healthier Eating Habits and Lifestyles.

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

Key Performance Targets:

Performance Measure	2005 Actual	2006 Actual	2007 Target	2008 Target	2009 Target
Measure #1					
a. Units	•Evaluated the health benefits of a new healthy food.	•Studied school-based interventions to prevent unhealthy weight gain in children.	•Provide updates of the National Nutrient Database. •Provide reports from the "What We Eat in America" survey. •Publish findings on requirements/ bioavailability of nutrients and their role in promoting health/ preventing obesity.	•Provide updates of the National Nutrient Database. •Provide reports from the "What We Eat in America" survey. •Publish findings on requirements/ bioavailability of nutrients and their role in promoting health/ preventing obesity.	•Provide updates of the National Nutrient Database. •Provide reports from the "What We Eat in America" survey. •Publish findings on requirements/ bioavailability of nutrients and their role in promoting health/ preventing obesity.

Performance Measure	2005 Actual	2006 Actual	2007 Target	2008 Target	2009 Target
			•Publish findings on community/individual nutrition intervention strategies.	•Publish findings on community/individual nutrition intervention strategies.	•Publish findings on community/individual nutrition intervention strategies.
b. Dollars ($)	$$10,598,000	$11,592,000	$11,971,000	$11,936,000	$12,028,000
Measure #2					
a. Units	•Conducted research on bioavailability of nutrients to define their role in promoting health and preventing obesity. •Continued to update the National Nutrient Database and collect data for "What We Eat in America" survey. •Conducted research to identify community and individual nutrition intervention strategies. •Began to establish a new dietary supplement ingredient database.	•Determined risk factors for obesity. •Conducted research to determine the factors that influence food choices. •Developed database that reflects food consumption of growing ethnic minorities.	•Evaluate dietary patterns useful for preventing obesity. •Conduct research on requirements/ bioavailability of nutrients to define their role in promoting health/preventing obesity. •Examine interaction of dietary intake with genetic predisposition for promoting health. •Release data from dietary supplement database.	•Evaluate dietary patterns useful for preventing obesity. •Conduct research on requirements/ bioavailability of nutrients to define their role in promoting health/preventing obesity. •Examine interaction of dietary intake with genetic predisposition for promoting health. •Release data from dietary supplement database.	•Evaluate dietary patterns useful for preventing obesity. •Conduct research on requirements/ bioavailability of nutrients to define their role in promoting health/preventing obesity. •Examine interaction of dietary intake with genetic predisposition for promoting health. •Release data from dietary supplement database.
b. Dollars ($)	$59,390,000	$59,320,000	$35,834,000	$35,653,000	$29,610,000
Measure #3					
a. Units	•Provided updates from the National Nutrient Database. •Reported on the "What We Eat in America" survey.	•Provided updates on National Nutrient •Released two year data from the "What We Eat in America" survey.	•Publish research on normal growth and aging processes that affect nutrient requirements. •Conduct research on metabolism that impacts nutritional status.	•Publish research on normal growth and aging processes that affect nutrient requirements. •Conduct research on metabolism that impacts nutritional status.	•Publish research on normal growth and aging processes that affect nutrient requirements. •Conduct research on metabolism that impacts nutritional status.

Performance Measure	2005 Actual	2006 Actual	2007 Target	2008 Target	2009 Target
	•Published findings on bioavailability of nutrients and their role in promoting health/ preventing obesity. •Published findings on community and individual nutrition intervention strategies.		•Conduct research on immunology that interacts with nutritional status. •Publish research on development of analytical methods for food composition and metabolism of nutrients.	•Conduct research on immunology that interacts with nutritional status. •Publish research on development of analytical methods for food composition and metabolism of nutrients.	•Conduct research on immunology that interacts with nutritional status. •Publish research on development of analytical methods for food composition and metabolism of nutrients.
b. Dollars ($)	$13,700,000	$13,865,000	$37,861,000	$37,750,000	$37,841,000

Notes: (1) ARS changed its performance measures last year which has impacted and skewed the dollar distribution for some performance measures.
(2) Space considerations preclude including 2004 data.

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

Key Performance Outcomes and Measures:

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

- Outcome: Safe, abundant, and reliable water resources.
- Perf. Measure #1: Develop technology and practices to reduce the delivery of agricultural pollutants by water on farms and ranches and quantify the environmental benefit of conservation practices in watersheds.

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

- Outcome: Enhanced crop production and improved environmental quality.
- Perf. Measure #2: Develop practices and technologies to enhance soil resources and reduce emissions of particulate matter and gases from crop production lands, agricultural processing operations, and animal production systems.

Objective 6.3: Protect Forests and Grasslands.

- Outcome: Pasture and range land management systems that enhance economic viability and environmental services.
- Perf. Measure #3: Improved management practices and technologies for managing pasture and range lands to improve economic profitability and enhance environmental values.

Key Performance Targets:

Performance Measure	2005 Actual	2006 Actual	2007 Target	2008 Target	2009 Target
Measure #1					
a. Units	•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 one tool that uses remote sensing to assess changes in land use and its impact on water resources. •Develop 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 one tool that uses remote sensing to assess changes in land use and its impact on water resources. •Develop 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 one method to conserve water and reuse degraded water to mitigate the impacts of drought and enhance water availability. •Develop one tool to evaluate environmental risks and cost effectiveness associated with the selection and placement of various conservation practices. •Develop at least one tool to assist with land application site selection and management of wastewater to minimize land degradation and off-site pollution potential. •Develop at least one technique to evaluate, improve, or restore stream corridors and/or riparian ecosystems.
b. Dollars ($)	$64,139,000	$65,715,000	$65,670,000	$65,476,000	$58,967,000
Measure #2					
a. Units	•Developed improved methods to measure air emissions from animal production operations.	•Developed two methods for reducing volatile organic compound emissions from	•Develop at least one management practice and/or control technology that reduce ammonia	•Develop one management practice and/or control technology that reduce ammonia	•Develop one decision tool to predict carbon sequestration in soil.

Performance Measure	2005 Actual	2006 Actual	2007 Target	2008 Target	2009 Target
		agricultural production operations. •Developed methods to predict dispersion of particulate emissions from agricultural production operations.	emissions from animal feeding operations. •Develop at least one decision tool to predict the impact of agricultural management practices on soil quality.	emissions from animal feeding operations. •Develop one management practice to overcome soil physical property limitations to crop production.	•Develop one management practice and/or control technology to reduce particulate matter emissions from agricultural operations.
b. Dollars ($)	$86,392,000	$86,931,000	$86,871,000	$86,615,000	$75,944,000
Measure #3					
a. Units	•Developed pasture management strategies for the Southern Great Plains that extend the grazing season and increase profitability of cattle production. •Developed hay feeding and watering tank management practices for the Southeastern States that reduce the shedding of E. coli and Salmonella by beef cattle. •Identified two varieties of disease resistant alfalfa that could greatly reduce economic losses due to wilt.	•Demonstrated that switchgrass production for bioenergy in the Eastern Great Plains is economically viable. •Developed a livestock grazing and fire management system for Great Basin range lands to control a toxic invasive weed, improve range land health, and reduce livestock abortions caused by the weed. •Identified important biochemical processes that limited cell wall digestion in grass species to provide better forages for livestock and bioenergy production.	•Develop at least one cost effective practice and/or strategy to restore degraded range lands. •Develop at least one methodology and/or technology to measure and monitor pasture and range land health. •Develop at least one environmentally acceptable practice or technology to control invasive weeds.	•Develop one cost effective practice and/or strategy to restore degraded range lands. •Develop one methodology and/or technology to measure and monitor pasture and range land health. •Develop one environmentally acceptable practice or technology to control invasive weeds.	•Develop one cost effective practice and/or strategy to restore degraded range lands. •Develop one methodology and/or technology to measure and monitor pasture and range land health. •Develop one environmentally acceptable practice or technology to control invasive weeds.
b. Dollars ($)	$68,826,000	$70,680,000	$70,631,000	$70,423,000	$64,669,000

Notes: (1) ARS changed its performance measures last year which has impacted and skewed the dollar distribution for some performance measures.
(2) Space considerations preclude including 2004 data.

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

Key Performance Outcomes and Measures:

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

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

Key Performance Targets:

Performance Measure	2005 Actual	2006 Actual	2007 Target	2008 Target	2009 Target
Measure #1					
a. Units	•Increased overall NAL service delivery by at least 20%. •Increased DigiTop access and availability by at least 25%. •Upgraded/enhanced software for accessing, navigating, evaluating, and delivering AGRICOLA database services.	•Increased overall NAL service delivery by at least 15%. •Increased DigiTop access and availability by at least 25%. •Upgraded/enhanced software for accessing, navigating, evaluating, and delivering AGRICOLA database services.	•Upgrade/enhance software for accessing, navigating, evaluating, and delivering AGRICOLA database services. •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.	•Continue to expand and improve services based on customers usage and satisfaction data.	•Continue to expand and improve services based on customers usage and satisfaction data.
b. Dollars ($)	$16,154,000	$16,360,000	$17,754,000	$16,337,000	$13,767,000
Measure #2					
a. Units	•Added at least 3 new AgNIC partners.	•Added at least 3 new AgNIC partners.	•Increase DigiTop access and availability by at least 25%.	•Continue to develop partnerships and content for the NDLA.	•Continue to develop partnerships and content for the NDLA.

Performance Measure	2005 Actual	2006 Actual	2007 Target	2008 Target	2009 Target
	•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 with the U.S. Agricultural Information Network libraries and AgNIC partners to preserve digital agricultural information.	•Add at least 3 new AgNIC partners. •Increase overall NAL service delivery by at least 15.		
b. Dollars ($)	$5,385,000	$5,453,000	$5,918,000	$5,446,000	$4,592,000

Notes: (1) ARS changed its performance measures last year which has impacted and skewed the dollar distribution for some performance measures.
(2) Space considerations preclude including 2004 data.

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

Key Performance Outcomes and Measures:

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

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

Key Performance Targets:

Performance Measure	2005 Actual	2006 Actual	2007 Target	2008 Target	2009 Target
Measure #1					
a. Units	•Modernized/ constructed and provided security upgrades to selected ARS buildings/facilities.	•Modernized/ constructed and provided security upgrades to selected ARS buildings/ facilities.	•Repair/maintain selected ARS buildings/facilities.	•Modernize/construct selected ARS buildings/facilities.	•Planning/design of the Biocontainment Laboratory and Consolidated Poultry Research Facility. •Rescission of selected projects.
b. Dollars ($)	$186,335,000	$159,083,000	$0	$46,752,000	($53,960,000)

Notes: (1) ARS changed its performance measures last year which has impacted and skewed the dollar distribution for some performance measures.
(2) Space considerations preclude including 2004 data.

PART Performance Measures

ARS has developed five general PART performance measures which apply to all of its research 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/Value Added (Goal 2)

(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	12
2008	15	
2009	18	
2010	21	
2011	24	
2012	27	

Livestock/Crop Production (Goal 2)

(1) 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	9
2006	12	13
2007	15	17
2008	18	
2009	21	
2010	24	
2011	27	

(2) 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	15
2008	18	
2009	21	
2010	24	
2011	27	

Food Safety (Goal 4)

(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	21
2008	25	
2009	30	
2010	35	
2011	40	

Livestock/Crop Protection (Goal 4)

(1) 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	15
2008	18	
2009	21	
2010	24	
2011	27	

(2) 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	15
2008	18	
2009	21	
2010	24	
2011	27	

Human Nutrition (Goal 5)

(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	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	20
2008	24	
2009	28	
2010	32	
2011	36	
2012	40	

Environmental Stewardship (Goal 6)

(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	11
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	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	5
2008	7	
2009	9	
2010	11	
2011	13	
2012	15	

AGRICULTURAL RESEARCH SERVICE
Full Cost by Departmental Strategic Objective

Strategic Objective 2.1: Expand Domestic Market Opportunities.

Program Items:	2007 Amount ($000)	2008 Amount ($000)	2009 Amount ($000)
Direct Costs:			
Research and Development	95,384	94,833	87,149
Indirect Costs:			
Program and Administrative/ Financial Management	7,576	7,766	7,960
USDA Central Charges	2,276	2,324	2,373
Task Force, Advisory Committees, and Other Support Costs	137	140	143
Total Indirect Cost	9,989	10,230	10,476
Total Cost	105,373	105,063	97,625
FTE's	924	924	904

Performance Measures:

Create new scientific knowledge and innovative technologies that represent scientific/technological advancements or breakthroughs applicable to bioenergy.

Develop cost effective, functional industrial and consumer products, including higher quality, healthy foods, that satisfy consumer demand in the United States and abroad.

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

Program Items:	2007 Amount ($000)	2008 Amount ($000)	2009 Amount ($000)
Direct Costs:			
Research and Development	259,182	257,687	232,672
Indirect Costs:			
Program and Administrative/ Financial Management	20,587	21,102	21,629
USDA Central Charges	6,185	6,315	6,447
Task Force, Advisory Committees, and Other Support Costs	372	380	388
Total Indirect Cost	27,144	27,797	28,464
Total Cost	286,326	285,484	261,136
FTE's	2,083	2,083	2,017

Performance Measures:

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

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

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

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

Program Items:	2007 Amount ($000)	2008 Amount ($000)	2009 Amount ($000)
Direct Costs:			
Research and Development	94,818	94,326	95,348
Indirect Costs:			
Program and Administrative/ Financial Management	7,531	7,720	7,913
USDA Central Charges	2,263	2,310	2,359
Task Force, Advisory Committees, and Other Support Costs	136	139	142
Total Indirect Cost	9,930	10,169	10,414
Total Cost	104,748	104,495	105,762
FTE's	819	819	822

Performance Measures:

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

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

Program Items:	2007 Amount ($000)	2008 Amount ($000)	2009 Amount ($000)
Direct Costs:			
Research and Development	256,869	250,883	229,338
Indirect Costs:			
Program and Administrative/ Financial Management	20,403	20,913	21,436
USDA Central Charges	6,129	6,258	6,390
Task Force, Advisory Committees, and Other Support Costs	369	377	385
Total Indirect Cost	26,901	27,548	28,211
Total Cost	283,770	278,431	257,549
FTE's	1,950	1,950	1,893

Performance Measures:

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

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

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

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

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

Strategic Objective 5.2: Promote Healthier Eating Habits and Lifestyles.

Program Items:	2007 Amount ($000)	2008 Amount ($000)	2009 Amount ($000)
Direct Costs:			
Research and Development	77,546	77,023	70,963
Indirect Costs:			
Program and Administrative/ Financial Management	6,159	6,313	6,471
USDA Central Charges	1,850	1,889	1,929
Task Force, Advisory Committees, and Other Support Costs	111	114	116
Total Indirect Cost	8,120	8,316	8,516
Total Cost	85,666	85,339	79,479
FTE's	290	290	285

Performance Measures:

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

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

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

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

Program Items:	2007 Amount ($000)	2008 Amount ($000)	2009 Amount ($000)
Direct Costs:			
Research and Development	59,445	59,101	52,438
Indirect Costs:			
Program and Administrative/ Financial Management	4,722	4,840	4,961
USDA Central Charges	1,418	1,448	1,479
Task Force, Advisory Committees, and Other Support Costs	85	87	89
Total Indirect Cost	6,225	6,375	6,529
Total Cost	65,670	65,476	58,967
FTE's	527	527	509

Performance Measures:

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

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

Program Items:	2007 Amount ($000)	2008 Amount ($000)	2009 Amount ($000)
Direct Costs:			
Research and Development	78,636	78,182	67,308
Indirect Costs:			
Program and Administrative/ Financial Management	6,246	6,402	6,562
USDA Central Charges	1,876	1,916	1,956
Task Force, Advisory Committees, and Other Support Costs	113	115	118
Total Indirect Cost	8,235	8,433	8,636
Total Cost	86,871	86,615	75,944
FTE's	842	842	813

Performance Measures:

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

Strategic Objective 6.3: Conserve and Use Pasture and Range Lands Efficiently.

Program Items:	2007 Amount ($000)	2008 Amount ($000)	2009 Amount ($000)
Direct Costs:			
Research and Development	63,935	63,566	57,648
Indirect Costs:			
Program and Administrative/ Financial Management	5,078	5,205	5,335
USDA Central Charges	1,526	1,558	1,590
Task Force, Advisory Committees, and Other Support Costs	92	94	96
Total Indirect Cost	6,696	6,857	7,021
Total Cost	70,631	70,423	64,669
FTE's	644	644	629

Performance Measures:

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

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

Program Items:	2007 Amount ($000)	2008 Amount ($000)	2009 Amount ($000)
Direct Costs:			
Information Services	21,427	19,485	16,006
Indirect Costs:			
Program and Administrative/ Financial Management	1,702	1,744	1,788
USDA Central Charges	511	522	533
Task Force, Advisory Committees, and Other Support Costs	31	31	32
Total Indirect Cost	2,244	2,298	2,353
Total Cost	23,671	21,783	18,359
FTE's	148	148	144

Performance Measures:

The services and collections of the National Agricultural Library continue to meet the needs of its customers.

The National Agricultural Library and partners implement the National Digital Library for Agriculture.

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

Program Items:	2007 Amount ($000)	2008 Amount ($000)	2009 Amount ($000)
Total Cost:	0	17,526	17,526
FTE's:	--	--	--

Performance Measure:

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

Total for Management Initiatives

Program Items:	2007 Amount ($000)	2008 Amount ($000)	2009 Amount ($000)
Direct Costs:			
Information Services	21,427	19,485	16,006
Indirect Costs:			
Program and Administrative/ Financial Management	1,702	1,744	1,788
USDA Central Charges	511	522	533
Task Force, Advisory Committees, and Other Support Costs	31	31	32
Total Indirect Cost	2,244	2,298	2,353
Buildings and Facilities	0	46,752	13,220
Total Cost	23,671	68,535	31,579
FTE's	148	148	144

Total Cost for All Strategic Objectives and Management Initiatives

Program Items:	2007 Amount ($000)	2008 Amount ($000)	2009 Amount ($000)
Direct Costs:			
Research and Development	1,007,242	995,086	908,870
Indirect Costs:			
Program and Administrative/ Financial Management	80,005	82,006	84,055
USDA Central Charges	24,035	24,540	25,056
Task Force, Advisory Committees, and Other Support Costs	1,447	1,477	1,509
Total Indirect Cost	105,486	108,023	110,620
Total Cost	1,112,728	1,103,109	1,019,490
FTE's	8,227	8,227	8,016
Other Items Not Included in Strategic Objectives:			
Homeland Security	(35,704)	(35,454)	(64,346)
Unobligated Balance	5,170	--	--
Construction/Miscellaneous Fees	8,726		
Collaborative Research Program	2,959	--	--
Repair and Maintenance	17,635	17,526	17,526
Total Cost	1,147,218	1,120,635	1,037,016
Buildings and Facilities Account	0	46,752	13,220
Grand Total, Cost	1,147,218	1,167,387	1,050,236