Table of Contents

AGENCY-WIDE

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); Act of June 29, 1935 (7 U.S.C. 427); Agricultural Marketing Act of 1946, as amended (7 U.S.C. 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. 1281 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 (FAIR) (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.

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

ARS' Headquarters Offices are located in the Washington, D.C. metropolitan area. The agency's research is organized under 15 national programs. Field activities are managed through five area offices. Research is conducted at field locations in the United States, 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, 2020, there were 5,018 permanent, full-time employees including 494 in the Headquarters offices and 4,524 in field offices.

OIG AND GAO REPORTS

Completed OIG Reports

ID	Date	Title	Result
50601-0006-31	3/5/2018	Reviewing the Integrity of USDA's Scientific Research Program	The Office of the Chief Scientist (OCS) should strengthen communication with Department agencies about scientific integrity and work with the agencies to identify non-confrontational approaches to understand the perceptions identified in the survey. In addition, OCS should ensure appropriate personnel receive updated training materials and make them available in multiple formats.
50024-0001-22	3/14/2018	CIGIE Purchase Card Initiative - USDA Controls over Purchase Card Use	We recommend establishing requirements for documenting the use of non-required sources, issuing guidance for identifying split purchases, and creating guidelines for documenting the recovery of sales tax.
50701-0001-21	9/12/2018	USDA Agency Activities for Agroterrorism Prevention, Detection, and Response	All three agencies need to compile agroterrorism preparedness actions during the year. APHIS and ARS need to identify actions to report as vulnerability assessments, and all three agencies need to regularly assess and update the status of efforts to mitigate vulnerabilities. Finally, the agencies need to document processes to annually track and report on corrective actions from exercises or incident responses.
50501-0020-12	7/3/2019	Improper Usage of USDA's Information Technology Resources	The Office of Human Resources Management and OCIO need to define improper usage and develop and implement a documented process for ensuring all parties are notified of incidents, agencies and staff offices need to track and monitor incidents, and OCIO and Departmental Administration need to ensure contractors and other non-Government employees are held accountable to the same improper usage standards as employees.
02026-0001-23	7/23/2019	ARS/Final Action Verification/U.S. Meat Animal Research Center Review	OIG determined that ARS provided sufficient documentation to OCFO to close the five

ID	Date	Title	Result
			recommendations we made in our September 30, 2016, audit report on U.S. Meat Animal Research Center Review.
02601-0001-24	10/03/2019	ARS' Animal Welfare Act Controls to Prevent Mistreatment of Animals Used For Researching Parasitic Diseases	OIG did not make any recommendations.
11601-0001-12	11/12/2019	USDA's Fiscal Year 2019, First Quarter DATA Act Submission	OIG recommended that the Office of Chief Financial Officer (OCFO) to strengthen USDA's DATA Act compliance through the establishment of new oversight processes. Additionally, the OIG recommended that agencies and offices coordinate with OCFO to establish procedures to identify their DATA Act reportable data, and made other recommendations to specific USDA agencies to improve the agencies' DATA Act Compliance.
50401-0018-11	11/27/2019	USDA's Consolidated Financial Statements for Fiscal Years 2019 and 2018	OIG did not make any recommendations.
50701-0002-21	04/03/2020	USDA's Controls to Prevent the Unauthorized Access and Transfer of Research Technology	Due to the nature of OIG findings and the agency's responses, the report contained sensitive content. OIG withheld their recommendations from public release due to concerns about the risk of circumvention of law.
50601-0009-31	05/15/2020	USDA's 2018 and 2019 Trade Mitigation Packages	OIG did not make any recommendations.
50024-0015-11	05/18/2020	U.S. Department of Agriculture's Fiscal Year 2019 Compliance with Improper Payment Requirements	OIG recommended USDA and its component agencies take steps to ensure its mandated actions are completed to meet improper payment requirements.
50501-0022-12	09/30/2020	Security Over Select USDA Agencies' Networks and Systems	Due to the nature of OIG findings and the agency's responses, the report contained sensitive content. OIG withheld their recommendations from public release due to concerns about the risk of circumvention of law.
50503-0003-12	10/29/2020	Fiscal Year 2020 Federal Information Security Modernization Act Audit	We recommend the Department mitigate existing security weaknesses by developing policy and implementing procedures; implementing a centrally managed software license program; prioritizing the remediation of outstanding vulnerabilities; removing unsupported software;

ID	Date	Title	Result
			revising regulations; implementing an improved patch and upgraded process; and implementing mechanisms and controls to ensure system contingency plans are tested annually, among other recommendations.
84801-0001-22	12/8/2020	USDA Research Integrity and Capacity	OIG recommend that REE identify and implement a standard mechanism across all REE agencies to enhance both USDA's and the public's ability to identify REE agencies' publications from USDA-funded research by subject areas.
50401-0019-11	12/14/2020	FY 2020 USDA Consolidated Financial Statements Audit	OIG did not make any recommendations.
50501-0024-12	2/25/2021	USDA's Security Controls Over the Prevention and Mitigation of Ransomware	This report contains sensitive content. It is being withheld from public release due to concerns about the risk of circumvention of law.

In-Progress OIG Reports

ID	Title
11601-0002-12	USDA's Fiscal Year 2021 DATA Act Compliance Efforts
50401-0020-11	U.S. Department of Agriculture's Consolidated Balance Sheet for Fiscal Year 2021
50503-0005-12	Fiscal Year 2021 Federal Information Security Modernization Act Audit
50801-0002-12	Security Over USDA Web Applications Inspection

Completed GAO Reports

ID	Date	Title	Result
GAO-18-307	3/12/2018	Chemical Innovation: Technologies to Make Processes and Products More Sustainable	GAO made no recommendations.
GAO-18-199	4/16/2018	Food Safety: Federal Efforts to Manage the Risk of Arsenic in Rice	The GAO recommendation has been closed and implemented.
GAO-19-103	3/12/2019	Foot-and-Mouth Disease: USDA's Efforts to Prepare for a Potential Outbreak Could Be Strengthened	As of June 2020, GAO is evaluating the agency's response to this recommendation.
GAO-19-47	6/3/2019	Renewable Fuel Standard: Information on Likely Program Effects on Gasoline Prices and Greenhouse Gas Emissions	GAO made no recommendations.
GAO-19-466	7/31/2019	Foreign Assistance: Federal Monitoring and Evaluation	The GAO recommendation has been closed and implemented.

ID	Date	Title	Result
		Guidelines Incorporate Most but Not All Leading Practices	
GAO-19-407	9/9/2019	Date Labels on Packaged Foods: USDA and FDA Could Take Additional Steps to Reduce Consumer Confusion	USDA agreed with GAO recommendation and is planning actions to implement the recommendation.
GAO-20-128SP	11/12/2019	Irrigated Agriculture: Technologies, Practices, and Implications for Water Scarcity	ARS is evaluating GAO recommendations.
GAO-20-81	11/21/2019	Federal Research: Additional Actions Needed to Improve Public Access to Research Results	GAO recommended that the Secretary of Agriculture should develop and implement a mechanism to ensure researcher compliance with the public access plan and associated requirements. The Secretary of Agriculture should complete development of guidance and provide training to agency officials or others involved in reviewing the merits of researchers' data management plans.
GAO-20-101	12/20/2019	Federal Property: Improved Monitoring, Oversight, and Data Would Help Understand Effects of Providing Property to Non-Federal Recipients	ARS is evaluating GAO recommendations.
GAO 20-243	02/19/2020	USDA Administrative Services: More Could Be Done to Assess Effectiveness and Impact of Business Centers	ARS is evaluating GAO recommendations.
GAO 20-273	02/19/2020	National Biodefense Strategy: Additional Efforts Would Enhance Likelihood of Effective Implementation	GAO had no recommendations for USDA.
GAO-20-187	03/19/2020	Sexual Harassment in Stem Research: Agencies Have Taken Actions, but Need Complaint Procedures, Overall Plans, and Better Collaboration	ARS is evaluating GAO recommendations.
GAO-20-382	05/07/2020	POVERTY REDUCTION: HHS Can Improve Information to Assist States and Localities in Adopting Approaches That Serve Whole Families	GAO had no recommendations for USDA in the report.
GAO-20-693	09/30/2020	Small Business Research Programs: Many Agencies' Award Issuances Are Not Timely; Some Practices May Improve Timeliness	ARS is evaluating GAO recommendations.

In-Progress GAO Reports

ID	Title
101434	USDA’s Regional Climate Hubs
101732	Federal Grants Workforce Training

ID	Title
102299	Information Technology Cloud Computing
102509	Federal Preparedness for Responding to Antimicrobial-Resistant Pathogens
102599	Network for Manufacturing Innovation Program
102947	Transfer of National Bio- and Agro-Defense Facility Operations
103570	Federal programs to reduce the costs and risks of diet-related chronic disease
104252	Review of Relocation of USDA research agencies
104292	GAO Engagement on Interagency Biodefense Preparedness and Response
104352	U.S. Government Accountability Office two engagements (1) Small Business Innovation Research (SBIR) Venture Capital
104353	Fraud, Waste, and Abuse in Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) Programs
104434	Chemical Contamination of Food
104436	Compacts of Free Association Grants and Trust Funds Update
104449	Federal Efforts to Address Harmful Algal Blooms (HAB) and Hypoxia
104540	USDA Relocation Cost-Benefit Analysis
104677	Timeliness of agency review of proposals and issuance of awards for the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs
104709	USDA’s Planning for and Relocation of Research Agencies
104740	Veteran Food Insecurity

AVAILABLE FUNDS AND FTES

Available Funds and FTEs (thousands of dollars)

Item	2019 Actual	FTE	2020 Actual	FTE	2021 Enacted	FTE	2022 Budget	FTE
Salaries and Expenses:								
Discretionary Appropriations	$1,303,266	5,361	$1,414,366	5,075	$1,491,784	5,855	$1,849,590	6,569
Mandatory Appropriations	-	-	-	-	20,000	-	20,000	-
Supplemental Appropriations	-	-	-	-	1,000	-	-	-
Total Appropriation, Other	1,303,266	5,361	1,414,366	5,075	1,512,784	5,855	1,869,590	6,569
Buildings and Facilities:								
Discretionary Appropriations	381,200	-	192,700	-	35,700	-	45,405	-
Transfers In	60	-	60	-	-	-	-	-
Total Adjusted Appropriation	1,684,526	5,361	1,607,126	5,075	1,548,484	5,855	1,914,995	6,569
Balance Available, SOY	379,417	-	759,506	-	183,786	-	125,435	-
Other Adjustments (Net)	10,788	-	23,598	-	-	-	-	-
Total Available	2,074,731	5,361	2,390,230	5,075	1,732,270	5,855	2,040,430	6,569
Lapsing Balances	-3,494	-	-2,508	-	-	-	-	-
Balance Available, EOY	-759,506	-	-183,786	-	-125,435	-	-157,257	-
Obligations	1,311,731	5,361	2,203,936	5,075	1,606,835	5,855	1,883,173	6,569
Other USDA:								
Agricultural Marketing Service, AMS	135	1	133	-	133	-	133	-
Animal & Plant Health Inspection Service, APHIS	28,465	107	36,028	116	36,028	116	36,028	116
Economic Research Service, ERS	3,871	15	4,817	15	4,817	15	4,817	15
Farm Services Agency, FSA	176	1	-	-	-	-	-	-
Food & Nutrition Services, FNS	391	1	607	2	607	2	607	2
Food Safety & Inspection Service, FSIS	4,294	16	5,778	19	5,778	19	5,778	19
Foreign Agricultural Services, FAS	987	4	725	2	725	2	725	2
Forest Service, FS	844	3	1,054	3	1,054	3	1,054	3
Hazardous Waste	1,445	5	2,365	8	2,365	8	2,365	8
National Agricultural Statistics Service, NASS	9,731	36	9,387	30	9,387	30	9,387	30
National Institute of Food and Agriculture, NIFA	20,176	76	30,593	98	30,593	98	30,593	98
Natural Resources Conservation Service, NRCS	4,761	18	7,000	22	7,000	22	7,000	22
Office of Budget & Program Analysis	-	-	150	-	150	-	150	-
Office of the Chief Economist	171	1	-	-	-	-	-	-
Office of the Chief Financial Officer, OCFO	-	-	5,000	16	5,000	16	5,000	16
Office of the Chief Information Officer, OCIO	132	1	186	1	186	1	186	1
Office of the Secretary	-	-	235	1	235	1	235	1
Quarters and Subsistence	-	-	151	1	151	1	151	1
Revocable Permits & Easements	995	4	696	2	696	2	696	2
Sale of Animals & Personal Property (Proceeds)	12,665	47	9,042	29	9,042	29	9,042	29
Misc., Other USDA Funds	389	1	85	-	85	-	85	-
Total, Other USDA	89,628	336	114,031	366	114,031	366	114,031	366

Item	2019 Actual	FTE	2020 Actual	FTE	2021 Enacted	FTE	2022 Budget	FTE
Total, Agriculture Available	1,401,359	5,697	2,317,967	5,441	1,720,866	6,221	1,997,204	6,935
Other Federal Funds:								
Agency for International Development	4,445	17	2,331	7	2,331	7	2,331	7
Department of Defense, DOD	2,162	8	2,158	7	2,158	7	2,158	7
Department of Energy, DOE	982	4	915	3	915	3	915	3
Department of Health & Human Services, DHHS	3,878	15	3,581	12	3,581	12	3,581	12
Department of Homeland Security, DHS	2,771	10	1,292	4	1,292	4	1,292	4
Department of State, DOS	997	4	129	-	129	-	129	-
Department of the Interior	2,888	11	2,530	8	2,530	8	2,530	8
Environmental Protection Agency, EPA	362	1	285	1	285	1	285	1
Federal Emergency Management Agency, FEMA	316	1	322	1	322	1	322	1
National Aeronautics & Space Administration, NASA	1,134	4	902	3	902	3	902	3
United States Geological Survey, USGS	304	1	299	1	299	1	299	1
Misc., Other Federal Funds	44	-	26	-	26	-	26	-
Total, Other Federal	20,282	76	14,771	47	14,771	47	14,771	47
Non-Federal Funds:								
Alaska, State of	-	-	187	1	187	1	187	1
Arizona State University	151	1	250	1	250	1	250	1
Arizona, University of	153	1	-	-	-	-	-	-
Arkansas, University of	383	1	129	-	129	-	129	-
Binational Agricultural Research & Development	257	1	192	1	192	1	192	1
California, State of	1,662	6	2,586	8	2,586	8	2,586	8
California, University of	1,485	6	1,734	6	1,734	6	1,734	6
California Walnut Board & Commission	411	2	132	-	132	-	132	-
Center for Produce Safety	309	1	-	-	-	-	-	-
Citrus Research & Development Foundation	743	3	1,023	3	1,023	3	1,023	3
Citrus Research Board	947	4	562	2	562	2	562	2
Clemson University	-	-	153	1	153	1	153	1
Colorado State University	151	1	-	-	-	-	-	-
Commodity Credit Corporation	153	1	157	1	157	1	157	1
Cornell University	615	2	254	1	254	1	254	1
Cotton Incorporated	991	4	1,063	3	1,063	3	1,063	3
Delaware, University of	104	-	-	-	-	-	-	-
Florida, State of	522	2	434	1	434	1	434	1
Florida, University of	638	2	977	3	977	3	977	3
Georgia, University of	158	1	285	1	285	1	285	1
Idaho State University	120	-	-	-	-	-	-	-
Idaho, University of	126	1	210	1	210	1	210	1
Illinois, University of	650	2	814	3	814	3	814	3
Iowa State University	314	1	-	-	-	-	-	-
John Hopkins University	-	-	133	-	133	-	133	-
Kansas State University	832	3	275	1	275	1	275	1
Kentucky, University of	-	-	116	-	116	-	116	-
Kings River Conservation	-	-	144	1	144	1	144	1
Maine, University of	411	2	243	1	243	1	243	1

Item	2019 Actual	FTE	2020 Actual	FTE	2021 Enacted	FTE	2022 Budget	FTE
Massachusetts, University of	101	-	-	-	-	-	-	-
Michigan State University	1,369	5	689	2	689	2	689	2
Minnesota, University of	311	1	217	1	217	1	217	1
Mississippi Soybean Promotion	125	1	-	-	-	-	-	-
Monell Chemical Senses Center	248	1	-	-	-	-	-	-
Nebraska, University of	358	1	467	2	467	2	467	2
New Mexico State University	457	2	383	1	383	1	383	1
North Carolina A&T University	-	-	486	2	486	2	486	2
North Carolina State University	658	2	960	3	960	3	960	3
North Carolina, University of	107	-	102	-	102	-	102	-
North Dakota State University	121	1	123	-	123	-	123	-
Ohio State University	562	2	587	2	587	2	587	2
Oklahoma, University of	124	1	-	-	-	-	-	-
Oregon State University	156	1	-	-	-	-	-	-
Pennsylvania State University	234	1	440	1	440	1	440	1
Purdue University	-	-	174	1	174	1	174	1
Rutgers University	104	-	-	-	-	-	-	-
Saint Louis University	184	1	149	1	149	1	149	1
Santa Lucia Conservancy	-	-	111	-	111	-	111	-
SmithBucklin Corporation	-	-	3,249	10	3,249	10	3,249	10
South Dakota State University	222	1	146	1	146	1	146	1
South Florida Water Management District	950	4	961	3	961	3	961	3
Texas A&M University	184	1	319	1	319	1	319	1
United Soybean Board	2,076	8	334	1	334	1	334	1
U.S. Highbush Blueberry Council	-	-	134	-	134	-	134	-
Utah State University	134	1	-	-	-	-	-	-
Vermont, University of	176	1	173	1	173	1	173	1
Virginia Polytechnic Institute	-	-	101	-	101	-	101	-
Washington, State of	619	2	316	1	316	1	316	1
Washington State University	193	1	461	1	461	1	461	1
Misc., Non-Federal Funds	2,303	9	2,472	8	2,472	8	2,472	8
Total, Non-Federal	24,359	91	25,605	83	25,605	83	25,605	83
Miscellaneous Contributed Funds	22,909	84	17,412	54	17,412	54	17,412	54
Total Available, ARS	1,468,909	5,948	2,375,755	5,625	1,778,654	6,405	2,054,992	7,119

PERMANENT POSITIONS BY GRADE AND FTE'S

Permanent Positions by Grade and FTEs

Item	2019 Actual			2020 Actual			2021 Enacted			2022 Budget		
	D.C.	Field	Total	D.C.	Field	Total	D.C.	Field	Total	D.C.	Field	Total
SES	11	20	31	11	19	30	11	19	30	11	19	30
GS-15	50	699	749	51	714	765	59	825	884	66	927	993
GS-14	72	440	512	68	430	498	79	497	576	89	558	647
GS-13	162	289	451	143	303	446	166	350	516	187	393	580
GS-12	154	224	378	134	240	374	155	277	432	174	311	485
GS-11	87	445	532	56	449	505	65	519	584	73	583	656
GS-10	-	-	-	-	2	2	-	2	2	-	2	2
GS-9	78	901	979	59	912	971	68	1,054	1,122	76	1,184	1,260
GS-8	12	245	257	11	272	283	13	314	327	15	353	368
GS-7	36	459	495	34	504	538	39	582	621	44	654	698
GS-6	9	159	168	12	190	202	14	219	233	16	246	262
GS-5	9	96	105	11	104	115	13	120	133	15	135	150
GS-4	3	20	23	4	20	24	5	23	28	6	26	32
GS-3	3	7	10	1	6	7	1	7	8	1	8	9
GS-2	-	5	5	1	12	13	1	14	15	1	16	17
GS-1	-	2	2	-	5	5	-	5	5	-	5	5
Other Graded	5	-	5	5	-	5	5	-	5	5	-	5
Ungraded	-	397	397	-	415	415	-	479	479	-	538	538
Total Permanent	691	4,408	5,099	601	4,597	5,198	694	5,306	6,000	779	5,958	6,737
Unfilled, EOY	118	67	185	107	73	180	122	80	202	136	89	225
Total Perm. FT EOY	573	4,341	4,914	494	4,524	5,018	572	5,226	5,798	643	5,869	6,962
FTE	595	5,353	5,948	549	5,076	5,625	627	5,778	6,405	698	6,421	7,119

VEHICLE FLEET

Motor Vehicle Fleet

The 2022 Budget Estimates proposes five planned replacements of owned passenger motor vehicles. Passenger motor vehicles are defined as sedans and stations wagons.

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

It is ARS policy to pool vehicle use to keep the number of vehicles to a minimum. ARS implemented telematics to automatically capture utilization data and improve data accuracy. ARS will continue to perform periodic surveys to help identify underutilized vehicles that may no longer be needed for the mission. During the biennial physical inventory process, ARS works to ensure inactive vehicles are removed from the inventory according to Federal property management regulations. ARS program managers are responsible for managing budgets and program needs to fulfill the agency's research mission. Vehicle replacement is based on program management, vehicle mileage/age, and funding. By Federal regulation, minimum replacement standards for passenger vehicles are three years or 60,000 miles, and light duty trucks are six years or 50,000 miles.

The composition of the ARS fleet is primarily work trucks which includes sport utility vehicles, vans, and pick-up trucks. These multi-purpose type vehicles enable research personnel to move equipment and transport personnel. Past practices have allowed ARS to decrease the number of passenger vehicles by relying on multi-purpose type vehicles. ARS will continue to review its fleet for opportunities to reduce vehicles no longer required for the mission, realign vehicles where it is necessary without affecting the mission and control operating costs. The agency continues to review inventory information to accurately classify the fleet.

Replacement Criteria

ARS retires or replaces vehicles based on program management, vehicle mileage/age, and funding.

Size, Composition, and Annual Costs of Motor Vehicle Fleet

Fiscal Year	Sedans and Station Wagons	Lt. Trucks, SUVs, and Vans (4x2)	Lt. Trucks (4x2)	Lt. Trucks, SUVs, and Vans (4x4)	Medium Duty Vehicles	Buses	Heavy Duty Vehicles	Total Vehicles[1]	Annual Operating Costs
2019	160	*[2]	921	856	666	2	152	2,757	$4,629
Change	-8	-	-541	-342	+61	-	-6	-835	-689
2020	152	842	380	514	727	1	148	2,764	3,940
Change	-	-	-	-	-	+1	-	-	+118
2021	152	842	380	514	727	1	148	2,764	4,058
Change	-	-	-	-	-	-	-	-	+980
2022	152	842	380	514	727	1	148	2,764	5,038

Note: Number of vehicles by type include vehicles owned by the agency and leased from commercial sources or GSA.
Annual Operating Costs excludes acquisition costs and gains from sale of vehicles shown in FAST.

[1] Total Vehicles – current active vehicles from FedFMS as of 9/30/2020.
[2] 2019 Light Duty 4x4 & 4x2 were not broken out by vehicle type per last years' report

Statement of Proposed Purchase of Passenger Motor Vehicles

Fiscal Year	Net Active Fleet, SOY	Disposals	Replacements	Additions	Total Acquisitions	Net Active Fleet, EOY
2019	205	46	-	-	-	159
2020	159	7	5	-	5	152
2021	152	5	5	-	5	152
2022	152	5	5	-	5	152

SHARED FUNDING PROJECTS

Shared Funding Projects (dollars in thousands)

Item	2019 Actual	2020 Actual	2021 Enacted	2022 Budget
Working Capital Fund:				
Administrative Services:				
Material Management Service	$228	$365	$337	$175
Mail and Reproduction Services	747	815	822	351
Integrated Procurement Systems	1,827	1,977	1,794	1,999
Procurement Operations Services	29	27	31	18
Human Resources Enterprise Management Systems	136	157	174	174
Subtotal	2,967	3,341	3,158	2,717
Communications:				
Creative Media & Broadcast Center	310	364	161	169
Finance and Management:				
National Finance Center	2,041	1,863	1,793	1,926
Internal Control Support Services	113	126	116	116
Financial Shared Services	5,440	5,507	5,904	5,936
Subtotal	7,594	7,496	7,813	7,978
Information Technology:				
Client Experience Center	4,778	13,151	19,810	19,892
Department Administration Information Technology Office	-	47	1,133	261
Digital Infrastructure Services Center	998	1,633	1,878	2,132
Enterprise Network Services	3,980	5,537	6,983	7,832
Subtotal	9,756	20,368	29,804	30,117
Office of the Executive Secretariat	390	393	26	26
Total, Working Capital Fund	21,017	31,962	40,962	41,007
Department-Wide Shared Cost Programs:				
Advisory Committee Liaison Services	3	4	4	4
Agency Partnership Outreach	481	467	441	-
Honor Awards	1	1	1	-
Human Resources Self-Service Dashboard	37	36	-	-
Medical Services	72	45	149	149
Office of Customer Experience	162	349	588	558
Personnel and Document Security	93	90	118	-
Physical Security	-	356	266	-
Security Detail	270	281	283	267
Security Operations	657	355	398	-
TARGET Center	77	69	73	-
TARGET Center NCR Interpreting Services	-	-	34	-
USDA Enterprise Data Analytics Services	-	493	307	-
Total, Department-Wide Reimbursable Programs	1,853	2,546	2,662	978
E-Gov:				
Budget Formulation and Execution Line of Business	7	7	7	7
Enterprise Human Resources Integration	139	-	-	-
E-Rulemaking	-	-	5	6
Financial Management Line of Business	5	6	6	6
Human Resources Line of Business	19	18	19	19
Integrated Acquisition Environment	209	173	154	154
Total, E-Gov	379	204	191	192
Agency Total	23,249	34,712	43,815	42,177

ACCOUNT 1: SALARIES AND EXPENSES

APPROPRIATIONS LANGUAGE

The appropriations language follows (new language underscored; deleted matter enclosed in brackets):

For necessary expenses of the Agricultural Research Service and for acquisition of lands by donation, exchange, or purchase at a nominal cost not to exceed $100, and for land exchanges where the lands exchanged shall be of equal value or shall be equalized by a payment of money to the grantor which shall not exceed 25 percent of the total value of the land or interests transferred out of Federal ownership, [$1,491,784,000]$1,849,590,000: *Provided, That of the funds provided, $192,000,000 is for activities related to climate change, in addition to other funds made available for that purpose, including not less than $92,000,000 for climate science, not less than $5,000,000 for climate hubs, and not less than $95,000,000 for an agreement with the Department of Energy for the Advanced Research Projects Agency-Climate,* [:] *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 $500,000, except for headhouses or greenhouses which shall each be limited to $1,800,0000, except for 10 buildings to be constructed or improved at a cost not to exceed $1,100,000 each, and except for [two] four buildings to be constructed at a cost not to exceed [$3,000,000] $5,000,000 each, and the cost of altering any one building during the fiscal year shall not exceed 10 percent of the current replacement value of the building or $500,000, 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 appropriations hereunder shall be available for granting easements at any Agricultural Research Service location for the construction of a research facility by a non-Federal entity for use by, and acceptable to, the Agricultural Research Service and a condition of the easements shall be that upon completion the facility shall be accepted by the Secretary, subject to the availability of funds herein, if the Secretary finds that acceptance of the facility is in the interest of the United States: *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.

Change Description

The first change (line 4 of paragraph 1) deletes the 2021 appropriation amount, replaces it with the 2022 request.

The second change (line 5 of paragraph 1) adds language for climate change.

The third change (line 14 of paragraph 1) changes the number of small buildings.

The last change (line 14 of paragraph 1) changes the construction cost amount.

LEAD-OFF TABULAR STATEMENT

Lead-Off Tabular Statement (In dollars)

Item	Amount
2021 Enacted	$1,491,784,000
Change in Appropriation	+357,806,000
Budget Estimate, 2022	1,849,590,000

PROJECT STATEMENT APPROPRIATIONS

Project Statement (thousands of dollars)

Item	2019 Actual	FTE	2020 Actual	FTE	2021 Enacted	FTE	Inc. or Dec.	FTE	Chg Key	2022 Budget	FTE
Discretionary Appropriations:											
Salaries and Expenses.....	$1,303,266	5,361	$1,414,366	5,075	$1,491,784	5,855	+$357,806	+714	(1)	$1,849,590	6,569
Subtotal.....	1,303,266	5,361	1,414,366	5,075	1,491,784	5,855	+357,806	+714		1,849,590	6,569
Mandatory Appropriations:											
Human Nutrition …….	-	-	-	-	20,000	-	-	-		20,000	-
Subtotal.....	-	-	-	-	20,000	-	-	-		20,000	-
Supplemental Appropriations:											
Kelp and Seagrass (Discretionary)……	-	-	-	-	1,000	-	-1,000	-		-	-
Subtotal.....	-	-	-	-	1,000	-	-1,000	-		-	-
Total Adjusted Approp.....	1,303,266	5,361	1,414,366	5,075	1,512,784	5,855	+356,806	+714	-	1,869,590	6,569
Transfers In:											
Cong. Relations.....	60	-	60	-	-	-	-	-		-	-
Total Transfers In.....	60	-	60	-	-	-	-	-	-	-	-
Recoveries, Other	10,788	-	23,529	-	-	-	-	-		-	-
Bal. Available, SOY.....	44,254	-	62,500	-	74,418	-	-74,418	-		-	-
Total Available[3].....	1,358,368	5,361	1,500,455	5,075	1,587,202	5,855	+282,388	+714	-	1,869,590	6,569
Lapsing Balances.....	-3,494	-	-2,508	-	-	-	-	-		-	-
Bal. Available, EOY.....	-62,500	-	-74,418	-	-	-	-	-		-	-
Total Obligations.....	1,292,374	5,361	1,423,529	5,075	1,587,202	5,855	+282,388	+714		1,869,590	6,569
Staff Years:											
Direct.....		5,361		5,075		5,855					6,569
Other.....		587		550		550					550
Total, Staff Years.....		5,948		5,625		6,405					7,119

[3] Discrepancy between project statement and Max schedule X is the reimbursables.

FUNDING DETAIL APPROPRIATIONS

Funding Detail (thousands of dollars)

Allocations	2019 Actual B.A.	2020 Actual B.A.	2021 Enacted B.A.	2022 Budget Request B.A.	Chg Key	Change from 2021 Enacted B.A.
Salaries and Expenses	**1,303,266**	**1,414,366**	**1,491,784**	**1,849,590**		**+357,806**
New Product Quality/Value Added……	$101,512	$117,512	$120,503	$197,841	(1)	+$77,338
Livestock Production……..	102,700	114,200	124,163	136,544	(2)	+12,381
Crop Production……..	258,348	282,748	299,882	326,140	(3)	+26,258
Food Safety…….	113,844	113,844	115,690	125,752	(4)	+10,062
Livestock Protection……	101,808	116,808	127,376	145,876	(5)	+18,500
Crop Protection……...	206,686	217,186	223,267	236,344	(6)	+13,077
Human Nutrition…….	90,510	92,510	99,144	100,104	(7)	+960
Environmental Stewardship……	225,323	231,523	251,675	312,978	(8)	+61,303
National Agricultural Library…….	25,791	28,791	28,884	34,162	(9)	+5,278
National Bio and Agro-Defense Facility (O&M/Transition Costs)……...	56,600	79,100	81,056	118,705	(10)	+37,649
Advanced Research Projects Agency for Climate (ARPA-C)…….……..……..	-	-	-	95,000	(11)	+95,000
Repair and Maintenance……..…….	20,144	20,144	20,144	20,144	(12)	-

PROJECT STATEMENT OBLIGATIONS

Project Statement (thousands of dollars)

Item	2019 Actual	FTE	2020 Actual	FTE	2021 Enacted	FTE	Inc. or Dec.	FTE	2022 Budget	FTE
Discretionary Obligations:										
Salaries and Expenses.....	$1,292,374	5,361	$1,423,529	5,075	$1,566,202	5,855	+$283,388	+714	$1,849,590	6,569
Subtotal Disc Oblig.....	1,292,374	5,361	1,423,529	5,075	1,566,202	5,855	+283,388	+714	1,849,590	6,569
Mandatory Appropriations:										
Human Nutrition ……	-	-	-	-	20,000	-	-	-	20,000	-
Subtotal Mand Oblig.....	-	-	-	-	20,000	-	-	-	20,000	-
Supplemental Obligations:										
Kelp and Seagrass (Discretionary).....	-	-		-	1,000	-	-1,000	-	-	-
Subtotal Supp Oblig.....	-	-	-	-	21,000	-	-1,000	-	20,000	-
Total Obligations.....	1,292,374	5,361	1,423,529	5,075	1,587,202	5,855	+282,388	+714	1,869,590	6,569
Add back:										
Lapsing Balances.....	3,494	-	2,508	-	-	-	-	-	-	-
Balances Available, EOY:	-	-	-	-	-	-	-	-	-	-
EOY Balance Available.....	62,500	-	74,418	-	-	-	-	-	-	-
Total Bal. Available, EOY.....	65,994	-	76,926	-	-	-	-	-	-	-
Total Available[4].....	1,358,368	5,361	1,500,455	5,075	1,587,202	5,855	+282,388	+714	1,869,590	6,569
Less:										
Total Transfers In.....	-60	-	-60	-	-	-	-	-	-	-
Recoveries, Other	-10,788	-	-23,529	-	-	-	-	-	-	-
Bal. Available, SOY.....	-44,254	-	-62,500	-	-74,418	-	+74,418	-	-	-
Total Appropriation.....	1,303,266	5,361	1,414,366	5,075	1,512,784	5,855	+356,806	+714	1,869,590	6,569
Staff Years:										
Direct.....		5,361		5,075		5,855				6,569
Other.....		587		550		550				550
Total, Staff Years.....		5,948		5,625		6,405				7,119

[4] Discrepancy between project statement and Max schedule X is the reimbursables.

FUNDING DETAIL OBLIGATIONS

Funding Detail (thousands of dollars)

Allocations	2019 Actual B.A.	2020 Actual B.A.	2021 Enacted B.A.	2022 Budget Request B.A.	Chg Key	Change from 2021 Enacted B.A.
Salaries and Expenses	**1,292,374**	**1,423,529**	**$1,587,202**	**1,869,590**		**+282,388**
New Product Quality/Value Added……	$101,475	$117,273	$128,322	$197,841	(1)	+$69,519
Livestock Production……..	102,663	113,968	132,220	136,544	(2)	+4,324
Crop Production……..	258,255	282,173	320,341	326,140	(3)	+5,799
Food Safety…….	113,844	113,844	115,690	125,752	(4)	+10,062
Livestock Protection……	101,771	140,270	135,641	145,876	(5)	+10,235
Crop Protection……...	206,611	216,744	237,754	236,344	(6)	-1,410
Human Nutrition…….	90,510	92,510	119,144	120,104	(7)	+960
Environmental Stewardship……	225,241	231,052	268,006	312,978	(8)	+44,972
National Agricultural Library…….	25,860	29,551	28,884	34,162	(9)	+5,278
National Bio and Agro-Defense Facility (O&M/Transition Costs)……...	46,000	66,000	81,056	118,705	(10)	+37,649
Advanced Research Projects Agency for Climate (ARPA-C)……	-	-	-	95,000	(11)	+95,000
Repair and Maintenance……..……	20,144	20,144	20,144	20,144	(12)	-

JUSTIFICATIONS OF INCREASES/DECREASES

SALARIES AND EXPENSES

ARS is requesting $1,849,590,000 in FY 2022 for its Salaries and Expenses account, an increase of $357,806,000 from the FY 2021 Enacted level.

The FY 2021 Budget includes an increase of $291,000,000 for new initiatives in clean energy, climate science, and climate hubs and for an agreement with the Department of Energy for the Advanced Research Projects Agency-Climate (ARPA-C). There is also an increase of $49,000,000 for operations/maintenance, and research program improvements required for the new National Bio and Agro-Defense Facility (NBAF),which replaces the outdated and inadequate Plum Island Animal Disease Center (PIADC). NBAF will be a state-of-the-art biocontainment facility for the study of foreign, emerging, and zoonotic animal diseases that pose a threat to U.S. animal agriculture and to public health. In addition, the Budget includes $17,806,000 for increases for pay costs, and the Federal Employees Retirement System.

New Products/Product Quality/Value Added

(1) An increase of $77,338,000 and 258 staff years increase for New Products/Product Quality/Value Added research ($120,503,000 and 549 staff years available in 2021).

ARS' New Products/Product Quality/Value Added research program is directed toward: Improving the efficiency and reducing the cost for the conversion of agricultural products into biobased products and biofuels; developing new and improved products for domestic and foreignmarkets; and providing higher quality, healthy foods that satisfy consumer needs in the United States and abroad.

Continuing New Products/Product Quality/Value Added base funding is essential for ARS to carryout its research mission and responsibilities. Base funding supports ARS' program goals of increasing the economic viability and competitiveness of U.S. agriculture by maintaining and/or enhancing the quality of harvested agricultural commodities; and expanding domestic and global market opportunities through the development of value-added food and nonfood technologies andproducts including energy and fuels. In addition to the activities and functions specifically described in the budget request, current year and budget year base funds will be used to carry out activities and functions consistent with the full range of authorities and activities delegated to the agency. ARS' New Products/Product Quality/Value Added research program is carried out at numerous locations where agency scientists frequently collaborate with researchers from other Federal/Stategovernments, academia, and private industry. The research supports many of USDA's Strategic Goals.

The funding change is requested for the following items:

A) An increase of $1,670,000 which includes $1,137,000 for pay inflation and $533,000 for FERS.

This increase will support a 2.7% Cost of Living pay increases for civilian employees, and a 1.1% increase to cover the expenses for the mandated increase of USDA's contribution to FERS.

Funding for pay and retirement benefit costs is critical for recruiting and retaining top level scientists and staff, conducting viable research programs, and carrying out ARS' mission. Elimination of the pay and retirement benefit costs would require ARS to absorb these costs and reduce planned hiring levels, eroding USDA's ability to meet key Administration priorities.

B) The President's FY 2022 Budget includes a total of $99,000,000 for Clean Energy for which $75,668,000 is for ARS' New Products/Product Quality/Value Added Program.

President Joe Biden on January 27, 2021 signed the "Executive Order on Tackling the Climate Crisis at Home and Abroad" which ordered federal agencies to develop clean energy technologies and accelerate clean energy generation projects that stimulates clean energy industries and benefits rural economies. The change to clean energy, and away from fossil-based energy, works by producing power without the negative environmental impacts such as greenhouse gases, like carbon dioxide and methane. And is generated from renewable, zero emission sources that do not pollute the atmosphere, as well as energy saved by energy efficiency measures. The various sources of clean energy are wind, solar, tidal,

geothermal, nuclear, hydrogen, and agriculturally based, renewable biomass feedstocks. The need for clean energy is multi-purposed: 1. it's important for future generations, as clean energy sources are inexhaustible and adapt well to natural cycles and do not emit greenhouse gases. 2. Clean Energy gives local economies an advantage by reducing the cycle of economic losses from a dependence on fossil fuels, to relying on locally produced renewable energy sources found everywhere and readily available for ensuring energy sustainability. 3. Clean Energy is becoming more affordable, with costs trending at a declining rate and becoming more competitive with natural gas, coal, and oil. And 4. Clean Energy is a benefit to local economies due to creating locally produced new jobs in the generation of energy. But research and development must happen faster to make clean energy solutions viable. Therefore, although, clean energy already makes good business sense, fully realizing its potential, however, requires further innovation to optimize technologies and system integration. A robust new research and development effort would strengthen and ensure global leadership of the American agriculture industry as well as creating new initiatives for rural development through generation of Bioenergy.

Means to Achieve Change

- Sustainable Clean Energy ($56,168,000). ARS will:
  - Develop sustainable clean energy conversion technologies (biochemical and thermochemical) focused on bio-jet, renewable marine fuels, oxygenated fuel additives, renewable natural gas, chemicals, and green hydrogen energy systems.
- Biowaste-stream to Bioenergy ($19,500,000). ARS will:
  - Use existing low-value agricultural waste products to create a renewable flex-use biomethane gas or synthesis gas (a mixture of methane, hydrogen, and carbon oxides).

Livestock Production

(2) An increase of $12,381,000 and 48 staff years for Livestock Production research ($124,163,000 and 454 staff years available in 2021).

ARS' Livestock Production research program is directed toward fostering an abundant, safe, nutritionally wholesome, and competitively priced supply of animal products produced in a viable,competitive, and sustainable animal agriculture sector of the U.S. economy by: safeguarding and utilizing animal genetic resources, associated genetic and genomic databases, and bioinformatic tools; developing a basic understanding of food animal physiology to address priority issues related to animal production, animal well-being, and product quality and healthfulness; and developing information, best management practices, novel and innovative tools, and technologies that improve animal production systems, enhance human health, and ensure domestic food security. The research is heavily focused on the development and application of genomics technologies to increase the efficiency and product quality of beef, dairy, swine, poultry, aquaculture, and sheep systems. Areas of emphasis include increasing the efficiency of nutrient utilization, increasing animal wellbeing and reducing stress in production systems, increasing reproductive rates and breeding animal longevity, developing and evaluating non-traditional production systems (e.g., organic and natural), and evaluating and conserving animal genetic resources.

Continuing Livestock Production base funding is essential for ARS to carry out its research missionand responsibilities. Base funding supports ARS' program goal of providing scientific information and biotechnologies which will ensure an abundant supply of competitively priced animal and aquaculture products. This includes: developing genome analysis tools; identifying economically important genetic traits; preserving agricultural animal genetic resources; improving the efficiency of nutrient utilization and conversion of feeds and forages to animal products; enhancing reproductive performance; and improving aquaculture production systems. In addition to the activities and functions specifically described in the budget request, current year and budget year base funds will be used to carry out activities and functions consistent with the full range of authorities and activities delegated to the agency.

ARS' Livestock Production research program is carried out at numerous locations where agency scientists frequently collaborate with researchers from other Federal/State governments, academia,and private industry. The research supports many of USDA's Strategic Goals.

The funding change is requested for the following items:

A) An increase of $1,381,000 which includes $940,000 for pay inflation and $441,000 for FERS.

This increase will support a 2.7% Cost of Living pay increases for civilian employees, and a 1.1% increase to cover the expenses for the mandated increase of USDA's contribution to FERS.

Funding for pay and retirement benefit costs is critical for recruiting and retaining top level scientists and staff, conducting viable research programs, and carrying out ARS' mission. Elimination of the pay and retirement benefit costs would require ARS to absorb these costs and reduce planned hiring levels, eroding USDA's ability to meet key Administration priorities.

B) The President's FY 2022 Budget includes a total of $92,000,000 for Climate Science of which $11,000,000 is for ARS' Livestock Production Program.

The urgency of the global climate crisis is growing. Nearly every aspect of the nation's agricultural enterprise is increasingly called on to contribute to climate change mitigation by reducing GHG emissions, sequestering carbon (C) to reduce atmospheric carbon dioxide (CO_2), and developing agriculturally based approaches for generating energy as alternatives to fossil fuels. Agriculture is also faced with adapting quickly to unprecedented climate changes and weather extremes with minimal interruptions in production. These enormous challenges call for innovative research supported by bold, trans-disciplinary collaborations. USDA-ARS has research projects and scientific expertise that address many topics related to climate change mitigation and adaptation. This existing infrastructure positions ARS to enable these advancements by establishing new research efforts and collaborations described below to support agriculture's response to the climate crisis.

Means to Achieve Change

- Develop new animal feeds that reduce methane emissions ($5,000,000). ARS will:
  - Develop feeds that meet the nutrient requirements of beef cattle throughout the production cycle while reducing methane emissions.
- Develop insects as animal and aquaculture feed ($3,000,000). ARS will:
  - Design and implement insect production systems for supplementing poultry and aquaculture feeds with insect ingredients such that the nutrient requirements are met throughout the lifecycle for poultry, trout, hybrid striped bass.
- Develop methods to reduce and mitigate the impacts of climate change on pests and pathogens of livestock, poultry, and aquaculture. ($3,000,000). ARS will:
  - Develop and implement strategies for reducing or eliminating the on-farm impacts of pests and pathogens on livestock, poultry, and aquaculture species due to climate change.
  - Evaluate germplasm for genetic resistance to pests and pathogens.

Crop Production

(3) An increase of $26,258,000 and 75 staff years increase for Crop Production research ($299,882,000 and 1,175 staff years available in 2021).

ARS' Crop Production research program focuses on developing and improving ways to reduce crop losses while protecting and ensuring a safe and affordable food supply. The program concentrates on production strategies that are environmentally friendly, safe to consumers, and compatible with sustainable and

profitable crop production systems. Research activities are directed at safeguarding and utilizing plant genetic resources and their associated genetic, genomic, and bioinformatic databases that facilitate selection of varieties and/or germplasm with significantly improved traits. Research activities attempt to minimize the impacts of crop pests while maintaining healthy crops and safe commodities that can be sold in markets throughout theworld. The agency 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 provides taxonomic information on invasive species that strengthens prevention techniques, aids in detection/identification of invasive pests, and increases control through management tactics that restore habitats and biological diversity.

Continuing Crop Production base funding is essential for ARS to carry out its research mission and responsibilities. Base funding supports ARS' program goals of protecting, expanding, and enhancing the Nation's crop genetic resources; increasing scientific knowledge of crop genes, genomes, and biological systems; and delivering technologies that improve the production efficiency, quality, health, and value of the Nation's crops. This includes: developing and maintaining genome databases and informatics tools; managing plant and microbial genetic resources; assessing systematic relationships; enhancing and releasing improved genetic resources and varieties; improving bee health; developing integrative strategies for managing pests, soil, water, nutrient and environmental factors for optimal yield; and determining the biological processes that improve crop productivity. In addition to the activities and functions specifically described in the budget request, current year and budget year base funds will be used to carry outactivities and functions consistent with the full range of authorities and activities delegated to the agency. ARS' Crop Production research program is carried out at numerous locations where agency scientists frequently collaborate with researchers from other Federal/State governments, academia,and private industry. The research supports many of USDA's Strategic Goals.

The funding change is requested for the following items:

A) An increase of $3,574,000 which includes $2,433,000 for pay inflation and $1,141,000 for FERS.

This increase will support a 2.7% Cost of Living pay increases for civilian employees, and a 1.1% increase to cover the expenses for the mandated increase of USDA's contribution to FERS.

Funding for pay and retirement benefit costs is critical for recruiting and retaining top level scientists and staff, conducting viable research programs, and carrying out ARS' mission. Elimination of the pay and retirement benefit costs would require ARS to absorb these costs and reduce planned hiring levels, eroding USDA's ability to meet key Administration priorities.

B) The President's FY 2022 Budget includes a total of $99,000,000 for Clean Energy of which $11,634,000 is for ARS' Crop Production Program.

President Joe Biden on January 27, 2021 signed the "Executive Order on Tackling the Climate Crisis at Home and Abroad" which ordered federal agencies to develop clean energy technologies and accelerate clean energy generation projects that stimulates clean energy industries and benefits rural economies. The change to clean energy, and away from fossil-based energy, works by producing power without the negative environmental impacts such as greenhouse gases, like carbon dioxide and methane. And is generated from renewable, zero emission sources that do not pollute the atmosphere, as well as energy saved by energy efficiency measures. The various sources of clean energy are wind, solar, tidal, geothermal, nuclear, hydrogen, and agriculturally based, renewable biomass feedstocks. The need for clean energy is multi-purposed: 1. it's important for future generations, as clean energy sources are inexhaustible and adapt well to natural cycles and do not emit greenhouse gases. 2. Clean Energy gives local economies an advantage by reducing the cycle of economic losses from a dependence on fossil fuels, to relying on locally produced renewable energy sources found everywhere and readily available for ensuring energy sustainability. 3. Clean Energy is becoming more affordable, with costs trending at a declining rate and becoming more competitive with natural gas, coal, and oil. And 4. Clean Energy is a benefit to local economies due to creating locally produced new jobs in the generation of energy. But research and development must happen faster to make clean energy solutions viable. Therefore, although, clean energy already makes good business sense, fully realizing its potential, however, requires further innovation to optimize technologies and system integration.

Means to Achieve Change

- Sustainable Clean Energy ($2,834,000). ARS will:
  - Develop new sustainable varieties of sugar and oil crops.
- Clean Energy Feedstocks ($8,800,000). ARS will:
  - Develop cellulosic feedstocks that overcome barriers to clean energy bioconversion and germplasm with greater resistance to insects and diseases for higher biomass yield potential.

C) The President's FY 2022 Budget includes a total of $92,000,000 for Climate Science of which $11,050,000 is for ARS' Crop Production Program.

The urgency of the global climate crisis is growing. Nearly every aspect of the nation's agricultural enterprise is increasingly called on to contribute to climate change mitigation by reducing GHG emissions, sequestering carbon (C) to reduce atmospheric carbon dioxide (CO_2), and developing agriculturally based approaches for generating energy as alternatives to fossil fuels. Agriculture is also faced with adapting quickly to unprecedented climate changes and weather extremes with minimal interruptions in production. These enormous challenges call for innovative research supported by bold, trans-disciplinary collaborations. USDA-ARS has research projects and scientific expertise that address many topics related to climate change mitigation and adaptation. This existing infrastructure positions ARS to enable these advancements by establishing new research efforts and collaborations described below to support agriculture's response to the climate crisis.

Means to Achieve Change

- Breed crops to survive climate change impacts while maintaining yield, agronomic, nutritional, and industrial output ($3,000,000). ARS will:
  - Develop high yielding crop varieties with climate resilient traits that are equipped with genes to preserve improved nutritional quality when grown under extreme climates.
  - Apply novel methods, including AI and machine learning, to elucidate the underlying physiological and elements of exposure to changing climate, determine the sensitivity of crops to various elements of extreme climates and assess physiological outcomes of prolonged exposure to climate extremes.
  - Produce new varieties and cultivars for American farmers that ensure adequate production, processing, and utilization of nutritious food and rural prosperity.
- Uncover new sources of climate resilience in ARS gene banks through novel, leading-edge, high through-put evaluation. ($3,000,000). ARS will:
  - Develop and implement novel, high through-put "phenomic" and multiple trait evaluations, analytical methods (involving hyperspectral imagery, weather sensors, UAVs), and data handling capacities to identify traits and germplasm for adapting crops in diverse US production regions to climate change.
- Mitigate climate change in crop production to develop crops with reduced greenhouse gas emissions and increased capacity for carbon banking. ($2,000,000). ARS will:
  - Improve the capture and storage of carbon in woody, perennial, and cover crops.
  - Develop carbon monitoring, measuring, and storage technologies in both above- and below-ground agricultural production.
  - Reduce greenhouse gas emissions in specialty crop and field crop production systems using crop production innovations, microbes, and engineering alternatives.

- Protect pollinators from the damages of climate change. ($2,300,000). ARS will:
  - Develop a Bee Climate Change Center to evaluate the use of bees as sentinel species of the negative effects of climate change, with the goal of protecting the Nation's pollinators and ensuring adequate pollination of specialty crops and survival of natural ecosystems.
- Understand climate change effects on the invasion biology of emerging and invasive pests. ($250,000). ARS will:
  - Evaluate the unpredictability in weather patterns associated with early seasonal warmth and increased rainfall or drought to see how they affect pest populations, their movement in the environment, and their impact on crops and natural ecosystems.
- Develop effective tools to manage pests, pathogens, and weeds in a changing environment. ($500,000). ARS will:
  - Enhance Climate Hub direct activities by strategic engagement of critical needs of each regional hub.
  - Promote and integrate climate hub programming and communication and synthesis needs.

Food Safety

(4) An increase of $10,062,000 and 18 staff years for Food Safety research ($115,690,000 and 678 staff years available in 2021).

ARS' Food Safety research program 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 pathogenic bacteria and fungi, parasites, chemical contaminants, and plant toxins. All of ARS' research activities involve a high degree of cooperation and collaboration with USDA'sResearch, Education, and Economics agencies, as well as with the Food Safety and Inspection Service, Animal and Plant Health Inspection Service (APHIS), Food and Drug Administration, Centers for Disease Control and Prevention (CDC), Department of Homeland Security (DHS), and the Environmental Protection Agency (EPA). The agency also collaborates in international researchprograms to address and resolve global food safety issues. Specific research efforts are directed toward developing new technologies that assist ARS stakeholders and customers, including regulatory agencies, industry, and commodity and consumer organizations in detecting, identifying, and controlling foodborne diseases that affect human health.

Continuing Food Safety base funding is essential for ARS to carry out its research mission and responsibilities. Base funding supports ARS' program goal of protecting food from pathogens, toxins, and chemical contamination during production, processing, and preparation. This includes:developing and evaluating technologies for the detection and characterization of microbial contaminants; developing new intervention and control strategies for the reduction of foodborne pathogens; and developing and evaluating detection methods for the reduction and control of veterinary drugs, chemical residues, heavy metals, organic pollutants, and biological toxins derived from bacteria, fungi, and plants. In addition to the activities and functions specifically described in the budget request, current year and budget year base funds will be used to carry out activities and functions consistent with the full range of authorities and activities delegated to the agency. ARS' Food Safety research program is carried out at numerous locations where agency scientists frequently collaborate with researchers from other Federal/State governments, academia, and private industry. The research supports many of USDA's Strategic Goals.

The funding change is requested for the following items:

A) An increase of $2,062,000, which includes $1,404,000 for pay inflation and $658,000 for FERS.

This increase will support a 2.7% Cost of Living pay increases for civilian employees, and a 1.1% increase to cover the expenses for the mandated increase of USDA's contribution to FERS.

Funding for pay and retirement benefit costs is critical for recruiting and retaining top level scientists and staff, conducting viable research programs, and carrying out ARS' mission. Elimination of the pay and

retirement benefit costs would require ARS to absorb these costs and reduce planned hiring levels, eroding USDA's ability to meet key Administration priorities.

B) The President's FY 2022 Budget includes a total of $92,000,000 for Climate Science of which $8,000,000 is for ARS' Food Safety Program.

The urgency of the global climate crisis is growing. Nearly every aspect of the nation's agricultural enterprise is increasingly called on to contribute to climate change mitigation by reducing GHG emissions, sequestering carbon (C) to reduce atmospheric carbon dioxide (CO_2), and developing agriculturally based approaches for generating energy as alternatives to fossil fuels. Agriculture is also faced with adapting quickly to unprecedented climate changes and weather extremes with minimal interruptions in production. These enormous challenges call for innovative research supported by bold, trans-disciplinary collaborations. USDA-ARS has research projects and scientific expertise that address many topics related to climate change mitigation and adaptation. This existing infrastructure positions ARS to enable these advancements by establishing new research efforts and collaborations described below to support agriculture's response to the climate crisis.

Means to Achieve Change

- Mitigate the Impact of Mycotoxins to the Food and Feed Supply ($3,000,000). ARS will:
  - Determine the genetic basis for enhanced resistance to Fusarium mycotoxin contamination of cereal crops such as wheat, barley, oats, and corn.
  - Use bioinformatic resources to identify novel sources of resistance resources so that breeders can develop climate resistant varieties.
  - Delineate the molecular basis of Aspergillus flavus resistance in corn.
  - Identify novel regulatory genes and gene networks that play key roles in host plant resistance against the fungus to contribute in marker-assisted breeding.
  - Apply functional genomics and bioinformatic resources to identify metabolic pathways that contribute to resistance to Aspergillus flavus and aflatoxin production.
  - Develop transgenic corn lines for cereal production expressing antifungal capacities that inhibit Aspergillus flavus contamination.
- Mitigate Climate-Driven Food Safety Risks Caused by Food and Waterborne Pathogens ($5,000,000). ARS will:
  - Use high-throughput genomic technologies and bioinformatics to identify current and emerging parasites responsible for foodborne illnesses from a range of complex environments affected by climate change.
  - Use mathematical modeling and artificial intelligence to assess complexities of climate and infection interactions that allow testing of adaption or mitigation measures to counteract the negative impacts of climate change on agricultural systems, food safety and public health.
  - Use genomic and advanced bioinformatic analytical tools to determine how climate-related stressors cause functional shifts in the broiler chicken gut microbiome and changes in enteric neurochemistry.

Livestock Protection

(5) An increase of $18,500,000 and 30 staff years for Livestock Protection research ($127,376,000 and 460 staff years available in 2021).

ARS' Livestock Protection research 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 through the discovery and development of diagnostics, vaccines, biotherapeutics, animal genomics applications, disease management systems, animal disease models, and farm biosecurity measures. The research program has the following strategic objectives: establish ARS laboratories into a fluid, highly effective research network to maximize use of core competencies and resources; use specialized high containment facilities to study zoonotic and emerging diseases; develop an integrated animal and microbial genomics research program; establish core competencies in bovine,swine, ovine, and avian immunology; launch a biotherapeutic discovery program providing alternatives to animal drugs; build a technology driven vaccine and diagnostic discovery research program; develop core competencies in field epidemiology and predictive biology; establish a best- in-class training center for our Nation's veterinarians and scientists; and develop a model technology transfer program to achieve the full impact of ARS research discoveries. The ARS animal research program includes the following core components: biodefense research, animal genomics and immunology, zoonotic diseases, respiratory diseases, reproductive and neonatal diseases, enteric diseases, parasitic diseases, and transmissible spongiform encephalopathies.

Continuing Livestock Protection base funding is essential for ARS to carry out its research mission and responsibilities. Base funding supports ARS' program goal of preventing and controlling pestsand animal diseases that pose a threat to agriculture, public health, and the well-being of Americans. This includes: identifying genes involved in animals with disease-resistant phenotypes;improving our understanding of microbial pathogenesis, transmission, and immune responses to develop countermeasures to prevent and control animal diseases; analyzing microbial genomes to better understand host-pathogen interactions; developing new vaccines to prevent disease in aquaculture species; developing new methods to minimize tick bites; identifying measures to restrict the cattle fever tick; developing methods to control stable flies, horn flies, and house flies and their impact on livestock; supporting the screwworm eradication program; and developing control methods for U.S. vectors of Rift Valley fever. In addition to the activities and functions specifically described in the budget request, current year and budget year base funds will be used to carry out activities and functions consistent with the full range of authorities and activities delegated to the agency.

ARS' Livestock Protection research program is carried out at numerous locations where agency scientists frequently collaborate with researchers from other Federal/State governments, academia,and private industry. The research supports many of USDA's Strategic Goals.

The funding change is requested for the following items:

A) An increase of $1,400,000 which includes $953,000 for pay inflation and $447,000 for FERS.

This increase will support a 2.7% Cost of Living pay increases for civilian employees, and a 1.1% increase to cover the expenses for the mandated increase of USDA's contribution to FERS.

Funding for pay and retirement benefit costs is critical for recruiting and retaining top level scientists and staff, conducting viable research programs, and carrying out ARS' mission. Elimination of the pay and retirement benefit costs would require ARS to absorb these costs and reduce planned hiring levels, eroding USDA's ability to meet key Administration priorities.

B) The President's FY 2022 Budget includes a total of $92,000,000 for Climate Science of which $5,500,000 is for ARS' Livestock Protection Program.

The urgency of the global climate crisis is growing. Nearly every aspect of the nation's agricultural enterprise is increasingly called on to contribute to climate change mitigation by reducing GHG emissions, sequestering carbon (C) to reduce atmospheric carbon dioxide (CO_2), and developing agriculturally based approaches for generating energy as alternatives to fossil fuels. Agriculture is also faced with adapting quickly to unprecedented climate changes and weather extremes with minimal interruptions in production. These enormous challenges call for innovative research supported by bold, trans-disciplinary collaborations. USDA-ARS has research projects and scientific expertise that address many topics related to climate change mitigation and adaptation. This existing infrastructure positions

ARS to enable these advancements by establishing new research efforts and collaborations described below to support agriculture's response to the climate crisis.

Means to Achieve Change

- Develop methods to reduce and mitigate the impacts of climate change on pests and pathogens of livestock, poultry, and aquaculture. ($5,500,000). ARS will:
  - Implement strategies for reducing or eliminating the on-farm impacts of Vesicular Stomatitis Virus and stable flies resulting from climate change.
  - Develop countermeasures to Orbivirus of livestock, including bluetongue and epizootic Hemorrhagic Fever.
  - Predict and control Vesicular Stomatitis Virus (VSV) in North America.
  - Develop Detection and Control Strategies for tick transmitted Bovine Babesiosis and anaplasmosis.

C) An increase of $11,600,000 for the National Bio and Agro-Defense Facility—Research.

The National Bio- and Agro-Defense Facility (NBAF), located in Manhattan, Kansas, will be a state-of-the-art biocontainment facility for the study of foreign, emerging, and zoonotic animal diseases that pose a threat to United States animal agriculture and public health. The facility will serve as a "One Health" national and international resource, offering capabilities for training, research and development, surveillance, prevention, and response to emerging infectious diseases. NBAF will provide the first U.S large animal biosafety level-4 (BSL-4) facilities to house livestock infected with zoonotic agents within the highest biocontainment envelope, a critical capability that is currently lacking in the U.S. NBAF will also house a Biologics Development Module that will provide small scale production of standardized biological reagents needed for basic and applied research, and biological test materials for supporting proof-of-concept studies and early phase veterinary medical countermeasures development.

Means to Achieve Change

- NBAF Research Programs for Rift Valley Fever, Japanese encephalitis, Crimean-Congo Hemorhagic Fever, and Nipah virus ($8,300,000). ARS will:
  - Develop new medical countermeasures to recover from Rift Valley Fever virus outbreaks with the development of next generation vaccines and diagnostics engineered to differentiate vaccinated from infected animals.
  - Identify molecular determinants responsible for the evolution of new genotypes of Japanese encephalitis viruses and their impact on viral pathogenesis and maintenance in mosquito vectors and animal hosts.
  - Determine the role of other animal species in the epidemiological cycle of Japanese encephalitis virus in areas where densities of pigs are low.
  - Determine the transmission cycle of Crimean-Congo Hemorhagic Fever virus from animals to humans, including the viral infectious dose, the period of time infected animals shed the virus, and whether domestic ruminants can shed the virus in milk.
  - Determine the competence of U.S hard ticks for Crimean-Congo Hemorhagic Fever virus.
  - Identify geographical areas of risk for the establishment of the Crimean-Congo Hemorhagic Fever virus vectors taking into consideration climatic and ecological conditions.

- Determine if antibodies in cattle infected with Crimean-Congo-Hemorhagic Fever are protective.
- Develop vaccines for Crimean-Congo Hemorhagic Fever virus reservoir animals to avoid tick-based infection and transmission.
- Determine the extent of henipavirus species and strains circulating in Pteropus bats and assess their potential for causing disease in domestic animals.
- Determine innate defense mechanisms responsible for limiting Nipah virus replication in bats.
- Identify determinants of Nipah virus virulence in domestic pigs.
- Determine correlates of Nipah virus protective immunity in pigs.
- Determine the effectiveness of available Nipah virus vaccine platforms in pigs.

- NBAF Partnerships and Innovation ($1,000,000). ARS will:
  - Provide the framework by which NBAF will enhance America's agricultural biosecurity by forming strategic partnerships to support the NBAF Strategic Plan and National Biodefense Strategy.
- NBAF Biologics Development Module ($2,300,000). ARS will:
  - Create dedicated space for the early stage development of veterinary medical countermeasures and enable their transfer to commercial partners for full development.
  - Accelerate the development of platform technologies and medical countermeasures through the early development stage to a development ready.
  - Produce master seeds and cells for viral vaccine production.
  - Produce recombinant proteins, monoclonal antibodies, and diagnostic reagents to support the development of point-of-care diagnostics.
  - Support biologics development activities including process development and scale up.

Crop Protection

(6) An increase of $13,077,000 and 51 staff years for Crop Protection research ($223,267,000 and 864 staff years available in 2021).

ARS' Crop Protection research program is directed to protect crops from insect and disease loss through research 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. The program's research priorities include: identification of genes that convey virulence traits in pathogens and pests; factors that modulate infectivity, gene functions, and mechanisms; genetic profiles that provide specified levels of disease and insect resistance under field conditions; and mechanisms that reduce 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 theecology, 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 and to address quarantine issues.

Continuing Crop Protection base funding is essential for ARS to carry out its mission and responsibilities. Base funding supports ARS' program goals of protecting our Nation's crops fromarthropods, plant pathogens, nematodes, and weeds; and developing economical alternatives to methyl bromide. In addition to the activities and functions specifically described in the budget request, current year and budget year base

funds will be used to carry out activities and functionsconsistent with the full range of authorities and activities delegated to the agency. ARS' Crop Protection research program is carried out at numerous locations where agency scientists frequently collaborate with researchers from other Federal/State governments, academia,and private industry. The research supports many of USDA's Strategic Goals.

The funding change is requested for the following items:

A) An increase of $2,627,000 which includes $1,789,000 for pay inflation and $838,000 for FERS.

This increase will support a 2.7% Cost of Living pay increases for civilian employees, and a 1.1% increase to cover the expenses for the mandated increase of USDA's contribution to FERS.

Funding for pay and retirement benefit costs is critical for recruiting and retaining top level scientists and staff, conducting viable research programs, and carrying out ARS' mission. Elimination of the pay and retirement benefit costs would require ARS to absorb these costs and reduce planned hiring levels, eroding USDA's ability to meet key Administration priorities..

B) The President's FY 2022 Budget includes a total of $99,000,000 for Clean Energy of which $500,000 is for ARS' Crop Protection Program.

President Joe Biden on January 27, 2021 signed the "Executive Order on Tackling the Climate Crisis at Home and Abroad" which ordered federal agencies to develop clean energy technologies and accelerate clean energy generation projects that stimulates clean energy industries and benefits rural economies. The change to clean energy, and away from fossil-based energy, works by producing power without the negative environmental impacts such as greenhouse gases, like carbon dioxide and methane. And is generated from renewable, zero emission sources that do not pollute the atmosphere, as well as energy saved by energy efficiency measures. The various sources of clean energy are wind, solar, tidal, geothermal, nuclear, hydrogen, and agriculturally based, renewable biomass feedstocks. The need for clean energy is multi-purposed: 1. it's important for future generations, as clean energy sources are inexhaustible and adapt well to natural cycles and do not emit greenhouse gases. 2. Clean Energy gives local economies an advantage by reducing the cycle of economic losses from a dependence on fossil fuels, to relying on locally produced renewable energy sources found everywhere and readily available for ensuring energy sustainability. 3. Clean Energy is becoming more affordable, with costs trending at a declining rate and becoming more competitive with natural gas, coal, and oil. And 4. Clean Energy is a benefit to local economies due to creating locally produced new jobs in the generation of energy. But research and development must happen faster to make clean energy solutions viable. Therefore, although, clean energy already makes good business sense, fully realizing its potential, however, requires further innovation to optimize technologies and system integration. A robust new research and development effort would strengthen and ensure global leadership of the American agriculture industry as well as creating new initiatives for rural development through generation of Bioenergy.

Means to Achieve Change

- Biowaste-stream to Bioenergy ($500,000). ARS will:
  - Use existing low-value agricultural waste products to create a renewable flex-use biomethane gas or synthesis gas (a mixture of methane, hydrogen, and carbon oxides).

C) The President's FY 2022 Budget includes a total of $92,000,000 for Climate Science of which $9,950,000 is for ARS' Crop Protection Program.

The urgency of the global climate crisis is growing. Nearly every aspect of the nation's agricultural enterprise is increasingly called on to contribute to climate change mitigation by reducing GHG emissions, sequestering carbon (C) to reduce atmospheric carbon dioxide (CO_2), and developing agriculturally based approaches for generating energy as alternatives to fossil fuels. Agriculture is also faced with adapting quickly to unprecedented climate changes and weather extremes with minimal interruptions in production. These enormous challenges call for innovative research supported by bold, trans-disciplinary collaborations. USDA-ARS has research projects and scientific expertise that

address many topics related to climate change mitigation and adaptation. This existing infrastructure positions ARS to enable these advancements by establishing new research efforts and collaborations described below to support agriculture's response to the climate crisis.

Means to Achieve Change

- Mitigate climate change in crop production to develop crops with reduced greenhouse gas emissions and increased capacity for carbon banking ($1,000,000). ARS will:
  - Improve the capture and storage of carbon in woody, perennial, and cover crops.
  - Develop carbon monitoring, measuring, and storage technologies in both above- and below-ground agricultural production.
- Protect pollinators from the damages of climate change ($700,000). ARS will:
  - Develop methods for bee population modeling and new strategies for protecting bees.
- Understand climate change effects on the invasion biology of emerging and invasive pests ($2,750,000). ARS will:
  - Evaluate the unpredictability in weather patterns associated with early seasonal warmth and increased rainfall or drought to see how they affect pest populations, their movement in the environment, and their impact on crops and natural ecosystems.
  - Determine how the competition between a crop and weeds, pests, and pathogens changes with the environment to minimize the likelihood that invasive species gain advantage due to their greater ability to adapt to new hosts and environments caused by climate change.
- Rapid response research infrastructure to manage pests, pathogens, and weeds in a changing environment ($3,000,000). ARS will:
  - Develop innovative solutions to monitor, rapidly and accurately detect, and predict potential new habitats of pathogens, pests and weeds.
  - Evaluate the potential of innovative technologies to detect pests, such as plant-embedded sensors developed by DARPA in the Advanced Plant Biotechnologies program, or Artificial Intelligence/Machine Learning facilitated systems and canines for rapid pathogen sensing and identification.
  - Apply biotechnological solutions to implement resistance to pests in breeding programs.
- Develop effective tools to manage pests, pathogens, and weeds in a changing environment. ($2,500,000). ARS will:
  - Develop an understanding of how climate change affects competition that is predicted to intensify between weeds and crops with increasing CO_2.
  - Determine how pathogen abundance and distribution will change with increasing variation in temperatures.
  - Evaluate the impacts of seasonal weather pattern changes on the movement of insects in crop fields and forest systems.

Human Nutrition

(7) An increase of $960,000 and no staff year increase for Human Nutrition research ($99,144,000 and 316 staff years available in 2021).

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 primary public health concerns in the U.S. Excessive consumption has become the primary nutrition problem in the American population. This is reflected by increased emphasis onprevention of obesity from basic science through intervention studies to assessments of large populations. The agency's research program also actively studies bioactive components of foods that have no known requirements but have health-promoting qualities. Four specific areas of research are emphasized: nutrition monitoring; the scientific basis for dietary recommendations; prevention of obesity and related diseases; and life stage nutrition and metabolism, in order to better define the role of nutrition in pregnancy and growth of children, and for healthier aging.

Continuing Human Nutrition base funding is essential for ARS to carry out its mission and responsibilities. Base funding supports ARS' program goal of enabling Americas to make health promoting, science-based dietary choices. This includes: determining food consumption and dietary patterns of Americans; updating U.S. food composition data; enhancing the health promoting quality of the food supply; developing and evaluating strategies to prevent obesity andrelated diseases; and understanding the mechanisms by which nutrition promotes healthy development. In addition to the activities and functions specifically described in the budget request, current year and budget year base funds will be used to carry out activities and functions consistent with the full range of authorities and activities delegated to the agency. ARS' Human Nutrition research program is carried out at numerous locations where agency scientists frequently collaborate with researchers from other Federal/State governments, academia,and private industry. The research supports many of USDA's Strategic Goals.

The funding change is requested for the following items:

A) An increase of $960,000 which includes $653,000 for pay inflation and $307,000 for FERS.

This increase will support a 2.7% Cost of Living pay increases for civilian employees, and a 1.1% increase to cover the expenses for the mandated increase of USDA's contribution to FERS.

Funding for pay and retirement benefit costs is critical for recruiting and retaining top level scientists and staff, conducting viable research programs, and carrying out ARS' mission. Elimination of the pay and retirement benefit costs would require ARS to absorb these costs and reduce planned hiring levels, eroding USDA's ability to meet key Administration priorities.

Environmental Stewardship

(8) An increase of $61,303,000 and 219 staff years increase for Environmental Stewardship research ($251,675,000 and 1,185 staff years available in 2021).

ARS' Environmental Stewardship research program emphasis is on developing technologies and systems that support sustainable production and enhance the Nation's vast renewable natural resource base. The agency 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' research also focuses on 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 strategiesfor enhancing the health and productivity of soils, including developing predictive tools to assess the sustainability of alternative land management practices. Finding mechanisms to aid agriculture in adapting to changes in atmospheric composition and climatic variations is also an important component of this program. ARS' range and grazing land research objectives include the conservation and restoration of the Nation's range land and pasture ecosystems and agroecosystems through improved management of fire, invasive weeds, grazing, global change, and other agents of ecological change. The agency is currently developing improved grass and forage legume germplasm for livestock, conservation, bioenergy, and bioproduct systems

as well asgrazing-based livestock systems that reduce risk and increase profitability. In addition, ARS is developing whole system management strategies to reduce production costs and risks.

Continuing Environmental Stewardship base funding is essential for ARS to carry out its mission and responsibilities. Base funding supports ARS program goals of providing integrated, effective, and safe water resources; improving the quality of atmosphere and soil resources and understanding the effects of climate change; effectively and safely managing the use of manure andother industrial byproducts that maximize their potential benefits while protecting the environmentand human and animal health; and developing and transferring economically viable and environmentally sustainable production and conservation practices, technologies, plant materials, and integrated management strategies that conserve and enhance the Nation's natural resources. Inaddition to the activities and functions specifically described in the budget request, current year and budget year base funds will be used to carry out activities and functions consistent with the fullrange of authorities and activities delegated to the agency. ARS' Environmental Stewardship research program is carried out at numerous locations whereagency scientists frequently collaborate with researchers from other Federal/State governments,academia, and private industry. The research supports many of USDA's Strategic Goals.

The funding change is requested for the following items:

A) An increase of $3,603,000 which includes $2,452,000 for pay inflation and $1,151,000 for FERS.

This increase will support a 2.7% Cost of Living pay increases for civilian employees, and a 1.1% increase to cover the expenses for the mandated increase of USDA's contribution to FERS.

Funding for pay and retirement benefit costs is critical for recruiting and retaining top level scientists and staff, conducting viable research programs, and carrying out ARS' mission. Elimination of the pay and retirement benefit costs would require ARS to absorb these costs and reduce planned hiring levels, eroding USDA's ability to meet key Administration priorities.

B) The President's FY 2022 Budget includes a total of $99,000,000 for Clean Energy for which $10,200,000 is for ARS' Environmental Stewardship Program.

President Joe Biden on January 27, 2021 signed the "Executive Order on Tackling the Climate Crisis at Home and Abroad" which ordered federal agencies to develop clean energy technologies and accelerate clean energy generation projects that stimulates clean energy industries and benefits rural economies. The change to clean energy, and away from fossil-based energy, works by producing power without the negative environmental impacts such as greenhouse gases, like carbon dioxide and methane. And is generated from renewable, zero emission sources that do not pollute the atmosphere, as well as energy saved by energy efficiency measures. The various sources of clean energy are wind, solar, tidal, geothermal, nuclear, hydrogen, and agriculturally based, renewable biomass feedstocks. The need for clean energy is multi-purposed: 1. it's important for future generations, as clean energy sources are inexhaustible and adapt well to natural cycles and do not emit greenhouse gases. 2. Clean Energy gives local economies an advantage by reducing the cycle of economic losses from a dependence on fossil fuels, to relying on locally produced renewable energy sources found everywhere and readily available for ensuring energy sustainability. 3. Clean Energy is becoming more affordable, with costs trending at a declining rate and becoming more competitive with natural gas, coal, and oil. And 4. Clean Energy is a benefit to local economies due to creating locally produced new jobs in the generation of energy. But research and development must happen faster to make clean energy solutions viable. Therefore, although, clean energy already makes good business sense, fully realizing its potential, however, requires further innovation to optimize technologies and system integration.

Means to Achieve Change

- Clean Energy Feedstocks ($10,200,000). ARS will:
  - Determine through innovative cellulosic feedstocks and cropping systems for the U.S. that overcome current barriers to clean energy bioconversion, including increasing biomass per acre

for non-crop plants and crop residues, reducing inputs required for feedstock production, and improving soil health and other ecosystems services.

C) The President's FY 2022 Budget includes a total of $5,000,000 for Climate Hubs.

The urgency of the global climate crisis is growing, as is the need for experts and new career scientists who can provide tools to the agricultural community to develop and implement climate-smart production systems. The USDA-ARS climate hubs have been successful, but demand to ensure ARS research and engagement extends across all Climate Hubs, including those led by the Forest Service, outpaces what can be accomplished by current staff. A strategic approach to address these needs is to use the USDA-ARS Climate Hub Fellows program to attract early career experts in needed domains. The fellows nature of the program will also provide strategic, on-the-ground expert training to the needed Civilian Climate Corps. Ultimately, USDA ARS Fellows will be exemplary candidates for jobs in the agricultural sector, industry, academia, and NGOs, to support the pressing need for experts to address climate change impacts on agriculture and society.

Means to Achieve Change

- Enhancing Climate Hub Impact by establishing a vital Fellowship Program that actively supports climate hub research, communication, and impact and that integrates with the establishment of a highly skilled Civilian Climate Corps ($5,000,000). ARS will:
  - Establish a Fellows program for the Climate Hubs that supports a total of nineteen fellows positioned across current and proposed new Climate Hub locations to expand and enhance each Hub's research and communication capacity. Fellows will work at individual Hubs but be coordinated across the entire Hub network.

D) The President's FY 2022 Budget includes a total of $92,000,000 for Climate Science of which $42,500,000 is for ARS' Environmental Stewardship Program.

The urgency of the global climate crisis is growing. Nearly every aspect of the nation's agricultural enterprise is increasingly called on to contribute to climate change mitigation by reducing GHG emissions, sequestering carbon (C) to reduce atmospheric carbon dioxide (CO_2), and developing agriculturally based approaches for generating energy as alternatives to fossil fuels. Agriculture is also faced with adapting quickly to unprecedented climate changes and weather extremes with minimal interruptions in production. These enormous challenges call for innovative research supported by bold, trans-disciplinary collaborations. USDA-ARS has research projects and scientific expertise that address many topics related to climate change mitigation and adaptation. This existing infrastructure positions ARS to enable these advancements by establishing new research efforts and collaborations described below to support agriculture's response to the climate crisis.

Means to Achieve Change

- Establish the USDA ARS Comprehensive Climate Change "center of excellence" ($6,900,000). ARS will:
  - Create an ARS center of excellence focused on climate change adaptation and mitigation modeling, data management and tool development to strengthen research across ARS and regional engagement of the Climate Hubs.
  - Catalyze a data-driven and precision agriculture focus on climate change adaptation and mitigation.
  - Develop approaches to support and enhance precision agriculture efforts already underway at ARS as well as at new precision livestock management efforts at other locations.
  - Increase focus on climate-smart practices, data, tools and technologies that are relevant both

regionally and nationally, and that can lead to GHG mitigation, producer participation in carbon and ecosystem markets, resilience to weather extremes, and adaptation to future climate.

- Establish ARS Advanced Climate Change Research Teams at each core ARS Climate Hub location to support regionally relevant locations and expand Hub impact. ($15,000,000). ARS will:
  - Establish critical scientific and climate expertise at ARS sites within each region of the ARS Climate Hubs to research field-level climate change impacts.
  - Increase capacity on practices to reduce methane and other GHG emissions from beef and dairy open feedlots.
  - Assess manure as a biochar feedstock and as an agronomically viable soil additive for grazing lands.
  - Modernize the current wind and water erosion science and assessment with the most current climate science and future change scenarios to quantify how weather extremes may affect environmental quality and to incorporate risk assessment that can be used to plan response and remediation strategies.
- Enhance the LTAR Network to focus on climate change ($15,600,000). ARS will:
  - Create a coordinated climate change adaptation and mitigation focus within the LTAR network that builds on the current collaborations and common research framework to increase adoption of climate smart practices that can lead to GHG mitigation, producer participation in carbon and ecosystem markets, resilience to weather extremes, and adaptation to future climate.
  - Establish a LTAR program in California that will create a four-pronged network that includes the two primary agricultural regions of California (the Central Valley and the Imperial Valley), the extensive network of California livestock grazing rangelands, and watersheds that supply much of the water for irrigated farmland.
- Enhanced the power of the USDA ARS Climate Hub engagement with their regions ($5,000,000). ARS will:
  - Expand engagement with producers, including indigenous and underserved farmers and ranchers, across Alaska and Hawaii and Affiliated Pacific Islands by creating two new Climate hub locations.
  - Enhance Climate Hub direct activities by strategic engagement of critical needs of each regional hub.
  - Provide resources to promote and integrate climate hub programming and communication and synthesis needs.

Library and Information Services

(9) An increase of $5,278,000 and 15 staff years increase for Library and Information Services ($28,884,000) and 92 staff years available in 2021).

The National Agricultural Library (NAL) is the largest and most accessible agricultural research library in the world. It provides services directly to the staff of USDA and to the public, primarily via its web site, http://www.nal.usda.gov. NAL was created with the USDA in 1862 and was named a national library in 1962 by Congress as the "primary agricultural information resource of the United States". NAL is the premier library for collecting, managing, and disseminating agricultural knowledge. The Library is the repository of our Nation's agricultural heritage, the provider of world class information, and a wellspring for generating new fundamental knowledge and advancing scientific discovery. It is a priceless national resource that, through its services, programs, information products, and web-based tools and technologies, serves anyone who needs agricultural information. The Library's vision is "advancing access to global information for agriculture."

Continuing Library and Information Services base funding is essential for NAL to carry out its mission and responsibilities. Base funding supports ARS' goal of ensuring the provision and access of agricultural information for USDA, the Nation, and the global agricultural community. This includes: delivering unified, easy to use, convenient 24/7 digital services; improving information delivery; extending AGRICultural OnLine Access (AGRICOLA); conserving rare and at-risk items; extending partnerships with USDA and other Federal agencies to develop targeted information services; and marketing NAL services to specific audiences. In addition to the activities and functions specifically described in the budget request, current year and budget year base funds will be used to carry out activities and functions consistent with the full range of authorities and activities delegated to the agency.

The funding change is requested for the following item:

A) An increase of $280,000 which includes $190,000 for pay inflation and $90,000 for FERS.

This increase will support a 2.7% Cost of Living pay increases for civilian employees, and a 1.1% increase to cover the expenses for the mandated increase of USDA's contribution to FERS.

Funding for pay and retirement benefit costs is critical for recruiting and retaining top level scientists and staff, conducting viable research programs, and carrying out ARS' mission. Elimination of the pay and retirement benefit costs would require ARS to absorb these costs and reduce planned hiring levels, eroding USDA's ability to meet key Administration priorities.

B) The President's FY 2022 Budget includes a total of $99,000,000 for Clean Energy of which $998,000 is for Library and Information Services.

President Joe Biden on January 27, 2021 signed the "Executive Order on Tackling the Climate Crisis at Home and Abroad" which ordered federal agencies to develop clean energy technologies and accelerate clean energy generation projects that stimulates clean energy industries and benefits rural economies. The change to clean energy, and away from fossil-based energy, works by producing power without the negative environmental impacts such as greenhouse gases, like carbon dioxide and methane. And is generated from renewable, zero emission sources that do not pollute the atmosphere, as well as energy saved by energy efficiency measures. The various sources of clean energy are wind, solar, tidal, geothermal, nuclear, hydrogen, and agriculturally based, renewable biomass feedstocks. The need for clean energy is multi-purposed: 1. it's important for future generations, as clean energy sources are inexhaustible and adapt well to natural cycles and do not emit greenhouse gases. 2. Clean Energy gives local economies an advantage by reducing the cycle of economic losses from a dependence on fossil fuels, to relying on locally produced renewable energy sources found everywhere and readily available for ensuring energy sustainability. 3. Clean Energy is becoming more affordable, with costs trending at a declining rate and becoming more competitive with natural gas, coal, and oil. And 4. Clean Energy is a benefit to local economies due to creating locally produced new jobs in the generation of energy. But research and development must happen faster to make clean energy solutions viable. Therefore, although, clean energy already makes good business sense, fully realizing its potential, however, requires further innovation to optimize technologies and system integration.

Means to Achieve Change

- Sustainable Clean Energy ($998,000). ARS will:
  - Enhance NAL capacity for Life Cycle-Assessment (LCA) and knowledge management support.

C) The President's FY 2022 Budget includes a total of $92,000,000 for Climate Science of which $4,000,000 is for Library and Information Services.

The urgency of the global climate crisis is growing. Nearly every aspect of the nation's agricultural enterprise is increasingly called on to contribute to climate change mitigation by

reducing GHG emissions, sequestering carbon (C) to reduce atmospheric carbon dioxide (CO_2), and developing agriculturally based approaches for generating energy as alternatives to fossil fuels. Agriculture is also faced with adapting quickly to unprecedented climate changes and weather extremes with minimal interruptions in production. These enormous challenges call for innovative research supported by bold, trans-disciplinary collaborations. USDA-ARS has research projects and scientific expertise that address many topics related to climate change mitigation and adaptation. This existing infrastructure positions ARS to enable these advancements by establishing new research efforts and collaborations described below to support agriculture's response to the climate crisis.

Means to Achieve Change

- National Agricultural Library Support for Climate Science Research ($4,000,000). ARS will:
  - Build capacity to improve Life-Cycle Assessment (LCA) in the agricultural economy and lead cross-government efforts to standardize LCA methods and data.
  - Align ARS research capacity with LCA assessment methods to support development of Environmental Product Declarations (EPDs).
  - Enhance existing NAL platforms to provide preservation and access to digital objects (i.e., data sets, literature, models, etc., and their associated metadata) to support climate research, including the Federal LCA program.
  - Support ARS scientists and USDA decision makers with systematic reviews and meta-analyses that provide deep insight and synthesis of scientific literature and other resources in support of climate research.

National Bio and Agro-Defense Facility

(10) An increase of $37,649,000 and no staff year increase for the National Bio and Agro-Defense Facility ($81,056,000 and 82 staff years available in 2021).

The funding change is requested for the following items:

A) An increase of $249,000 which includes $170,000 for pay inflation and $79,000 for FERS.

This increase will support a 2.7% Cost of Living pay increases for civilian employees, and a 1.1% increase to cover the expenses for the mandated increase of USDA's contribution to FERS.

Funding for pay and retirement benefit costs is critical for recruiting and retaining top level scientists and staff, conducting viable research programs, and carrying out ARS' mission. Elimination of the pay and retirement benefit costs would require ARS to absorb these costs and reduce planned hiring levels, eroding USDA's ability to meet key Administration priorities.

B) An increase of $37,400,000 for the National Bio and Agro-Defense Facility--Operations and Maintenance.

The new National Bio and Agro-Defense Facility (NBAF) in Manhattan, Kansas will replace the outdated and inadequate Plum Island Animal Diseases Center (PIADC) in New York. NBAF will be a state-of-the-art biocontainment facility for the study of high consequence foreign, emerging, and zoonotic animal diseases that pose a threat to U.S. animal agriculture and to public health. NBAF will include the first Biosafety Level-4 biocontainment facility for large livestock in the United States.

ARS is working closely with the Department of Homeland Security and APHIS to ensure a smooth transition of operations from PIADC to NBAF. Once the transition is complete, both ARS and APHIS will share responsibility for NBAF's operations.

Means to Achieve Change

- NBAF Operations and Maintenance. ($37,400,000). ARS will use additional funds for increased costs associated with:
  - Utility costs associated with full operation of the facility.
  - Contracts and Services associated with facility operations.
  - Building modifications and Specialized equipment.

Advanced Research Projects Agency for Climate (ARPA-C)

(11) An increase of $95,000,000 and no staff years for Advanced Research Projects Agency - Climate.

The U.S. Department of Energy's Advanced Research Projects Agency-Climate (ARPA-C) will invest in climate-related innovations necessary to enable adaptation, increase resilience and achieve net zero non-energy emissions by 2050. ARPA-C's mission will be to harness innovation to solve the global climate crisis while enhancing the economic and energy security of the United States through development of new technologies that will lead to economic opportunities for American workers and businesses. ARPA-C will identify and promote revolutionary advances in climate-related applied sciences, translating scientific discoveries and cutting-edge innovations into products, services, and systems that the market, government agencies, and other organizations can adopt. It will also accelerate transformational technological advances in areas where industry by itself is not likely to invest due to technical and financial uncertainty. The role of ARPA-C is not to duplicate the basic research and applied programs within DOE and the other Federal research and development (R&D) enterprises, but to focus on R&D with technology applications that can be meaningfully advanced with a targeted investment over a defined period of time. The Climate Innovation Working Group as part of the National Climate Task Force, co-chaired by the White House Office of Domestic Climate Policy, Office of Science of Technology and Policy, and Office of Management and Budget, will spur initial coordination among climate-related technology agencies. ARPA-C will enable the U.S. to seize a once-in-a-generation opportunity to create and deploy technologies that will transform the U.S. and Global economies, and to capture their value for the benefit of the American people.

Repair and Maintenance

(12) No change in Repairs and Maintenance of ARS' Laboratories and Facilities ($20,144,000 available in 2021).

ARS' Repair and Maintenance (R&M) program is intended to improve existing facilities, that is, primarily for the protection of life and property, and implementation of mandated regulations including energy conservation, compliance with building codes, and more effective space utilization. Examples of R&M expenditures include: HVAC/electrical/plumbing component repair and maintenance; roof replacement; site utility system replacement/maintenance/repairs; protection installation/repair; road paving; correction of site damage; etc. There is currently a backlog of R&M needs. The funding level only addresses ARS' highest priorities.

PROPOSED LEGISLATION

Annual Appropriations for Salaries and Expenses

ARS proposes to amend the agency's limitation used for two buildings to be constructed at a cost not to exceed $3,000,000 each in the annual appropriations for the Salaries and Expenses account. ARS proposes to increase the number of buildings per year from 2 to 4 and dollar limitation on the authority from $3,000,00 to $5,000,000.

This small building authority limitation provides the agency flexibility to replace worn out, decrepit facilities with new, more efficient same size/purpose facilities. This authority is used only where repair of existing structures/systems does not make sense and is not cost effective. In recent years, construction and building costs have increased substantially. The current limitations are no longer sufficient.

The goal is to provide the most cost-effective program for the construction, alteration, and repair of ARS' buildings. With the proposed change to the small building authority limitation, ARS will provide significant cost savings. For example, under the current limitations on small buildings, ARS recently upgraded its Clay Center swine facilities by constructing four small buildings. Only three larger buildings would have been constructed if the proposed increased limitations or the new authority had been in effect. The construction of fewer buildings, therefore less infrastructure (i.e., less mechanical/electrical/plumbing systems) with reduced operating and maintenance costs, results in significant cost savings to the government. Consolidating facilities also has the added advantage of reducing the footprint of Federal facilities.

Change in Funding Due to Annual Appropriations for Salaries and Expenses (thousands of dollars)

Item	2022	2021	2022	10 Year Total
Budget Authority	-$0	-$0	-$0	-$0
Outlays	-$0	-$0	-$0	-$0

GEOGRAPHIC BREAKDOWN OF OBLIGATIONS AND FTE

Geographic Breakdown of Obligations and FTE (thousands of dollars)

State/Territory/Country	2019 Actual	FTE	2020 Actual	FTE	2021 Enacted	FTE	2022 Budget	FTE
Alabama								
Auburn……	8,774	37	14,522	34	20,447	46	20,575	46
Total……	8,774	37	14,522	34	20,447	46	20,575	46
Arizona								
Maricopa…….	9,743	63	10,644	56	11,001	56	17,232	80
Tucson…….	6,791	47	6,641	45	6,485	45	7,510	48
Total……..…..….	16,534	110	17,285	101	17,486	101	24,742	128
Arkansas								
Booneville……..……..	4,448	20	4,814	22	3,953	22	4,014	22
Fayetteville…….……	2,180	12	2,181	14	1,882	14	3,721	17
Jonesboro……..……..	1,387	8	1,212	8	1,435	8	1,457	8
Little Rock……..……	7,754	-	8,618	-	9,999	3	10,007	3
Stuttgart……...……	7,544	55	7,785	52	7,972	52	9,917	61
Total……...…….	23,313	95	24,610	96	25,241	99	29,116	111
California								
Albany…….……	41,184	188	41,897	171	40,077	174	53,912	219
Davis……...	12,590	73	13,876	72	16,904	72	21,469	93
Parlier……..	11,684	86	11,382	80	12,779	83	13,010	83
Riverside…….	5,919	27	5,681	26	5,908	26	5,981	26
Salinas…….	6,695	44	7,186	45	7,100	45	7,675	48
Total……	78,072	418	80,022	394	82,768	400	102,041	469
Colorado								
Akron……..	1,550	13	1,663	12	1,992	12	2,025	12
Fort Collins…….	21,087	130	21,975	122	21,035	125	26,018	140
Total……	22,637	143	23,638	134	23,027	137	28,043	152
Delaware								
Newark……	1,913	18	1,940	16	2,024	16	2,518	19
Total……	1,913	18	1,940	16	2,024	16	2,518	19
District of Columbia								
National Arboretum……	12,987	54	12,807	49	14,215	49	14,351	49
Headquarters Federal Administration[5]....……..	145,609	595	149,480	549	165,276	1,179	167,931	1,197
Total……	158,596	649	162,287	598	179,491	1,228	182,282	1,249
Florida								
Canal Point……..	2,853	25	3,037	26	3,854	26	3,926	26
Fort Lauderdale……...	2,429	30	2,388	27	2,474	27	2,773	27
Fort Pierce……...	16,970	100	19,595	93	17,460	93	22,669	108
Gainesville……..	11,973	79	11,481	76	12,141	76	12,532	76
Miami……..	5,067	25	5,061	25	5,962	25	6.032	25
Total……	39,292	259	41,562	247	41,891	247	47,932	262
Georgia								
Athens…….	27,341	132	29,209	127	32,165	127	37,018	151

[5] Federal Administration contains supplemental funding for kelp and seagrass in FY 2021 Enacted.

State/Territory/Country	2019 Actual	FTE	2020 Actual	FTE	2021 Enacted	FTE	2022 Budget	FTE
Byron……..	3,264	35	3,433	28	5,288	31	5,374	31
Dawson……...	3,393	23	3,172	22	5,051	25	5,121	25
Griffin…….	3,005	15	2,465	13	2,435	13	2,471	13
Tifton……..	9,943	67	10,326	66	10,741	66	16,099	90
Total……	46,946	272	48,605	256	55,680	262	66,083	310
Hawaii								
Hilo…….	11,405	50	12,431	49	13,478	52	15,086	52
Total……	11,405	50	12,431	49	13,478	52	15,086	52
Idaho								
Aberdeen……	6,686	38	7,030	33	7,931	33	8,923	36
Boise……...	2,788	29	2,821	27	2,902	27	4,237	33
Dubois…….	1,915	10	1,997	10	2,605	13	2,641	13
Kimberly…….	5,317	34	5,445	36	5,637	36	5,737	36
Total……	16,706	111	17,293	106	19,075	109	21,538	118
Illinois								
Peoria……..	31,030	170	32,430	154	33,274	154	62,277	262
Urbana…….	5,672	26	5,565	27	5,615	27	6,815	33
Total……	36,702	196	37,995	181	38,889	181	69,092	295
Indiana								
West Lafayette……	7,380	50	7,560	52	7,851	52	9,571	58
Total……	7,380	50	7,560	52	7,851	52	9,571	58
Iowa								
Ames……...	54,782	316	55,590	304	57,441	304	62,156	321
Total……	54,782	316	55,590	304	57,441	304	62,156	321
Kansas								
Manhattan……...	61,614	94	83,193	146	114,650	176	161,714	206
Total……	61,614	94	83,193	146	114,650	176	161,714	206
Kentucky								
Bowling Green……	2,534	14	2,662	14	2,646	14	2,685	14
Lexington……	2,547	11	2,669	10	3,625	10	3,653	10
Total……	5,081	25	5,331	24	6,271	24	6,338	24
Louisiana								
Baton Rouge……...	2,756	23	3,079	22	3,117	22	3,448	22
Houma……	4,640	42	4,881	39	5,359	39	5,918	42
New Orleans…….....	20,040	104	19,612	94	21,854	94	37,040	151
Total……	27,436	169	27,572	155	30,330	155	46,406	215
Maine								
Orono……..……	2,249	15	4,802	16	5,876	19	6,379	22
Total……	2,249	15	4,802	16	5,876	19	6,379	22
Maryland								
Beltsville…….	116,810	526	119,064	491	123,880	497	134,352	532
National Ag Library……	25,860	56	29,551	62	27,839	62	28,909	63
Frederick…….	5,662	30	5,945	26	6,493	26	7,240	29
Total……	148,332	612	154,560	579	158,212	585	170,501	624
Massachusetts								
Boston…….	16,241	8	16,341	7	15,690	7	15,709	7
Total……	16,241	8	16,341	7	15,690	7	15,709	7
Michigan								

State/Territory/Country	2019 Actual	FTE	2020 Actual	FTE	2021 Enacted	FTE	2022 Budget	FTE
East Lansing……	1,881	8	1,616	7	2,137	10	2,165	10
Total……	1,881	8	1,616	7	2,137	10	2,165	10
Minnesota								
Morris…….	2,557	17	2,571	15	3,003	18	3,863	21
St. Paul……	8,852	44	10,384	44	11,202	44	12,134	48
Total……	11,409	61	12,955	59	14,205	62	15,997	69
Mississippi								
Mississippi State…….	13,310	59	15,209	54	18,290	60	19,357	72
Oxford…….	15,044	69	14,796	55	15,446	55	16,319	58
Poplarville……...	5,600	26	5,828	27	5,943	27	6,018	27
Stoneville……	47,800	209	46,261	183	53,787	186	54,304	186
Total……	81,754	363	82,094	319	93,466	328	95,998	343
Missouri								
Columbia…….	8,957	50	9,877	49	11,440	52	12,485	55
Total……	8,957	50	9,877	49	11,440	52	12,485	55
Montana								
Miles City……...	4,814	23	3,575	23	4,685	23	4,749	23
Sidney…….	4,768	35	5,131	36	5,315	36	9,330	42
Total……	9,582	58	8,706	59	10,000	59	14,079	65
Nebraska								
Clay Center…….	24,790	104	23,150	104	23,805	104	27,694	119
Lincoln……	6,115	49	6,856	47	7,861	47	19,647	95
Total……	30,905	153	30,006	151	31,666	151	47,341	214
Nevada								
Reno……	2,368	14	2,363	11	2,298	11	2,329	11
Total……	2,368	14	2,363	11	2,298	11	2,329	11
New Mexico								
Las Cruces……..	7,380	45	7,788	40	7,579	40	11,245	55
Total……	7,380	45	7,788	40	7,579	40	11,245	55
New York								
Geneva……	4,178	26	4,239	24	5,726	27	5,801	27
Greenport/Orient Point……...	8,111	19	8,922	18	5,981	18	6.031	18
Ithaca……..	21,439	51	21,889	49	12,927	49	13,738	52
Total……	33,728	96	35,050	91	24,634	94	25,570	97
North Carolina								
Raleigh……	10,831	77	12,496	76	12,307	76	12,743	76
Total……	10,831	77	12,496	76	12,307	76	12,743	76
North Dakota								
Fargo……...	19,092	87	24,385	84	29,360	99	30,085	102
Grand Forks……	8,977	35	9,108	30	9,758	30	9,841	30
Mandan……...	4,202	31	4,581	32	5,997	38	6,823	41
Total……	32,271	153	38,074	146	45,115	167	46,749	173
Ohio								
Columbus……	1,845	14	2,031	14	1,924	14	2,683	17
Wooster……...	8,032	39	9,119	39	8,012	39	8,120	39
Total……	9,877	53	11,150	53	9,936	53	10,803	56
Oklahoma								
El Reno……...	7,053	49	6,629	40	6,990	40	10,656	55

State/Territory/Country	2019 Actual	FTE	2020 Actual	FTE	2021 Enacted	FTE	2022 Budget	FTE
Stillwater……	4,641	27	4,534	25	4,745	28	5,453	28
Woodward……...	2,187	16	9,576	14	2,238	14	2,277	14
Total……	13,881	92	20,739	79	13,973	82	18,386	97
Oregon								
Burns……...	3,940	21	4,049	22	5,339	22	5,400	22
Corvallis……..	16,812	87	22,929	82	21,748	88	22,893	94
Pendleton……	3,546	13	3,337	12	5,066	15	5,108	15
Total……	24,298	121	30,315	116	32,153	125	33,401	131
Pennsylvania								
University Park……...	7,211	34	6,629	32	6,720	32	7,529	35
Wyndmoor……..	30,731	134	30,574	118	33,143	118	42,321	148
Total……	37,942	168	37,203	150	39,863	150	49,850	183
South Carolina								
Charleston……...	9,079	36	8,640	29	9,855	32	10,843	38
Florence……..	3,902	27	4,180	22	4,053	22	4,115	22
Total……	12,981	63	12,820	51	13,908	54	14,958	60
South Dakota								
Brookings……	2,397	17	3,054	18	3,353	18	3,853	21
Total……	2,397	17	3,054	18	3,353	18	3,853	21
Texas								
Bushland…….	7,058	37	6,824	32	7,390	32	8,019	35
College Station[6]..……	14,044	73	12,980	67	32,237	70	32.432	70
Houston……...	14,991	6	19,113	6	15,997	9	16,022	9
Kerrville……..	6,355	31	10,633	30	11,955	30	12,488	30
Lubbock……..	9,258	75	9,324	64	10,150	64	10,508	64
Temple……	4,490	28	4,403	30	4,701	30	5,504	33
Total……	56,196	250	63,277	229	82,430	235	84,973	241
Utah								
Logan……..	9,299	69	9,728	61	10,322	61	10,942	64
Total……	9,299	69	9,728	61	10,322	61	10,942	64
Vermont								
Burlington……..…..	-	-	-	-	9,900	6	9,917	6
Total……	-	-	-	-	9,900	6	9,917	6
Washington								
Pullman……...……	20,722	114	22,946	103	24,465	103	29,634	115
Wapato……	5,846	45	6,664	45	5,933	45	7,408	54
Wenatchee……...	2,323	19	3,209	17	3,403	17	3,450	17
Total……	28,891	178	32,819	165	33,801	165	40,492	186
West Virginia								
Kearneysville……..	7,582	47	9,994	39	9,393	39	9,951	42
Leetown……..	7,276	32	8,556	29	9,441	32	9,980	35
Total……	14,858	79	18,550	68	18,834	71	19,931	77
Wisconsin								
Madison……..	20,188	99	21,339	98	22,834	101	25,545	110
Total……	20,188	99	21,339	98	22,834	101	25,545	110

[6] College Station, Texas contains mandatory funding for human nutrition in FY 2021 Enacted and FY 2022 PB.

State/Territory/Country	2019 Actual	FTE	2020 Actual	FTE	2021 Enacted	FTE	2022 Budget	FTE
Puerto Rico								
Mayaguez……	2,900	33	3,347	33	3,406	33	3,498	33
Total……	2,900	33	3,347	33	3,406	33	3,498	33
Other Countries								
France……	4,248	1	3,551	1	3,204	1	3,477	1
Total……	4,248	1	3,551	1	3,204	1	3,477	1
Extramural & Funds Administered…….	19,203	-	57,329	-	98,476	-	145,071	-
Repair & Maintenance of Facilities……	20,144	-	20,144	-	20,144	-	20,144	-
Obligations……..	1,292,374	5,948	1,423,529	5,625	1,587,202	6,405	1,869,590	7,119
Lapsing Balances……	3,494	-	2,508	-	-	-	-	-
Bal. Available, EOY……...	62,500	-	74,418	-	-	-	-	-
Total, Available……..	1,358,368	5,948	1,500,455	5,625	1,587,202	6,405	1,869,590	7,119

CLASSIFICATION BY OBJECTS

Classification by Objects (thousands of dollars)

Item No.	Item	2019 Actual	2020 Actual	2021 Enacted[7][8]	2022 Budget[7]
	Personnel Compensation:				
	Washington D.C.	$39,256	$35,871	$39,822	$40,728
	Personnel Compensation, Field	434,214	444,075	492,983	504,198
11	Total personnel compensation	473,470	479,946	532,805	544,926
12	Personal benefits	166,435	181,147	186,482	192,167
13.0	Benefits for former personnel	379	511	-	-
	Total, personnel comp. and benefits	640,284	661,605	719,287	737,093
	Other Objects:				
21.0	Travel and transportation of persons	10,245	5,320	6,043	7,232
22.0	Transportation of things	484	631	717	858
23.1	Rental payments to GSA	4,884	4,982	4,982	4,982
23.2	Rental payments to others	3,585	1,868	2,122	2,539
23.3	Communications, utilities, and misc. charges	44,176	40,214	46,352	56,564
24.0	Printing and reproduction	548	736	836	1,000
25.1	Advisory and assistance services	804	1,021	1,160	1,388
25.2	Other services from non-Federal sources	27,760	21,127	23,996	28,720
25.3	Other goods and services from Federal sources	3,492	1,562	1,774	2,123
25.4	Operation and maintenance of facilities	45,476	40,830	46,376	55,507
25.5	Research and development contracts	288,666	349,789	399,807	572,119
25.6	Medical care	240	206	234	280
25.7	Operation and maintenance of equipment	18,651	52,509	59,641	71,383
25.8	Subsistence and support of persons	8	11	13	15
26.0	Supplies and materials	85,192	93,605	106,318	127,251
31.0	Equipment	65,487	83,834	95,219	113,967
32.0	Land and Structures	22,491	29,024	32,966	39,457
41.0	Grants, subsidies, and contributions	29,902	34,654	39,361	47,110
	Total, Other Objects	652,090	761,924	867,915	1,132,497
99.9	Total, new obligations	1,292,374	1,423,529	1,587,202	1,869,590
	DHS Building Security Payments (included in 25.3).....	$175	$175	$175	$175
	Information Technology Investments:.....				
25.2	Mission Area Non-Major Investment Totals.....	23,125	36,580	45,601	44,309
	Mission Area Standard Investment Totals.....	32,968	22,808	12,008	10,860
25.3	Mission Area WCF Transfers.....	-	20,521	29,804	30,118
	Position Data:				
	Average Salary (dollars), ES Position	$185,109	$250,818	$245,683	$224,823
	Average Salary (dollars), GS Position	$74,100	$78,810	$76,835	$70,702
	Average Grade, GS Position	10.9	10.7	10.7	10.7

[7] Human Nutrition funding of $20m is reflected in the FY 2021 and FY 2022 columns.
[8] NOAA Working Group on Kelp and Seagrass funding is reflected in the FY 2021 column

STATUS OF PROGRAMS

The Agricultural Research Service (ARS) is the U.S. Department of Agriculture's chief scientific in-house research agency. Our mission is to deliver scientific solutions to national and global agricultural challenges. ARS' major research programs -- New Products/Product Quality/Value Added; Livestock/Crop Production; Food Safety; Livestock/Crop Protection; Human Nutrition; and Environmental Stewardship -- address the Department's goals and priorities. A brief summary of the agency's selected FY 2020 accomplishments and current activities, including the National Agricultural Library, are detailed below.

Program Evaluations

In FY 2020, ARS conducted retrospective reviews of its Water Availability and Watershed Management; Soil and Air; Plant Diseases; and Animal Health research programs. Overall, the programs were found to have had high impact (i.e., significant benefit or influence). The programs were evaluated by experts who represented government, private industry, customer/stakeholder groups, and nonprofits. Performance was evaluated based on the quality of the research leading to actual impact, or progress toward anticipated benefits. The panel of experts provided recommendations that ARS managers can use in making future management decisions.

New Products/Product Quality/Value Added

Current Activities

ARS' New Products/Product Quality/Value Added research program is directed toward: Improving the efficiency and reducing the cost for the conversion of agricultural products into biobased products and biofuels; developing new and improved products for domestic and foreign markets; and providing higher quality, healthy foods.

Selected Examples of Recent Progress:
COVID antiviral cotton facemasks. During the COVID-19 enforced maximal telework period ARS researchers at New Orleans, LA, in collaboration with a medical trauma wound dressing company, revealed that a jointly developed cotton nonwoven product exhibited antiviral activity. The natural compound in cotton (hydrogen peroxide) was discovered by ARS and tested by a contract company and was found to have antiviral activity based on a molecular model of SARS-CoV-2 virus. The product exhibited 99.999 percent antiviral activity after 1 hour of contact with the fabric. Nonwoven cotton will be studied with collaborators to determine its ability to inhibit COVID-19, which is caused by the current SARS-CoV-2 virus. Following testing by a secondary company to obtain a Food and Drug Administration-approved International Organization for Standardization (ISO) test for antiviral textiles, the company plans to develop a prototype for use in facemasks.

Discovery of a standard reference for wheat "falling number" quality determination. Falling number is an 80-year-old method used the world over to measure the quality of harvested wheat. There has long been a need to identify a stable reference material to standardize the precision and accuracy of machines that calculate falling numbers. ARS engineers in Beltsville, MD, determined that corn starch is an excellent material to serve as a substitute for harvested wheat because of its high precision in falling number tests, long shelf life, and low cost. Government regulatory agencies in Canada, the USDA Agricultural Marketing Service, and private grain-handling and milling companies are, for the first time, developing the acceptable limits for a worldwide standard chart, based on this standard reference, to reliably determine wheat falling number.

Livestock Production

Current Activities

ARS' Livestock Production research program is directed toward fostering an abundant, safe, nutritionally wholesome, and competitively priced supply of animal products produced in a viable, competitive, and sustainable animal agriculture sector of the U.S. economy. This is accomplished by: safeguarding and utilizing animal genetic resources, associated genetic and genomic databases, and bioinformatic tools; developing a basic understanding of food animal physiology to address priority issues related to animal production, animal well-being, and product quality and healthfulness; and developing information, best management practices, novel and innovative tools, and technologies that improve animal production systems, enhance human health, and ensure domestic food security. The research is heavily focused on the development and application of genomics technologies to increase the efficiency and product quality of beef, dairy, swine, poultry, aquaculture, and sheep systems. Areas of emphasis

include increasing the 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 and natural); and evaluating and conserving animal genetic resources.

Selected Examples of Recent Progress:
A high-quality cattle gene atlas. The goal of genomic analyses in livestock is to make sense of the genome to understand and improve important livestock traits. With modern technologies, it is possible to localize variation in traits to regions of the genome, but it can be difficult to determine the gene, and the change in the gene, responsible for the trait. For some genes where the functions are not well characterized, it can also be difficult to determine what parts of the body are involved in controlling the trait. ARS scientists in Beltsville, MD, developed a comprehensive tissue-gene atlas for cattle by integrating their own information with publicly available information on gene regions associated with traits, genes expressed by tissues, and changes in gene chromosome structure that are known to control gene function. This high-quality cattle gene atlas links these three data sources for the first time and provides an important tool for discovering the tissues, genes, and genome structure that control traits in cattle.

Release of the Delta Select strain of channel catfish. Improved catfish germplasm in aquaculture will reduce production costs and allow U.S. catfish farmers to remain competitive in the global seafood market. ARS researchers in Stoneville, MS, developed the 'Delta Select' strain of channel catfish through three generations of genetic selection, leading to a 25 percent increase in growth rate and 0.9 percent increase in carcass yield compared to the non-selected Delta Control line that originated from the same population. Approximately 90,000 head (180,000 pounds) of 2-year-old Delta Select catfish were released to industry, providing U.S. farmers access to improved catfish germplasm that will make them more efficient and profitable.

Crop Production

Current Activities

ARS' Crop Production research program focuses on developing and improving ways to reduce crop losses while protecting and ensuring a safe and affordable food supply. The program concentrates on production strategies that are environmentally friendly, safe to consumers, and compatible with sustainable and profitable crop production systems. Research activities are directed at safeguarding and utilizing plant genetic resources and their associated genetic, genomic, and bioinformatic databases that facilitate selection of varieties and/or germplasm with significantly improved traits. 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. The agency 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 provides taxonomic information on invasive species that strengthens prevention, aids in detection/identification, and increases control through tactics that restore habitats and biological diversity.

Selected Examples of Recent Progress:
Microalga as a promising nutritional supplement for honey bees. Feeding honey bees an artificial pollen substitute diet to support colony health during periods of reduced forage is a common management practice by beekeepers, but most substitute diets need improvement. Artificial diets may be deficient in essential macronutrients (proteins, lipids, prebiotic fibers), micronutrients (vitamins, minerals), and antioxidants. In an effort to improve artificial diets, ARS researchers in Baton Rouge, LA, evaluated the nutritional aspects of the microalga *Arthrospira platensis* (commonly called spirulina), finding that spirulina is rich in the essential amino acids and functional lipids commonly found in pollen. Nutritional physiology and microbiome evaluations of bees fed spirulina closely matched those of bees fed a natural pollen diet. The study results thus show that the alga has significant potential to serve as a pollen substitute or prebiotic diet additive to improve honey bee health. Results of the study were highlighted in the August 2020 edition of *American Bee Journal*. More broadly, adapting beekeeping and broader livestock management practices with microalgae feeds could contribute to achieving objectives outlined in the United Nations sustainable development goals related to food security, sustainable water management, reversal of land degradation, and halting biodiversity loss. The long-term aim of this research is to characterize and develop microalgae as a sustainable feed source for honey bees that can be augmented via biotechnology to improve bee nutrition and health.

Universal intelligent spray control system as a retrofit for conventional sprayers commercialized. An intelligent spray technology developed by ARS researchers in Wooster, OH, effectively controls pest insects and diseases with

significant reductions in pesticide waste to the environment; however, to ensure that growers use this technology economically, it must be adaptable to conventional sprayers. To address this challenge, the researchers developed a universal intelligent spray system as a retrofit unit for conventional orchard sprayers. The retrofit unit was tested in 15 commercial nurseries, fruit and nut orchards, and vineyards in California, Ohio, Oregon, South Carolina, Tennessee, Texas, and Australia. Field tests demonstrate this new technology can provide pest and disease control that is as effective as conventional spray systems while reducing spray drift by up to 87 percent and ground loss by 90 percent. In addition, pesticide use was reduced by up to 85 percent, resulting in an annual chemical cost saving of $812 per acre, depending on crop type. This cost reduction does not include reductions in labor and fuel costs. The technology was transferred to a commercial partner and a commercial product, “Intelligent Spray Control System” by Smart Guided Systems, LLC, was released to the market. Citrus, apple, grape, nursery, and pecan growers in the United States and other countries have started to upgrade their sprayers with the commercial product. The use of a new laser-guided intelligent spraying system is beneficial to the environment and saves growers money. The ability to retrofit conventional sprayers offers a sustainable and environmentally responsible approach to protecting crops.

Food Safety

Current Activities

ARS’ Food Safety research program 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 pathogenic bacteria and fungi, parasites, chemical contaminants, and plant toxins. All of ARS' research activities involve a high degree of cooperation and collaboration with USDA's Research, Education, and Economics agencies, as well as with the FSIS, APHIS, FDA, CDC, DHS, and the EPA. The agency 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, including regulatory agencies, industry, and commodity and consumer organizations in detecting, identifying, and controlling foodborne diseases that affect human health.

Selected Examples of Recent Progress:
A novel strategy for estimating *Salmonella* contamination levels in raw ground beef. *Salmonella* is a leading cause of foodborne illness worldwide. Despite the use of numerous process controls in food production industries, there has been little progress in decreasing the occurrence of *Salmonella* food poisoning over the past decade. This is in part because current testing methods indicate only the presence or absence of *Salmonella*, but they do not measure how much contamination is in a tested product. To address this need, ARS scientists in Clay Center, NE, developed a novel strategy for rapidly estimating *Salmonella* contamination levels in raw ground beef based in the same amount of time that it takes to detect *Salmonella* in enrichments using two different commercial molecular detection methods. The ability to detect high levels of *Salmonella* contamination will enable meat companies to improve their process controls and remove more highly contaminated products from the food chain. This will improve the safety of beef and decrease the incidence of human exposure to levels of *Salmonella* that cause disease.

Livestock Protection

Current Activities

ARS’ Livestock Protection research 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 through the discovery and development of diagnostics, vaccines, biotherapeutics, animal genomics applications, disease management systems, animal disease models, and farm biosecurity measures. The research program has the following strategic objectives: establish ARS laboratories into a fluid, highly effective research network to maximize use of core competencies and resources; use specialized high containment facilities to study zoonotic and emerging diseases; develop an integrated animal and microbial genomics research program; establish core competencies in bovine, swine, ovine, and avian immunology; launch a biotherapeutic discovery program providing alternatives to animal drugs; build a technology driven vaccine and diagnostic discovery research program; develop core competencies in field epidemiology and predictive biology; establish a best-in-class training center for our Nation's veterinarians and scientists; and develop a model technology transfer program to achieve the full impact of ARS research discoveries. ARS’ animal research program includes: biodefense research, animal genomics and immunology, zoonotic diseases, respiratory diseases, reproductive and neonatal diseases, enteric diseases, parasitic diseases, and transmissible spongiform encephalopathies.

Selected Examples of Recent Progress:
Development of a safe and effective African swine fever virus vaccine -ASFV-G-delta I177L. African swine fever (ASF) is a devastating and highly lethal disease of pigs for which there are no commercial vaccines. One of the most significant knowledge gaps that has hindered scientists from developing a safe and effective ASF vaccine is the lack of genomics information on the function of the virus's 150 genes. ARS scientists at Orient Point, NY, successfully developed genetic engineering techniques that systematically delete genes from the ASF viral genome to determine their function. Pathogenicity studies in pigs with these altered viruses led to the discovery of essential genes for ASF viral replication, host immune evasion, and determinants of virulence. Gene identification provides potential targets for a rational design of safe and efficacious gene-deleted vaccines. The most recent vaccine candidate is the discovery of a genetically engineered gene-deleted live attenuated vaccine strain called ASFV-G-delta I177L. This vaccine strain was shown to be safe and effective and exceeded the performance of other ASF vaccine candidates. For the first time, the ASFV-G-delta I177L vaccine was shown to fully protect pigs against ASF with a low dose of vaccine virus. The safety characteristics of the vaccine include no adverse events even when high doses of the vaccine were administered to pigs. A patent covering the development ASFV-G-delta I177L was filed and several commercial partners initiated the process of licensing ASFV-G-delta I177L. ARS scientists have established an agreement with one of these companies to initiate the commercial development of the vaccine.

Crop Protection

Current Activities

ARS' Crop Protection research program is directed to protect crops from insect and disease loss through research 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. The program's research priorities include: identification of genes that convey virulence traits in pathogens and pests; factors that modulate infectivity, gene functions, and mechanisms; genetic profiles that provide specified levels of disease and insect resistance under field conditions; and mechanisms that reduce 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 and address quarantine issues.

Selected Examples of Recent Progress:
Stopping blue mold fungus decay in apples. Apples are one of the most popular fruits consumed in the United States, and may be stored for up to 12 months. During storage, the blue mold fungus may cause the apple to rot, reducing its quality and marketability. ARS researchers in Beltsville, MD, in collaboration with University of Wisconsin, Pennsylvania State University, and Dartmouth University colleagues, have discovered a way to block the gene in the blue mold fungus that causes apple rot in storage. The apple industry and researchers are using this new knowledge to develop postharvest decay treatments for the blue mold fungus Plant "organ transplants" offer a new way of delivering genetic engineering solutions to solve crop pest/pathogen problems. There is an urgent need for solutions to control whitefly and the diseases transmitted by it. ARS researchers in Fort Pierce, FL, in collaboration with a private industry partner, developed a method of engineering only a group of plant cells that can be attached to other plants (essentially as a new organ) to produce desired molecules that are secreted into the plant vascular tissue and move throughout the plant. This "new organ" cannot survive away from the plant and does not move from the location where it is attached, thus the harvested commodity (i.e., fruit, nut, etc.) is not genetically engineered. It also cannot form whole plants, seed, or pollen, thus there is no escape of genetic material. The scientists are evaluating the ability of this strategy to cure trees infected with Huanglongbing (HLB, aka citrus greening) by engineering similar organs to produce natural peptides and double-stranded RNA that kills the HLB-causing bacterium, and attaching these organs to ornamental and/or horticultural crops. Proof-of-concept has been completed in tomato. This strategy could be adapted as a means to rapidly deliver genetic engineering solutions in an environmentally sustainable and consumer acceptable method.

Human Nutrition

Current Activities

Maintenance of health throughout the lifespan along with prevention of obesity and chronic diseases via food-based recommendations are the major emphases of ARS' Human Nutrition research program. These health-related goals are based on the knowledge that deficiency diseases are no longer primary public health concerns in the U.S. Excessive consumption has become the primary nutrition problem in the American population. This is reflected by increased emphasis on prevention of obesity from basic science through intervention studies to assessments of large populations. The agency's research program also actively studies bioactive components of foods that have no known requirements but have health promoting qualities. Four areas of research are emphasized: nutrition monitoring; the scientific basis for dietary recommendations; prevention of obesity and related diseases; and life stage nutrition and metabolism.

Selected Examples of Recent Progress:
Dietary carbohydrate intake contributes to reduced stress. Mental stress is linked to risk of chronic diseases. In an 8-week randomized controlled trial that compared effects of a healthy Dietary Guidelines for Americans (DGA)-based diet against the less healthy typical American diet, ARS scientists in Davis, CA, found that the DGA diet, with a higher amount of dietary carbohydrate, resulted in reduced concentrations of a key stress response hormone, cortisol, and dampened stress-induced cortisol reactions. These novel findings provide new evidence suggesting that in the context of a healthy diet, carbohydrate consumption may provide some protection from stress-related disease risk. Furthermore, this apparent stress and cortisol dampening effect could reduce stress-related eating by some individuals and improve their ability to sustain a healthier diet based on the DGA.

Intestinal permeability is affected by gender and genetics in children. A certain amount of absorption by the intestine is essential for life but excess permeability is associated with adverse health consequences. ARS-supported researchers in Houston, TX, studied large numbers of children with normal gastrointestinal function, irritable bowel syndrome (IBS), or functional abdominal pain (FAP), along with their siblings and parents. Several partially absorbable sugar derivatives were administered orally, and amounts recovered in urine over a day measured intestinal permeability. As expected, children with IBS had increased intestinal permeability, but this was not found in those with FAP. Boys had a significantly weaker intestinal barrier than girls and both the siblings and parents of children with higher permeability showed the same pattern of results. Because recent studies show that bacteria in the intestine contribute to liver disease and perhaps obesity, the stronger the gut barrier, the less likely those microorganisms and their potentially harmful products can enter the bloodstream. These data may help explain why boys are more susceptible than girls to liver disease.

Environmental Stewardship

Current Activities

ARS' Environmental Stewardship research program emphasis is on developing technologies and systems that support sustainable production and enhance the Nation's vast renewable natural resource base. The agency 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' research also focuses on developing measurement, prediction, and control technologies for emissions of greenhouse gases, particulate matter, ammonia, hydrogen sulfide, and volatile organic compounds affecting air quality and land-surface climate interactions. The agency is a leader in developing measurement and modeling techniques for characterizing gaseous and particulate matter emissions from agriculture. In addition, ARS is evaluating strategies for enhancing the health and productivity of soils, including developing predictive tools to assess the sustainability of alternative land management practices. Finding mechanisms to aid agriculture in adapting to changes in atmospheric composition and climatic variations is also an important component of this program. ARS' range and grazing land research objectives include the conservation and restoration of the Nation's range land and pasture ecosystems and agroecosystems through improved management of fire, invasive weeds, grazing, global change, and other agents of ecological change. The agency is currently developing improved grass and forage legume germplasm for livestock, conservation, bioenergy, and bioproduct systems as well as grazing-based livestock systems that reduce risk and increase profitability. In addition, ARS is developing whole system management strategies to reduce production costs and risks.

Selected Examples of Recent Progress:
A long-term solution for thirsty crops. A cost-effective means of increasing plant-available water can alleviate water stress from infrequent precipitation or limited irrigation supplies. Polymer hydrogels increase the capacity of soil to hold water, but the effects were previously thought to last only a few years. ARS researchers in Kimberly, ID, conducted a 9-year study to measure the effects of a single hydrogel application on plant-available water in soil. Based on the slow decline in water availability seen in this study, the water retention benefits of hydrogels should last from 24 years to 29 years, considerably longer than current industry estimates. The long-term water retention benefits substantially increase the cost effectiveness for farmers applying hydrogels to improve soil's water holding capacity.

Evidence of consistent and sustained profitability in precision agriculture cropping systems. Targeting management practices and inputs with precision agriculture has high potential to meet some of the grand challenges of sustainability in the coming century. The benefits include improving crop profitability and reducing environmental impacts, but its reputation for high cost limits its popularity. To better understand long-term effects of precision agriculture on crop profitability, ARS scientists in Columbia, MO, Long-Term Agroecosystem Research (LTAR) network site monitored a 90-acre field in central Missouri for over a decade under conventional management (1993–2003) and then for another decade under a precision agriculture system (2004–2014). Conventional management was a corn-soybean rotation, annual tillage, and uniform fertilizer and herbicide inputs. Key aspects of the precision system were no-tillage, cover crops, winter wheat instead of corn on areas with shallow topsoil and low corn profitability, and variable-rate fertilizer (nitrogen, phosphorus, potassium, and lime) applications. Results indicated that precision agriculture sustained profits in 97 percent of the field without subsidies for cover crops or payments for enhanced environmental protection. In a separate study, ARS scientists in Pendleton, OR, applied a specialized mathematical model to multiple years of yield map data from a dryland field in South Dakota (corn-soybean rotation) and an irrigated field in Georgia (corn, soybean, and peanut). In both cropping systems, this analysis method effectively revealed patterns of productive and unproductive parts of the field. This information can be used to target more efficient crop management techniques, and these results help growers gain confidence in the economic success of precision agriculture management and conservation practices.

Library and Information Services

Current Activities

The National Agricultural Library (NAL) is the largest and most accessible agricultural research library in the world. It provides services directly to the staff of USDA and to the public, primarily via its web site, http://www.nal.usda.gov. NAL, which was created with the USDA in 1862, was named a national library 100 years later, in 1962, by Congress as "the primary agricultural information resource of the United States." NAL is the premier library for collecting, managing, and disseminating agricultural knowledge.

Selected Examples of Recent Progress:
Expanding public access to data outcomes from USDA-funded research through Ag Data Commons. The Ag Data Commons is a Federal scientific research data catalog and repository that helps the agricultural research community share and discover research data funded by USDA. In FY 2020, NAL's Ag Data Commons team worked with the ARS Agricultural Collaborative Research Outcomes System (AgCROS) team to develop a workflow to create and apply Digital Object Identifiers (DOIs) for data deposited in AgCROS. The result of improved platform interfaces and other customer service improvements in FY 2020 was a 20 percent increase in individual data submitters, as well as an increase in the number of cataloged datasets and dataset downloads.

Increasing USDA full-text publications and peer-reviewed citations in PubAg. PubAg is the NAL search system for USDA-funded scholarly agricultural literature. In FY 2020, NAL created a new workflow that added more than 1,200 manuscripts. PubAg now contains more than 3 million citations for peer-reviewed, agriculture-related scientific articles, an increase of more than 350,000 citations from FY 2019.

ACCOUNT 2: BUILDINGS AND FACILITIES

APPROPRIATIONS LANGUAGE

For the 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, [$35,700,000] $45,405,000 to remain available until expended.

Change Description

The first change (line 3 of paragraph) deletes $35,700,000.

The second change adds $45,405,000 (line 4 of paragraph).

The third change (line 4 of paragraph) deletes the allocation for ARS facilities co-located with university partners.

LEAD-OFF TABULAR STATEMENT

Lead-Off Tabular Statement (In dollars)

Item	Amount
2021 Enacted	$35,700,000
Change in Appropriation	+9,705,000
Budget Estimate, 2022	45,405,000

PROJECT STATEMENT APPROPRIATIONS

Project Statement (thousands of dollars)

Item	2019 Actual	2020 Actual	2021 Enacted	Inc. or Dec.	2022 Budget
Discretionary Appropriations:					
Buildings and Facilities					
Buildings and Facilities	$133,500	$25,800	$24,500	+$20,905	$45,405
ARS Co-Located Facilities	247,700	166,900	11,200	-11,200	-
Subtotal	381,200	192,700	35,700	+9,705	45,405
Total Appropriation	381,200	192,700	35,700	+9,705	45,405
Recoveries, Other	-	69	-	-	-
Bal. Available, SOY	335,163	697,006	109,368	+16,067	125,435
Total Available	716,363	889,775	145,068	+25,772	170,840
Bal. Available, EOY	-697,006	-109,368	-125,435	-31,822	-157,257
Total Obligations	19,357	780,407	19,633	-6,050	13,583

FUNDING DETAIL APPROPRIATIONS

Funding Detail (thousands of dollars)

Allocations	2019 Actual B.A.	2020 Actual B.A.	2021 Enacted B.A.	2022 Budget Request B.A.	Change from 2021 Enacted B.A.
Buildings and Facilities					
Beltsville, MD, Beltsville Area Research Center, Buildings 002, 005 and 308	-	$12,300	-	-	-
Beltsville, MD, Beltsville Area Research Center, Building 002 …….	-	-	$24,500	-	-$24,500
Beltsville, MD, Beltsville Area Research Center, Building 005 …….	-	-	-	$34,805	+34,805
Corvallis, OR, National Clonal Germplasm Repository …….	-	13,500	-	-	-
Madison, WI, U.S. Dairy Forage Research Center ……	$71,700	-	-	-	-
Manhattan, KS, National Bio and Agro-Defense Facility	-	-	-	10,600	+10,600
Tifton, GA, Southeast Watershed Research Laboratory …….	39,900	-	-	-	-
University Park, PA, U.S. Pasture Laboratory	21,900	-	-	-	-
**Subtotal..... **	**133,500**	**25,800**	**24,500**	**45,405**	**+20,905**
ARS Co-Located Facilities					
Auburn, AL, National Soil Dynamics Laboratory …….	43,300	-	-	-	-
Columbia, MO, University of Missouri …	-	24,800	-	-	-
Davis, CA, University of California …….	-	76,200	-	-	-
Geneva, NY, Grape Genetics Research Center ……	68,900	-	-	-	-
Lexington, KY, University of Kentucky ...	-	65,900	-	-	-
Lincoln, NE, University of Nebraska …...	-	-	11,200	-	-11,200
Pullman, WA, Pullman ARS Research Laboratory …….	104,900	-	-	-	-
Raleigh, NC, Raleigh Research Laboratory …….	30,600	-	-	-	-
**Subtotal..... **	**247,700**	**166,900**	**11,200**	-	**-11,200**
**Total..... **	**381,200**	**192,700**	**35,700**	**45,405**	**+9,705**

PROJECT STATEMENT OBLIGATIONS

Project Statement (thousands of dollars)

Item	2019 Actual	2020 Actual	2021 Enacted	Inc. or Dec.	2022 Budget
Discretionary Obligations:					
Buildings and Facilities					
Buildings and Facilities	$12,764	$413,969	$8,733	-$6,900	$1,833
ARS Co-Located Facilities	-	364,058	2,200	+6,450	8,650
Subtotal	12,764	778,027	10,933	-450	10,483
Supplemental Obligations:					
Emergency Supplemental	6,593	2,380	8,700	-5,600	3,100
Subtotal	6,593	2,380	8,700	-5,600	3,100
Total Obligations	19,357	780,407	19,633	-6,050	13,583
Bal. Available, EOY	697,006	109,368	125,435	+31,822	157,257
Total Available	716,363	889,775	145,068	+25,772	170,840
Recoveries, Other	-	-69	-	-	-
	-		-		-
Bal. Available, SOY	335,163	-697,006	109,368	-16,067	125,435
Total Appropriations	381,200	192,700	35,700	+9,705	45,405

*Emergency Hurricane Supplemental funds were appropriated in FY18 and are not displayed on the Project Statement Appropriations exhibit. The funds are still being obligated through FY22 and are reflected on the Project Statement Obligations exhibit.

FUNDING DETAIL OBLIGATIONS

Funding Detail (thousands of dollars)

Allocations	2019 Actual B.A.	2020 Actual B.A.	2021 Enacted B.A.	2022 Budget B.A.	Change From 2021 Enacted B.A.
Buildings and Facilities					
Athens, GA, Southeast Poultry Research Laboratory	$949	$284	$1,587	$200	-$1,387
Ames, IA, National Laboratory for Agricultural and the Environment	360	445	-	-	-
Beltsville, MD, Beltsville Area Research Center, Buildings 002, 005 and 308	-	7,736	-	-	-
Beltsville, MD, Beltsville Area Research Center, Building 307	405	31,984	1,196	-	-1,196
Corvallis, OR, National Clonal Germplasm Repository	-	13,472	-	-	-
Frederick, MD, Foreign Disease-Weed Science Research Laboratory	-	65,472	-	-	-
Houston, TX, Children's Nutrition Research Center	-	28,258	-	-	-
Kerrville, TX, Knipling Bushland Research Center	3,365	50,176	-	-	-
Prairie du Sac, WI, Dairy Forage Agriculture Research Center	-	56,500	-	-	-
Salinas, CA, U.S. Agricultural Research Station	5,382	90,149	3,800	1,000	-2,800
Temple, TX, Grassland, Soil and Water Research Laboratory	1,528	17,004	500	633	+133
Tifton, GA, Southeast Watershed Research Laboratory	-	32,400	-	-	-
Tucson, AZ, Southwest Watershed Research Laboratory	775	-	1,650	-	-1,650
University Park, PA, U.S. Pasture Laboratory	-	20,089	-	-	-
Subtotal	**12,764**	**413,969**	**8,733**	**1,833**	**-6,900**
ARS Co-Located Facilities					
Auburn, AL, National Soil Dynamics Laboratory	-	42,068	-	-	-
Columbia, MO, University of Missouri	-	24,028	-	-	-
Davis, CA, University of California	-	75,092	-	-	-
Geneva, NY, Grape Genetics Res. Center	-	54,300	-	-	-
Lexington, KY, University of Kentucky	-	55,478	-	-	-
Lincoln, NE, University of Nebraska	-	-	2,200	8,650	+6,450
Pullman, WA, Pullman ARS Research Laboratory	-	82,700	-	-	-
Raleigh, NC, Raleigh Research Laboratory	-	30,392	-	-	-
Subtotal	**-**	**364,058**	**2,200**	**8,650**	**+6,450**
Emergency Hurricane Supplemental					
Subtotal	**6,593**	**2,380**	**8,700**	**3,100**	**-5,600**
Total	**19,357**	**780,407**	**19,633**	**13,583**	**-6,050**

JUSTIFICATIONS OF INCREASES/DECREASES

Buildings and Facilities

ARS operates laboratories and facilities that have a capitalization value of $5 billion. Many of these laboratories/facilities are decades old, have outlived their functional lifespan, and are badly in need of major repairs, renovation, or replacement.

In 2012, ARS completed an extensive review of its laboratory portfolio and developed a plan for future capital investments. The report, known as the "Capital Investment Strategy (CIS)," highlighted ARS' aging infrastructure, noting that approximately $200,000,000 in capital investments was needed on a regular and recurring basis. Since 2012, modernization or replacement has begun on 24 of ARS' priority facilities.

ARS has updated its 2012 CIS to identify its highest priority facilities in need of modernization or replacement. Funding is requested below to address one of the highest priority facilities.

(1) An increase of $34,805,000 for renovation/construction of the Beltsville Agricultural Research Center (BARC), Beltsville, Maryland, Building 005, and its supporting utilities and infrastructure.

BARC is one of the largest agricultural research centers in the world, in terms of program scope and number of scientists (over 200) and support staff (over 500). It has long had a worldwide reputation because of its prominent scientists, quality of research, and contributions to agriculture. BARC's programs include hundreds of research projects related to: food animal production; animal health; veterinary, medical, and urban entomology; food safety; human nutrition; water availability and watershed management; grass, forage, and rangeland agroecosystems; sustainable agricultural systems; plant genetic resources, genomics, and genetic improvement; plant diseases; crop protection and quarantine; crop production; and product quality and new uses.

Building 005 is a laboratory/office building on BARC-West in need of major renovations to meet current research needs. The facility does not meet state-of-the-art research requirements for high quality scientific research. This renovation will continue the consolidation of BARC's campus, moving the Invasive Insect Biocontrol and Behavior Lab, Soybean Genomics and Improvement Lab and the Hydrology and Remote Sensing Lab into the BARC-West cluster of buildings that face the main thoroughfare traversing Beltsville. Building 005 is in the historic district of Beltsville and must comply with State Historical Society requirements.

In FY 2020, ARS received $4,300,000 for the programming and design for the renovation of Building 005.

(2) An increase of $10,600,000 for capital improvement and maintenance at the National Bio and Agro-Defense Facility (No funds available in 2021).

The National Bio and Agro-Defense Facility (NBAF) is a $1.25 billion facility that is being constructed by the Department of Homeland Security in Manhattan, Kansas. USDA will operate the facility upon completion of construction. The high containment facility is extraordinarily complex and requires sophisticated air handling system to protect the people, animals, and the environment. NBAF science programs will be located within a 574,000 square-foot high-containment laboratory facility. Several ancillary facilities will support the main laboratory complex, including the central utility plant (CUP), wastewater treatment plant, trans-shipping facility, and visitor's center. Including all buildings, NBAF will total 709,000 square feet. Dedicated resources are needed to address ongoing capital improvement and maintenance needs of this critical center charged with the study of highly contagious, emerging, and zoonotic animal diseases that pose a threat to the U.S. agriculture, the food supply, and public health.

USDA will begin operation of the CUP, wastewater treatment plant, and facility security in 2021.

Capital improvements are needed for the CUP which has been in use for eight years and additional security measures.

CLASSIFICATION BY OBJECTS

Classification by Objects (thousands of dollars)

Item No.	Item	2019 Actual	2020 Actual	2021 Enacted	2022 Budget
	Other Objects:				
32.0	Land and structures	$19,357	$780,407	$19,633	$13,583
99.9	Total, new obligations	19,357	780,407	19,633	13,583

STATUS OF CONSTRUCTION

Status of Construction Projects as of December 2020

Status of research facilities authorized or funded in prior years and reported as uncompleted in the 2021 Explanatory Notes, are as follows:

NOTE: Program Of Requirement: A study/document that defines the research program, associated space and equipment needs and associated design criteria. DESIGN: The design is either a conceptual design - designated as 35% - or a complete design designated as 100%. YEARS: All references to years are fiscal years.

Location and Purpose	Year	Amount of Funds Provided	Description
Alabama, Auburn National Soil Dynamics Research Laboratory	2019 Design and Construction	$43,300,000	New funding was provided in 2019. Project transferred to USACE for managing the design and construction. New sites determined - Research Park & Longleaf for Land Swap. Land Swap to be finalized for 3rd Quarter 2021. Anticipated award of A-E contract expected in the 2nd Quarter 2021. Design to be complete in the 2nd Quarter 2022. Projected Contract Award for 4th Quarter 2022.
Arizona, Tucson Southwest Watershed Research Center	2016 Design and Construction	$12,400,000	Design/Programming completed in the 1st Quarter 2018. Construction contract awarded in the 4th Quarter 2018. The construction contractor was incorporated by a Native American tribe and has been dissolved. Working with the Surety and company's attorney, negotiations re-started with original construction company to continue and complete the SWRC Modernization project. Construction completion date has been re-established to 3rd Quarter 2022.
California, Albany Western Regional Research Center (Research and Development Facility)	2000 Planning and Design 2001 Construction 2002 Construction 2009 ARRA 2015 Rescission Total	$2,600,000 4,889,220 3,800,000 15,624,460 (166) 26,913,514	Construction of Phases 1-3a of the Research and Development Facility is complete. The re-design of the remaining work (Phases 3b, 4, 5, and 6) was completed in the 1st Quarter 2010. Construction contract award for the final phases 3 thru 6 was awarded for 3rd Quarter 2010 with ARRA funding and was completed in the 3rd quarter 2015.
California, Davis Center for Advanced Viticulture and Tree Crop Research	2004 Planning and Design 2005 Construction 2006 Construction 2008 Construction 2009 Construction 2010 Construction 2011 Rescission	$2,684,070 2,976,000 3,588,750 1,869,819 2,192,000 3,000,000 (16,062,114)	POR completed in the 2nd Quarter 2007. Lease agreement was not executed. Project transferred to USACE for managing the design and construction. Land purchased for an off-campus site adjacent to UC-Davis and should be completed in the 1st Quarter 2022. Anticipated award of A-E contract expected in the 3rd Quarter 2021. Design to be complete in 3rd Quarter 2023. Projected Contract Award for 2nd Quarter 2024.

	2020 Design and Construction	76,200,000	
	Total	76,448,525	
California, Salinas	2004 Planning and Design	$4,473,450	Design (100%) completed in the 2nd Quarter 2007. A design update was awarded
Agricultural Research Station	2005 Planning and Design	2,976,000	1st Quarter 2017 and completed 4th Quarter 2018. Design changed from 3 phases
	2006 Construction	3,588,750	to 2 phases for construction. A construction contract solicitation was advertised
	2008 Construction	1,869,819	"open to small-business only" in FY2019. No bids were received. The project was
	2009 Construction	2,192,000	resolicited and an acceptable bid was received. Contract awarded in the 4th
	2010 Construction	3,654,000	Quarter 2020. Construction completion date is scheduled for 4th Quarter 2024.
	2011 Rescission	(14,937,644)	
	2016 Design	1,300,000	
	2017 Construction	30,200,000	
	2018 Construction	71,200,000	
	Total	106,516,375	
Connecticut, Storrs	2008 Planning and Design	$1,869,819	POR completed 4th Quarter 2010. Lease agreement was not executed.
Center of Excellence for Vaccine Research	2009 Design and Construction	2,192,000	
	2010 Construction	3,654,000	
	2011 Rescission	(7,221,296)	
	Total	494,523	
District of Columbia	2000 Planning and Design	$500,000	Design (100%) of Bladensburg Road Entrance completed 1st Quarter 2006. The
U.S. National Arboretum	2001 Design and Construction	3,322,674	Administrative Building Modernization design completed 1st Quarter 2006. The construction of Phase 2, greenhouse and mechanical support space, completed 1st
	2002 Design and Construction	4,600,000	Quarter 2009. ARRA funds were used to award a construction contract for Administrative Building Modernization 4th Quarter 2010. Construction completed
	2003 Design and Construction	1,688,950	2nd Quarter 2013.
	2008 Construction	695,100	
	2009 ARRA	8,041,842	
	2011 Rescission	(2,066,637)	
	Total	16,781,929	
Florida, Canal Point	2008 Planning and Design	$521,325	POR completed 2nd Quarter 2011. Land purchases complete. Historic
Agricultural Research Service	2009 Planning and Design	1,096,000	preservation consultation completed and building demolition contract awarded 4th
Laboratory	2010 Construction	3,422,000	Quarter 2016. Demolition was completed in the 4th Quarter 2017.
	2011 Rescission	(4,106,211)	

	2015 Rescission	(149,125)	
	Total	783,989	
Georgia, Athens U.S. National Poultry Research Center	2005 Planning	$400,000	Draft POR completed 1st Quarter 2007. The POR was awarded in the 3rd Quarter 2015 and completed 4th Quarter 2015. POR/Bridging documents were awarded 4th Quarter 2015 and completed in the 3rd Quarter 2016. Design Build Construction Contract was awarded in the 4th Quarter 2017. Total contract duration from notice to proceed to completion is expected to take 5½ years (all work to be completed by the 3rd Quarter 2023). The Government will take ownership of buildings as they are completed and accepted. The estimated completion by building is as follows: - B43A Hatchery/Brooding - 4th Quarter 2019 (actual) - B47 BLS-3 Animal Holding/Laboratory - 2nd Quarter 2021 - B48 SPF Animal Holding - TBD when funded - B45 Laboratory/Office/Administration - 2nd Quarter 2021 - B46 BSL-2 Animal Holding - 3rd Quarter 2023 - Finalize Roadways, Sidewalks etc. - 4th Quarter 2023
	2005 Construction	677,000	
	2008 Planning and Design	2,780,400	
	2009 Planning and Design	2,427,000	
	2011 Rescission	(5,832,898)	
	2015 Planning, Design, Construction	45,000,000	
	2016 Construction	113,701,000	
	Total	159,152,502	
Georgia, Tifton Southeast Watershed Research Laboratory	2019 Design and Construction	$39,900,000	New Funding provided in 2019. Project transferred to USACE for managing the design and construction. A-E Contract awarded for 4th Quarter 2020. Design complete by 1st Quarter 2022. Construction awarded by 4th Quarter 2022. Construction complete by 4th Quarter 2024.
Hawaii, Hilo U.S. Pacific Basin Agricultural Research Center	1999 Planning and Design	$4,500,000	Design of Phases 1 and 2 is complete. Construction of Phase 1 completed 3rd Quarter 2007. Construction contract for Phase 2 awarded 4th Quarter 2010 and completed 1st Quarter 2012.
	2000 Construction	4,500,000	
	2001 Construction	4,989,000	
	2002 Construction	3,000,000	
	2003 Design and Construction	2,980,500	
	2004 Construction	4,831,326	
	2005 Construction	2,976,000	
	2006 Construction	3,588,750	
	2008 Construction	1,737,750	
	2009 Construction	1,565,000	
	2010 Construction	5,000,000	
	2011 Rescission	(7,730,452)	
	2015 Rescission	(129,570)	
	Total	31,808,304	

Idaho, Hagerman Aquaculture Facility	2005 Planning and Design 2006 Construction 2008 Construction 2009 Construction 2011 Rescission Total	$992,000 990,000 695,100 544,000 (2,907,600) 313,500	Lease agreement is in place. POR completed 3rd Quarter 2007.
Illinois, Peoria National Center for Agricultural Utilization Research (Central Wing)	2000 Construction Design 2002 Construction 2004 Construction 2005 Construction 2006 Construction 2008 Construction 2009 Construction 2009 ARRA 2015 Rescission Total	$1,800,000 6,500,000 2,684,070 2,976,000 3,588,750 1,869,819 2,192,000 16,237,165 (142,565) 37,705,239	The modernization of the Chemical Wing was completed in 3 segments. The construction of phases 1 and 2 is complete. Construction for all remaining phases of the Central Wing awarded 2nd Quarter 2010 using ARRA funding and completed 3rd Quarter 2012.
Iowa, Ames National Centers for Animal Health	2001 Design and Construction 2002 Design and Construction 2002 Construction 2002 APHIS Transfers [Supplemental] [Other Transfers] 2002 Construction 2003 Construction 2003 Construction 2005 Construction 2006 Construction 2015 Rescission Total	$8,980,200 40,000,000 50,000,000 15,753,000 [14,081,000] [1,672,000] 25,000,000 32,785.500 110,000,000 121,024,000 58,212,000 (1,108,686) 460,646,014	The accelerated plan for the completion of the modernization of ARS/APHIS animal facilities is in progress. All major components of the modernization are complete. -Phase 1 Lab/Office (APHIS) completed in 2004. -Large Animal BSL-3Ag facilities construction completed 2nd Quarter 2007. -Central Utility Plant and Infrastructure, Phase 1 and 2 construction is complete. Phase 3 construction completed 1st Quarter 2009. -Construction of the Consolidated Laboratory Facility completed 2nd Quarter 2009. -Low Containment Large Animal Facility construction completed 1st Quarter 2009. - Demolition of existing facilities on 1st and 2nd Street completed 3rd Quarter 2012. - Buildings 1 and 2 demolition is complete.
Iowa, Ames National Laboratory for Agricultural and the Environment	2016 Design and Construction	$13,500,000	Design awarded 4th Quarter 2016 and bridging documents were completed 4th Quarter 2017. Construction awarded 4th Quarter 2018 and was completed 4th Quarter 2020.

Kentucky, Bowling Green Animal Waste Management Research Laboratory	2005 Planning and Design 2006 Construction 2008 Construction 2009 Construction 2010 Construction 2011 Rescission Total	$2,281,600 2,970,000 1,390,200 1,088,000 2,000,000 (5,880,338) 3,849,462	POR is complete for total project. Design (100%) for the Headhouse/Greenhouse only was completed 3rd Quarter 2008. Lease agreement is in place. Construction of the Headhouse/Greenhouse awarded 4th Quarter 2010 and completed 2nd Quarter 2012.
Kentucky, Lexington Forage Animal Research Laboratory	2005 Planning and Design 2006 Construction 2008 Construction 2009 Construction 2010 Construction 2011 Rescission 2020 Construction Total	$2,976,000 3,960,000 2,085,300 1,632,000 2,000,000 (9,678,689) 65,900,000 68,874,611	POR is complete. Lease agreement terminated 2016. Design (100%) was completed 2nd Quarter 2011. Project transferred to USACE for managing the design and construction. Project reactivated by FY20. Lease agreements for laboratory office building and animal facility sites should be completed in the 3rd Quarter 2021. ARS/University of Kentucky will discuss HH/GH and Animal Facility needs. Design schedules will be developed once Functional Statement (FS) is finalized. A-E contract award anticipated for 3rd Quarter 2021.
Louisiana, Houma Sugarcane Research	2004 Planning and Design 2005 Construction 2006 Construction 2008 Construction 2009 Construction 2010 Construction 2015 Rescission Total	$1,342,035 2,976,000 3,588,750 1,869,819 2,505,000 3,654,000 (100) 15,935,504	Design (100%) completed 4th Quarter 2007. Repackaging of design to allow for construction of some elements within the available funding completed 2nd Quarter 2008. Phase 1A construction completed 4th Quarter 2010. Phase 1B construction awarded 2nd Quarter 2011 and completed 3rd Quarter 2013.
Louisiana, New Orleans Southern Regional Research Center (Industrial Wing)	1998 Planning and Design 1999 Modernization 2000 Modernization 2006 Supplemental (design) 2006 Supplemental (construct.) Total	$1,100,000 6,000,000 5,500,000 4,900,000 20,000,000 37,500,000	The 2006 Supplemental funding was appropriated for the design and construction of the Long-Term Restoration (LTR) of facilities damaged by Hurricane Katrina. Design (100%) for the LTR of facilities completed 4th Quarter 2008. Construction of the LTR awarded 3rd Quarter 2009 and completed 3rd Quarter 2011.
Maine, Orono/Franklin National Cold Water Marine Aquaculture Center	2001 Planning and Design 2002 Construction 2003 Construction 2004 Design and Const. 2005 Design and Const. 2006 Design and Const.	$2,494,500 3,000,000 9,090,525 2,684,070 2,976,000 2,475,000	Construction of all facilities at Franklin (Pump House, Storage Tanks, Lab/Office/Tank Bldg.) is complete. Program for the laboratory facility located at the University of Maine Campus in Orono, ME needs to be developed when funds are made available.

	2011 Rescission	(2,012,504)	
	Total	20,707,591	
Maryland, Beltsville Beltsville Agricultural Research Center, (BARC)	1988 Design and Const.	$5,750,000	Study to evaluate boiler plants, steam lines, and electrical distribution completed 4th Quarter 2009. Construction contract for repairs to boiler plants and portions of the steam distribution system awarded 4th Quarter 2010 with ARRA funding and completed 2nd Quarter 2012. Design-Build contract for major renovations to Building 306 awarded 4th Quarter 2010 with ARRA funding and completed 4th Quarter 2012.
	1989 Design and Const.	6,100,000	
	1990 Design and Const.	9,860,000	
	1991 Design and Const.	15,999,792	
	1992 Design and Const.	16,000,000	
	1993 Design and Const.	13,547,000	
	1994 Design and Const.	19,700,000	
	1995 Design and Const.	3,960,000	
	1996 Design and Const.	8,000,000	
	1997 Design and Const.	4,500,000	
	1998 Design and Const.	3,200,000	
	1999 Design and Const.	2,500,000	
	2000 Design and Const.	13,000,000	
	2001 Design and Const.	13,270,740	
	2002 Design and Const.	3,000,000	
	2003 Design and Const.	4,152,830	
	2004 Design and Const.	2,684,070	
	2005 Design and Const.	2,976,000	
	2006 Design and Const.	3,588,750	
	2009 Design and Const.	2,192,000	
	2009 ARRA	21,513,046	
	2010 Construction	3,000,000	
	2011 Rescission	(9,831,954)	
	Total	168,662,274	
Renovate Building 307	2016 Design and Const.	$37,100,000	Preparation of design bridging documents for Building 307 was awarded for 4th Quarter 2016 and completed in the 1st Quarter 2018. Construction was awarded in the 1st Quarter 2020 with completion in the 2nd Quarter 2022.
Renovate Buildings 002, 005, and 308	2020 Design	$12,300,000	Project transferred to USACE for managing the design and construction. Design awarded for Building 002 was awarded for 4th Quarter 2020 and is scheduled for completion in the 4th Quarter 2021. Design awarded for Building 005 was awarded 4th Quarter 2020 and is scheduled for completion in the 2nd Quarter 2022. Design awarded for Building 308 was awarded 4th Quarter 2020 and is scheduled for completion in the 4th Quarter 2021.

Renovate Building 002	2021 Construction	$24,500,000	
Maryland, Beltsville National Agricultural Library	1998 Design and Const. 1999 Design and Const. 2001 Design and Const. 2002 Construction 2003 Design and Const. 2004 Design and Const. 2009 ARRA 2011 Rescission Total	$2,500,000 1,200,000 1,766,106 1,800,000 1,490,250 894,690 6,357,422 (115,175) 15,893,293	Renovation of the NAL building continues. Completed projects include: replacement of the computer room HVAC and fire suppression systems; completion of chiller replacement and brick repairs of three building elevations; and 14th floor window replacements. Construction for the deteriorated building envelope, repair of brick façade, and replacement of the plumbing system awarded for 1st Quarter 2010 using ARRA funding and completed in the 3rd Quarter 2012.
Maryland, Frederick (Fort Detrick) Foreign Disease-Weed Science Research Laboratory	2016 Design 2017 Construction Total	$4,900,000 64,300,000 69,200,000	Design/Programming awarded for the 4th Quarter 2016 and completed 2nd Quarter 2018. Project transferred to USACE for managing the design and construction. Construction currently scheduled to be awarded in the 4th Quarter 2021. Construction completion planned for 3rd Quarter 2024.
Michigan, East Lansing Avian Disease and Oncology Laboratory	1992 Planning 1993 Planning 1998 Planning and Design 2011 Rescission Total	$250,000 212,000 1,800,000 (63,193) 2,198,807	Design (100%) for this multi-phased facility modernization is complete.
Mississippi, Lorman Biotechnology Laboratory Alcorn State University	2006 Planning and Design 2008 Planning and Design 2009 Construction 2010 Construction 2011 Rescission Total	$1,980,000 1,390,200 1,176,000 1,500,000 (5,798,055) 248,145	A lease agreement with Alcorn State University for the new facility completed 4th Quarter 2009. POR completed 3rd Quarter 2008.
Mississippi, Poplarville Thad Cochran Southern Horticulture Laboratory	2002 Design 2003 Construction 2006 Supplemental 2011 Rescission Total	$800,000 9,140,200 4,300,000 (9,178) 14,231,022	Construction of the Headhouse/Greenhouse awarded for 4th Quarter 2007 and completed in the 1st Quarter 2008.
Mississippi, Starkville Poultry Science Research Facility	2005 Planning and Design 2006 Construction	$2,976,000 4,950,000	Lease agreement is in place. Design (100%) completed in the 1st Quarter 2008.

	2008 Construction	1,390,200	
	2009 Construction	3,177,000	
	2011 Rescission	(10,345,645)	
	Total	2,147,555	
Mississippi, Stoneville	2004 Construction	$4,831,326	Design (100%) completed. Construction of Phase 1 completed. Construction of
Jamie Whitten Delta States	2005 Construction	2,976,000	mechanical, electrical, and plumbing systems for phases 2 thru 5 (of 5 total) and
Research Center	2008 Construction	2,780,400	repair of deteriorated building envelope awarded for 3rd Quarter 2010. Phase 2
	2009 ARRA	36,347,783	and 3 completed in the 1st Quarter 2013, Phase 4 completed in the 2nd Quarter
	2010 Construction	4,000,000	2015, and Phase 5 completed in the 2nd Quarter 2016.
	2011 Rescission	(6,047,327)	
	2015 Rescission	(134)	
	Total	44,888,048	
Missouri, Columbia	2004 Planning and Design	$2,415,663	Design (100%) completed in the 4th Quarter 2008. Project transferred to USACE
National Plant and Genetics	2005 Construction	4,960,000	for managing the design and construction. Anticipated award of A-E contract
Security Center	2006 Construction	3,687,750	expected in the 3rd Quarter 2021. Design to be complete 3rd Quarter 2022.
	2008 Construction	2,085,300	Projected Contract Award for 1st Quarter 2023.
	2009 Construction	1,633,000	
	2010 Construction	3,500,000	
	2011 Rescission	(15,590,075)	
	2020 Design and Construction	24,800,000	
	Total	27,491,638	
Montana, Bozeman	2005 Planning and Design	$1,984,000	Lease agreement in place. Conceptual Design (35%) completed in the 3rd Quarter
Animal Bioscience Facility	2006 Construction	3,960,000	2008.
	2008 Construction	1,869,819	
	2009 Construction	2,192,000	
	2010 Construction	3,654,000	
	2011 Rescission	(12,720,879)	
	Total	938,940	
Montana, Sidney	1998 Planning and Design	$606,000	Construction of Phase 1 (Lab/Office Building) completed 2003 and Phase 2
Northern Plains Agricultural	1999 Construction	7,300,000	(Quarantine Lab) completed in the 4th Quarter 2008.
Research Laboratory	2004 Design and Const.	2,505,132	
	2011 Rescission	(29,505)	
	Total	10,381,627	

Nebraska, Lincoln	2008 Planning and Design	$1,390,200	POR completed in the 3rd Quarter 2011.
Systems Biology Research	2009 Planning and Design	1,088,000	
Facility	2010 Construction	3,760,000	
	2011 Rescission	(5,782,528)	
	Total	455,672	
Nebraska, Lincoln	2021 Design	$11,200,000	Details are being established.
University of Nebraska			
New York, Geneva	2004 Planning and Design	$2,415,663	Design (100%) completed in the 4th Quarter 2007. Project transferred to USACE
Grape Genetics Research Center	2005 Construction	2,976,000	for managing the design and construction. Lease should be finalized for 3rd
	2006 Construction	3,588,750	Quarter 2021. A-E contract awarded 4th Quarter 2020. Design to be completed
	2008 Construction	1,869,819	2nd Quarter 2022. Projected contract award in the 1st Quarter 2023.
	2009 Construction	2,192,000	
	2010 Construction	3,654,000	
	2011 Rescission	(14,806,870)	
	2019 Design and Construction	68,900,000	
	Total	70,789,362	
New York, Ithaca	2004 Planning and Design	$3,847,167	Design (100%) completed in the 2nd Quarter 2008.
Crop-based Health Genomics	2005 Construction	2,976,000	
	2006 Construction	3,588,750	
	2011 Rescission	(7,314,491)	
	Total	3,097,426	
North Carolina, Raleigh	2019 Design and	$30,600,000	New funding was provided in 2019. Project transferred to USACE for managing
Plant Science Research	Construction		the design and construction. NCSU has reserved a 15-acre parcel at the Lake Wheeler site for ARS; once the ARS project has been designed and a premises established, a lease agreement can be executed. Anticipated A-E of award in 1st Quarter 2021. Negotiations are underway with AE. Anticipated design complete in 2nd Quarter 2022. Anticipated contract award for 4th Quarter 2022.
Ohio, Toledo	2005 Planning and Design	$1,984,000	Design (100%) completed in the 1st Quarter 2010. Lease agreement in place.
University of Toledo	2006 Construction	1,584,000	
	2008 Construction	1,869,819	
	2009 Construction	2,192,000	

	2010 Construction	3,654,000	
	2011 Rescission	(9,356,845)	
	Total	1,926,974	
Oklahoma, Woodward Southern Plains Range Research Center	2002 Planning and Design	$1,500,000	Phases 1 and 2 of the three-phased construction project completed.
	2003 Construction	7,948,000	
	2005 Construction	2,976,000	
	2011 Rescission	(152,556)	
	Total	12,271,444	
Oregon, Corvallis National Clonal Germplasm Repository	2020 Design and Construction	$13,500,000	Project transferred to USACE for managing the design and construction. Anticipate A-E Task Order Award for 2nd Quarter 2021. Anticipate design complete in 4th Quarter 2022. Anticipated contract award in 2nd Quarter 2023.
Pennsylvania, Wyndmoor Eastern Regional Research Center	1997 Construction	$4,000,000	Modernization of the Center accomplished in nine phases, with construction of Phases 1 through 7 completed. Construction award for Phases 8 and 9 was made in 4th Quarter 2010 with ARRA funding and completed in the 2nd Quarter 2012.
	1998 Construction	5,000,000	
	1999 Construction	3,300,000	
	2000 Construction	4,400,000	
	2002 Design and Construction	5,000,000	
	2009 ARRA	15,084,486	
	2015 Rescission	(2)	
	Total	36,784,484	
Pennsylvania, University Park Pasture Systems & Watershed Management Research	2019 Design and Construction	$21,900,000	New funding was provided in 2019. Project includes construction at the Klingerstown, PA field site. Project transferred to USACE for managing the design and construction. Design started in 1st Quarter 2021. Anticipated design completion for 1st Quarter 2022. Anticipated Contract Award for 3rd Quarter 2022. Program of requirements and design-bid-build documents being prepared by USACE-Baltimore District (in-house). Budget may not allow for any work at Klingerstown.
South Carolina, Charleston U.S. Vegetable Laboratory	1988 Feasibility Study	$50,000	Construction of Phase 1 (Laboratory) and Phase 2A (Headhouse) completed. Phase 2B (Greenhouse) construction awarded 2nd Quarter 2007 and completed 4th Quarter 2008. Reprogrammed from Horticultural Crop and Water Management Research Laboratory, Parlier, CA.
	1990 Planning and 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	
	2011 Rescission	(517)	
	Total	33,439,798	
Texas, Houston Children's Nutrition Research Center	2016 Design and Construction	$29,200,000	Design (bridging documents stage) awarded for 4th Quarter 2016 and completed in the 4th Quarter 2017. Construction solicitation on hold pending Congressional B&F Funding decisions for ARS. Project transferred to USACE for managing the design and construction. Project re-started in 4th Quarter 2020. Anticipated design complete in 4th Quarter 2021. Anticipate contract award in 2nd Quarter 2022. Construction completion date projected for 4th Quarter 2024.
Texas, Kerrville	2008 Planning and Design	$1,390,200	POR completed 2nd Quarter 2010 for a new site. Project transferred to USACE for managing the design and construction. The design was awarded for 1st Quarter 2019 and plan to be complete in the 2nd Quarter 2021. Anticipated construction award in 4th Quarter 2021.
Knipling Bushland Laboratory	2009 Planning and Design	1,957,000	
	2011 Rescission	(2,768,214)	
	2017 Planning and Design	3,700,000	
	2018 Construction	50,700,000	
	Total	54,978,986	
Texas, Temple	2017 Planning and Design	$1,400,000	In 2017, funding was appropriated for planning and design of a laboratory modernization at Temple and repairs at the associated field site in Riesel, TX. The POR and Investigative Study was awarded for 1st Quarter 2018. Additional funding provided in 2018 for construction. Design was completed in the 4th Quarter 2019. Construction awarded in the 4th Quarter 2020. Construction completion of Phase 1 is planned for 1st Quarter 2022. The final Phase 2 Construction completion is planned for 1st Quarter 2023.
Grassland Soil & Water Research Laboratory	2018 Construction	18,700,000	
	Total	20,100,000	
Utah, Logan Agricultural Research Center	2008 Planning and Design	$5,560,800	Lease completed 3rd Quarter 2010. POR completed in the 4th Quarter 2010.
	2009 Design and Construction	4,351,000	
	2010 Construction	4,527,000	
	2011 Rescission	(13,839,929)	
	Total	598,871	

Washington, Pullman Pullman ARS Research Laboratory	2004 Planning and Design 2005 Construction 2006 Construction 2008 Construction 2009 Construction 2010 Construction 2011 Rescission 2019 Design and Construction Total	$3,936,636 2,976,000 3,588,750 1,869,819 2,192,000 3,740,000 (17,240,830) 104,900,000 105,962,375	Lease agreement with Washington State University in place. Conceptual Design (35%) completed. New funding was provided in 2019. The previous design, completed to 35% cannot be used. Project transferred to USACE for managing the design and construction. A-E awarded for 4th Quarter 2020 and is planned to to be complete in 2nd Quarter of 2021. Anticipated contract award in 4th Quarter 2022.
West Virginia, Kearneysville Appalachian Fruit Laboratory	2003 Planning and Design 2004 Construction 2005 Construction 2006 Construction 2008 Planning and Design 2009 Planning and Design 2010 Construction 2011 Rescission Total	$471,913 1,789,380 3,608,896 2,024,550 1,529,220 783,000 2,000,000 (3,430,725) 8,776,234	Construction of Phases 1 and 2 (immediate laboratory repairs and renovation) completed in 3rd Quarter 2007. The construction of the Greenhouse completed in 1st Quarter 2008. POR for the new laboratory completed in 2nd Quarter 2010. Conceptual design for new laboratory completed in the 3rd Quarter 2011.
West Virginia, Leetown National Center for Cool and Cold Water Aquaculture (Broodstock Facility)	2002 Design and Construction 2006 Construction 2011 Rescission Total	$2,200,000 891,000 (4,717) 3,086,283	Construction completed in the 3rd Quarter 2008.
Wisconsin, Marshfield Nutrient Management Laboratory	2003 Planning, Design and Construction 2004 Construction 2005 Construction 2006 Construction 2011 Rescission Total	$2,980,500 3,668,229 4,860,800 7,920,000 (18,229) 19,411,300	Design (100%) of Phase 1 and Phase 2 completed. Phase 1 (Nutrient Lab) construction completed in the 4th Quarter 2008. Phase 2 construction (Animal Holding Facility) awarded for 4th Quarter 2007. Phase 2 construction completed in the 1st Quarter 2010.
Wisconsin, Prairie du Sac	2008 Planning and Design	$2,502,360	POR completed 3rd Quarter 2011. New funding was provided in 2019. Funds

Dairy Forage Agriculture Research Center	2009 Construction 2010 Construction 2011 Rescission 2019 Design and Construction Total	2,002,000 4,000,000 (7,675,381) 71,700,000 72,528,979	have been transferred to the USACE to manage design and construction of this project. Anticipated A-E award in 2nd Quarter 2021. Design completion in the 4th Quarter of 2021. Anticipated contract award for 2nd Quarter 2022.
Emergency Hurricane Supplemental Funding	2018 Planning, Design and Construction	$22,000,000	In 2019, more than 30% of contracts were awarded for Hurricane Irma & Maria damages. In 2020, an additional 13% of funds were awarded on contracts. The majority of the awarded funds included farm road and drainage improvements, installation of an emergency backup generator, fuel tank and physical security measures. Final designs, specifications, and drawings for electrical distribution upgrades and quarantine facility renovations were turned over to the procurement process. The award of the construction phase of those requirements is in process. Contracts previously awarded approximately 84% of work was completed.