

**2025 USDA EXPLANATORY NOTES - AGRICULTURAL RESEARCH SERVICE**

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**PREFACE**

This publication summarizes the fiscal year (FY) 2025 Budget for the U.S. Department of Agriculture (USDA). Throughout this publication any reference to the “Budget” is in regard to the 2025 Budget, unless otherwise noted. All references to years refer to fiscal year, except where specifically noted. The budgetary tables throughout this document show actual amounts for 2022 and 2023, annualized Continuing Resolution levels for 2024, and the President’s Budget request for 2025. Amounts for 2024 estimated levels include: non-enacted amounts such as Full-Time Equivalent levels, fleet levels, information technology investment levels, recovery levels, transfers in and out, balances available end of year, and obligation levels.

Throughout this publication, the “2018 Farm Bill” is used to refer to the Agriculture Improvement Act of 2018. Most programs funded by the 2018 Farm Bill are funded through 2023. Amounts shown in 2024 and 2025 for most Farm Bill programs reflect those confirmed in the baseline.

Pursuant to the Balanced Budget and Emergency Deficit Control Act of 1985, sequestration is included in the numbers for mandatory programs in 2022, 2023, 2024 and 2025.

In tables throughout this document, amounts equal to zero (0) are displayed as dashes (-). Amounts less than 0.5 and greater than zero are rounded and shown as a zero (0). This display treatment is used to prevent the masking of non-zero amounts that do not round up to one (1).

**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, 2023, there were 5,334 permanent, full-time employees including 538 in the Headquarters offices and 4,796 in field offices.

**OIG AND GAO REPORTS**

**Table ARS-1. Closed, Implemented OIG Reports**

<b>ID</b>	<b>Date</b>	<b>Title</b>	<b>Result</b>
50401-0021-11	11/14/2022	USDA’s Consolidated Financial Statements for Fiscal Years 2022 and 2021	Since USDA has actions planned and in progress, OIG made no further recommendations herein.
50024-0003-24	5/22/2023	USDA’s Compliance with Improper Payment Requirements for Fiscal Year 2022	OIG made no recommendations to the REE mission area.
13601-0002-22	6/26/2023	Agriculture and Food Research Initiative	OIG recommended that NIFA complete all required compliance reviews from 2019; establish a process to periodically review grants for timely close out and deobligation of funds; establish a process to document why any compliance review is not completed timely; and establish a process to document monitoring of grantees’ progress reports and Federal Financial Reports. NIFA has completed all required compliance reviews from 2019 and has established a process to document why any compliance review is not completed timely. NIFA is still addressing the remaining three recommendations.
50503-0011-12	7/2/2023	U.S. Department of Agriculture, Office of the Chief Information Officer, Fiscal Year 2023 Federal Information Security Modernization Act	OIG provided 22 recommendations. Research, Education, Economics (REE) is in the process of implementing a standardize process for the system teams to conduct, monitor, and maintain user access request forms prior to granting system access.
11303-0003-12	9/15/2023	Independent Service Auditor’s Report on National Finance Center's Description and Operating Effectiveness of Its Payroll and Personnel Systems for October 2022 Through June 2023	OIG did not provide any recommendations.
11301-0001-23	9/29/2023	Agreed-Upon Procedures— Employee Benefits, Withholdings, Contributions, and Supplemental Semiannual Headcount Reporting Submitted to the Office of Personnel Management for Fiscal Year 2023	OIG did not provide any recommendations.

**Table ARS-2. Closed, Implemented GAO Reports**

<b>ID</b>	<b>Date</b>	<b>Title</b>	<b>Result</b>
GAO-23-106042	12/8/2022	National Security Space: Overview of Contracts for Commercial Satellite Imagery	There were no USDA recommendations.

<b>ID</b>	<b>Date</b>	<b>Title</b>	<b>Result</b>
GAO-23-104709	1/13/2023	Agency Relocations: Following Leading Practices Will Better Position USDA to Mitigate the Ongoing Impacts on Its Workforce	GAO provided 8 recommendations. ERS and NIFA are working to address each of the recommendations.
GAO-23-104557	2/16/2023	Climate Change: Options to Enhance the Resilience of Agricultural Producers and Reduce Federal Fiscal Exposure	GAO recommended that the Office of the Chief Economist, analyzes the options to enhance the climate resilience of agricultural producers that were identified in this report and integrates them, as appropriate, into USDA's future climate resilience prioritization and planning efforts. USDA will continue to assess USDA's progress towards completing this analysis.
GAO-23-105300	3/27/2023	Sustainable Aviation Fuel: Agencies Should Track Progress Toward Ambitious Federal Goals [Reissued with Revisions May 17, 2023]	GAO recommended that DOE and USDA develop and incorporate into the Grand Challenge Roadmap performance measures that enable the agencies to evaluate their actions and the effect of policy on SAF production and communicate the extent to which SAF is poised to contribute to larger aviation greenhouse gas emissions reduction goals.
GAO-23-105846	3/28/2023	Food Prices: Information on Trends, Factors, and Federal Roles	GAO did not provide any recommendations.
GAO-23-105538	4/12/2023	Federal Spending: Information on U.S. Funding to Entities Located in China	GAO did not provide any recommendations.
GAO-23-106561	9/28/2023	Tracking the Funds: Specific 2023 Provisions for Federal Agencies	GAO did not provide any recommendations.
GAO-23-106318	9/28/2023	Tracking the Funds: Agencies Have Begun Executing 2022 Community Project Funding/Congressionally Directed Spending	GAO did not provide any recommendations.
GAO-23-106338	9/29/2023	Small Business Research Programs: Most Agencies Allow Applicants to Define Needs and Propose Solutions	GAO did not provide any recommendations.
GAO-24-106144	10/31/2023	Sugar Program: Alternative Methods for Implementing Import Restrictions Could Increase Effectiveness	GAO recommended that USDA should evaluate the effectiveness of the WTO raw sugar tariff-rate quota allocation method versus other tariff-rate quota allocation methods to determine which would most effectively maintain an adequate sugar supply and minimizes costs to the government. USDA is addressing the recommendation.
GAO-24-106130	11/16/2023	Dietary Guidelines for Americans: Strengthening Interagency Collaboration Could Help Inform Nutrition Research and Future Guidelines	GAO recommended that the REE should fully incorporate seven leading interagency collaboration practices in order to better inform and prioritize DGA-related nutrition research.
GAO-24-106237	11/16/2023	Federal Spending Transparency: Opportunities Exist to Improve COVID-19 and Other Grant	GAO did not direct any recommendations to USDA.

ID	Date	Title	Result
		Subaward Data on USAspending.gov	
GAO-24-106400	11/16/2023	Small Business Research Programs: Agencies Are Implementing Programs to Manage Foreign Risks and Plan Further Refinement	GAO did not direct any recommendations to USDA.
GAO-24-106399	11/28/2023	Small Business Research Programs: Information Regarding Subaward Use and Data Quality	GAO did not direct any recommendations to USDA.
GAO-24-106086	12/4/2023	Crop Insurance: Update on Opportunities to Reduce Program Costs	USDA did not have any comments on the report.

**AVAILABLE FUNDS AND FTEs**

*Table ARS-3. Available Funds and FTEs (thousands of dollars, FTEs)*

Item	2022		2023		2024		2025	
	Actual	FTEs	Actual	FTEs	Estimated	FTEs	Estimated	FTEs
<b>Salaries and Expenses:</b>								
Discretionary Appropriations	\$1,633,996	5,698	\$1,744,779	5,656	\$1,744,279	5,656	\$1,755,512	5,794
Mandatory Appropriations.....	18,860	-	-	-	-	-	-	-
Offsetting Collections.....	-374	-	-	-	-	-	-	-
<b>Buildings and Facilities:</b>								
Discretionary Appropriations.....	127,805	-	\$132,297	-	\$132,297	-	\$28,405	-
Total Discretionary Appropriations.....	1,761,801	5,698	1,877,076	5,656	1,876,576	5,656	1,783,917	5,794
Total Offsetting Collections.....	-374	-	-	-	-	-	-	-
Total Adjusted Appropriation.....	1,780,287	5,698	1,877,076	5,656	1,876,576	5,656	1,783,917	5,794
Balance Available, SOY.....	188,855	-	174,390	-	280,256	-	200,489	-
Recoveries, Other.....	29,095	-	23,546	-	-	-	-	-
Total Available.....	1,998,237	5,698	2,075,012	5,656	2,156,832	5,656	1,984,406	5,794
Lapsing Balances.....	-3,212	-	-2,158	-	-	-	-	-
Balance Available, EOY.....	-174,390	-	-280,256	-	-200,489	-	-201,915	-
Total Obligations, ARS.....	1,820,635	5,698	1,792,598	5,656	1,956,343	5,656	1,782,491	5,794
<b>Other USDA:</b>								
Agricultural Marketing Service, AMS....	129	-	2,196	7	2,196	7	2,196	7
Animal & Plant Health Inspection Service, APHIS.....	24,007	68	23,521	75	23,521	75	23,521	75
Commodity Credit Corporation, CCC....	272	1	1,124	4	1,124	4	1,124	4
Departmental Administration.....	-	-	1,023	3	1,023	3	1,023	3
Economic Research Service, ERS.....	6,616	19	6,442	21	6,442	21	6,442	21
Food & Nutrition Service, FNS.....	-	-	558	2	558	2	558	2
Food Safety & Inspection Services, FSIS.....	5,432	15	6,377	20	6,377	20	6,377	20
Foreign Agricultural Service, FAS.....	1,017	3	524	2	524	2	524	2
Forest Service, FS.....	1,411	4	2,079	7	2,079	7	2,079	7
National Agricultural Statistics Service, NASS.....	8,836	24	8,922	29	8,922	29	8,922	29
National Institute of Food and Agriculture, NIFA.....	40,634	115	36,202	116	36,202	116	36,202	116
Natural Resources Conservation Service, NRCS.....	8,374	24	12,714	41	12,714	41	12,714	41
Office of the Chief Economist, OCE.....	-	-	275	1	275	1	275	1
Office of the Chief Information Officer, OCIO.....	400	1	1,237	4	1,237	4	1,237	4
Office of Civil Rights.....	173	1	-	-	-	-	-	-
Office of Communications.....	-	-	317	1	317	1	317	1
Office of the Secretary.....	2,329	7	6,720	21	6,720	21	6,720	21
Patent Collections.....	143	1	-	-	-	-	-	-
Quarters and Subsistence.....	251	1	-	-	-	-	-	-
Revocable Permits and Easements.....	560	2	817	3	817	3	817	3

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Item	2022		2023		2024		2025	
	Actual	FTEs	Actual	FTEs	Estimated	FTEs	Estimated	FTEs
Sale of Animals & Personal Property (Proceeds) .....	11,944	34	14,894	48	14,894	48	14,894	48
Misc., Other USDA Funds.....	131	-	368	1	368	1	368	1
Total, Other USDA .....	112,659	320	126,310	404	126,310	404	126,310	404
Total, Agriculture Available .....	1,933,294	6,018	1,918,908	6,060	2,082,653	6,060	1,908,801	6,198
Other Federal Funds:								
Agency for International Development ..	288	1	916	3	916	3	916	3
Department of Defense, DOD.....	1,423	4	1,896	6	1,896	6	1,896	6
Department of Energy, DOE.....	511	1	635	2	635	2	635	2
Department of Health & Human Services, DHHS .....	2,916	7	3,349	11	3,349	11	3,349	11
Department of Homeland Security, DHS	543	1	433	1	433	1	433	1
Department of the Interior, DOI .....	2,291	7	2,274	7	2,274	7	2,274	7
Department of Treasury .....	147	-	-100	-	-100	-	-100	-
Departmental Administration.....	225	1	-	-	-	-	-	-
Environmental Protection Agency, EPA	200	1	101	-	101	-	101	-
Farm Production and Conservation Business Center.....	980	3	-	-	-	-	-	-
Federal Emergency Management Agency, FEMA .....	-	-	298	1	298	1	298	1
Food and Nutrition Service.....	4,085	12	-	-	-	-	-	-
National Aeronautics & Space Administration, NASA .....	602	2	283	1	283	1	283	1
United States Geological Survey, USGS	583	2	-	-	-	-	-	-
Misc., Other Federal Funds.....	32	-	86	-	86	-	86	-
Total, Other Federal .....	14,826	42	10,171	32	10,171	32	10,171	32
Non-Federal Funds:								
Arizona Board of Regents	101	-	-	-	-	-	-	-
Arizona, University of .....	-	-	111	-	111	-	111	-
Arkansas, University of .....	109	-	-	-	-	-	-	-
Binational Agricultural Research & Development (BARD) .....	288	1	165	1	165	1	165	1
Cal Fire.....	354	1	-	-	-	-	-	-
California Agriculture Export Commission .....	148	1	151	1	151	1	151	1
California Department of Food & Agriculture .....	329	1	-	-	-	-	-	-
California Department of Social Services .....	403	1	-	-	-	-	-	-
California State University .....	249	1	487	2	487	2	487	2
California, State of.....	1,223	3	2,424	8	2,424	8	2,424	8
California, University of .....	2,038	6	2,668	10	2,668	10	2,668	10
California Walnut Board & Commission	218	1	-	-	-	-	-	-
Center for Produce Safety .....	282	1	381	1	381	1	381	1
Citrus Research & Development Foundation .....	546	2	171	1	171	1	171	1
Citrus Research Board .....	247	1	456	1	456	1	456	1
Clemson University .....	373	1	406	1	406	1	406	1
Colorado State University.....	208	1	-	-	-	-	-	-
Connecticut, University of.....	342	1	125	-	125	-	125	-
Cornell University.....	416	1	439	1	439	1	439	1
Cotton Incorporated .....	626	2	798	3	798	3	798	3
Florida Department of Agriculture & Consumer Service .....	104	-	180	1	180	1	180	1
Florida Fish and Wildlife .....	252	1	-	-	-	-	-	-
Florida, University of.....	914	3	653	2	653	2	653	2
Georgia, University of .....	444	1	712	2	712	2	712	2
Idaho, University of .....	-	-	208	1	208	1	208	1
Illinois, University of .....	769	2	370	1	370	1	370	1
Iowa State University.....	201	1	138	-	138	-	138	-
Kansas State University .....	-	-	174	1	174	1	174	1
Maryland, University of.....	-	-	109	-	109	-	109	-

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Item	2022		2023		2024		2025	
	Actual	FTEs	Actual	FTEs	Estimated	FTEs	Estimated	FTEs
Massachusetts, University of .....	121	-	-	-	-	-	-	-
Miami Date County.....	138	-	-	-	-	-	-	-
Michigan State University .....	292	1	297	1	297	1	297	1
Mississippi State University .....	-	-	100	-	100	-	100	-
Missouri, University of .....	-	-	246	1	246	1	246	1
Missouri Soybean Merchandising Council.....	-	-	116	-	116	-	116	-
Montana Department of Agriculture.....	-	-	102	-	102	-	102	-
Montana State University .....	-	-	117	-	117	-	117	-
National Cattlemens Beef Association ...	-	-	187	1	187	1	187	1
National Pork Board .....	121	-	-	-	-	-	-	-
Nebraska, University of .....	242	1	278	1	278	1	278	1
New Mexico Consortium.....	293	1	286	1	286	1	286	1
New Mexico State University.....	-	-	225	1	225	1	225	1
Noble Research Institute .....	-	-	484	2	484	2	484	2
North Carolina State University.....	885	3	444	1	444	1	444	1
North Carolina, University of .....	134	-	113	-	113	-	113	-
North Dakota State University.....	113	-	-	-	-	-	-	-
Ohio Department of Agriculture.....	229	1	-	-	-	-	-	-
Ohio State University.....	188	-	352	1	352	1	352	1
Pennsylvania State University .....	524	1	357	1	357	1	357	1
Pennsylvania, University of .....	510	1	498	2	498	2	498	2
Root Applied Sciences .....	-	-	151	1	151	1	151	1
Smith Bucklin Corporation .....	2,337	7	2,095	7	2,095	7	2,095	7
South Florida Water Management District.....	894	3	1,003	3	1,003	3	1,003	3
Southern California, University of.....	169	-	148	1	148	1	148	1
Southwest Florida Water Management...	111	-	-	-	-	-	-	-
Tennessee State University .....	149	1	106	-	106	-	106	-
Tennessee, University of.....	120	-	-	-	-	-	-	-
Texas A&M University (TAMU).....	555	2	417	1	417	1	417	1
Texas Tech University .....	161	-	142	1	142	1	142	1
United Soybean Board .....	535	2	1,525	5	1,525	5	1,525	5
U.S. Highbush Blueberry Council .....	188	-	248	1	248	1	248	1
Vermont, University of .....	-	-	110	-	110	-	110	-
Virginia Polytechnic Institute .....	161	-	257	1	257	1	257	1
Washington State Department of Agriculture .....	302	1	314	1	314	1	314	1
Washington State University .....	580	2	603	2	603	2	603	2
Western Illinois University .....	123	-	179	1	179	1	179	1
Winrock International .....	113	-	149	1	149	1	149	1
Wisconsin, University of .....	123	-	280	1	280	1	280	1
Misc., Non-Federal Funds.....	2,830	8	3,178	10	3,178	10	3,178	10
Total, Non-Federal.....	24,425	69	26,433	85	26,433	85	26,433	85
Miscellaneous Contributed Funds.....	14,685	40	16,800	42	16,800	42	16,800	42
Total Available, ARS.....	1,987,230	6,169	1,972,312	6,219	2,136,057	6,219	1,962,205	6,357



**PERMANENT POSITIONS BY GRADE AND FTES***Table ARS-4. Permanent Positions by Grade and FTEs*

Item	2022 Actual			2023 Actual			2024 Estimated			2025 Estimated		
	D.C.	Field	Total	D.C.	Field	Total	D.C.	Field	Total	D.C.	Field	Total
SES.....	17	14	31	11	20	31	11	20	31	11	20	31
GS-15.....	127	632	759	51	708	759	51	708	759	52	726	778
GS-14.....	77	374	451	71	372	443	71	372	443	73	382	455
GS-13.....	142	374	516	179	355	534	179	355	534	184	364	548
GS-12.....	98	440	538	143	399	542	143	399	542	147	409	556
GS-11.....	96	401	497	65	429	494	65	429	494	67	440	507
GS-10.....	-	3	3	-	4	4	-	4	4	-	4	4
GS-9.....	88	904	992	42	962	1,004	42	962	1,004	43	987	1,030
GS-8.....	23	277	300	11	302	313	11	302	313	11	310	321
GS-7.....	54	470	524	44	493	537	44	493	537	45	506	551
GS-6.....	16	201	217	9	187	196	9	187	196	9	192	201
GS-5.....	6	100	106	7	92	99	7	92	99	7	94	101
GS-4.....	5	18	23	3	20	23	3	20	23	3	21	24
GS-3.....	-	10	10	-	10	10	-	10	10	-	10	10
GS-2.....	1	2	3	-	4	4	-	4	4	-	4	4
GS-1.....	-	1	1	-	1	1	-	1	1	-	1	1
Other Graded.....	5	-	5	5	-	5	5	-	5	5	-	5
Ungraded.....	-	489	489	-	488	488	-	488	488	-	501	501
Total Permanent....	755	4,710	5,465	641	4,846	5,487	641	4,846	5,487	657	4,971	5,628
Unfilled, EOY.....	225	71	296	103	50	153	103	50	153	105	41	146
Total Perm. FT EOY..	530	4,781	5,311	538	4,796	5,334	538	4,796	5,334	552	4,930	5,482
FTE*.....	481	5,688	6,169	490	5,729	6,219	490	5,729	6,219	504	5,853	6,357

**VEHICLE FLEET****Motor Vehicle Fleet**

The 2025 Budget proposes ten planned replacements of owned passenger motor vehicles. Passenger motor vehicles are defined as sedans and station wagons. As the Federal fleet transitions to electric vehicles, we are seeing an uptick of sedans being replaced with zero emissions vehicles. Since sedans are primarily used for travel to and from meetings, and conferences and for local use, they are more likely to encounter multiple charging stations along their route while being used to meet the agency mission.

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 through various types of terrain and weather conditions. 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 replaces vehicles based on utilization, maintenance costs, operating costs, and mission needs. ARS evaluates current vehicles against the proposed replacement to compare gains in fuel efficiency, increased safety features, and to ensure a like for like replacement or for a valid justification an upgrade in size or capabilities.

*Table ARS-5. Size, Composition, and Annual Costs of Motor Vehicle Fleet*

	Sedans and Station Wagons	Vans	SUVs	Light Trucks 4X2	Light Trucks 4X4	Medium Duty Vehicles	Buses	Heavy Duty Vehicles	Total Vehicles	Annual Operating Costs
<b>2018 End of Year Operating Inventory</b>	<b>205</b>	<b>245</b>	<b>738</b>	<b>438</b>	<b>596</b>	<b>722</b>	<b>3</b>	<b>163</b>	<b>3,110</b>	<b>\$4,628</b>
<b>2022 End of Year Operating Inventory.</b>	<b>144</b>	<b>173</b>	<b>644</b>	<b>361</b>	<b>539</b>	<b>735</b>	<b>1</b>	<b>146</b>	<b>2,743</b>	<b>3,483</b>
2023 Actual Acquisitions .....	-	-	20	-	74	1	-	4	99	
2023 Actual Disposals.....	18	22	-	35	-	-	-	-	75	
<b>2023 End of Year Operating Inventory.</b>	<b>126</b>	<b>151</b>	<b>664</b>	<b>326</b>	<b>613</b>	<b>736</b>	<b>1</b>	<b>150</b>	<b>2,767</b>	<b>3,451</b>
2024 Planned Acquisitions .....	-	-	6	-	4	3	-	-	13	
2024 Planned Disposals.....	6	-	-	1	-	-	-	-	7	
<b>2024 End of Year Operating Inventory.</b>	<b>120</b>	<b>151</b>	<b>670</b>	<b>325</b>	<b>617</b>	<b>739</b>	<b>1</b>	<b>150</b>	<b>2,773</b>	<b>3,900</b>
2025 Planned Acquisitions .....	-	-	-	-	-	-	-	-	-	
2025 Planned Disposals.....	-	-	-	-	-	-	-	-	-	
<b>2025 End of Year Operating Inventory.</b>	<b>120</b>	<b>151</b>	<b>670</b>	<b>325</b>	<b>617</b>	<b>739</b>	<b>1</b>	<b>150</b>	<b>2,773</b>	<b>4,407</b>

*Table ARS-6. Statement of Proposed Purchase of Passenger Motor Vehicles*

Fiscal Year	Net Active Fleet, SOY	Disposals	Replacements	Additions	Total Acquisitions	Net Active Fleet, EOY
2022	144	18	4	-	4	130
2023	130	16	12	-	12	126
2024	126	10	10	-	10	126
2025	126	10	10	-	10	126

**SHARED FUNDING PROJECTS****Table ARS-7. Shared Funding Projects (thousands of dollars)**

Item	2022 Actual	2023 Actual	2024 Estimated	2025 Estimated
<b>Working Capital Fund:</b>				
Administrative Services:				
Material Management Service .....	\$415	\$345	\$340	\$324
Mail and Reproduction Services .....	517	617	705	704
AskUSDA Contact Center .....	-	214	378	395
Fleet Charge Card Services .....	-	-	-	38
Integrated Procurement Systems .....	2,059	2,069	1,927	-
Procurement Operations Services .....	25	57	52	1,846
Human Resources Enterprise Management Systems .....	148	157	140	143
Subtotal .....	3,164	3,459	3,542	3,450
Communications:				
Creative Media & Broadcast Center .....	137	216	240	188
Finance and Management:				
National Finance Center .....	2,050	2,021	2,166	1,979
Financial Shared Services .....	5,800	6,024	6,841	6,678
Internal Control Support Services .....	114	113	98	94
Personnel and Document Security .....	-	300	346	348
Subtotal .....	7,964	8,458	9,451	9,099
Information Technology:				
Client Experience Center .....	24,581	25,540	24,347	24,745
Department Administration Information Technology Office .....	2	-	-	1
Digital Infrastructure Services Center .....	2,927	17,210	7,904	7,465
Enterprise Cybersecurity Services .....	-	2,500	4,241	4,713
Enterprise Data and Analytics Services .....	-	2,930	815	768
Enterprise Network Services .....	5,292	4,670	6,700	5,928
Subtotal .....	32,802	52,850	44,007	43,620
Office of the Executive Secretariat .....	33	88	92	59
Total, Working Capital Fund .....	44,100	65,071	57,332	56,416
<b>Department-Wide Shared Cost Programs:</b>				
Advisory Committee Liaison Services .....	4	-	-	-
Agency Partnership Outreach .....	397	449	436	436
Diversity, Equity, Inclusion and Accessibility .....	-	122	156	156
Employee Experience .....	-	210	218	218
Medical Services .....	145	136	137	137
National Capital Region Interpreting Services .....	68	102	129	129
Office of Customer Experience .....	548	196	188	188
Personnel and Document Security Program .....	116	-	-	-
Physical Security .....	267	276	274	274
Security Detail .....	283	307	313	313
Security Operations Program .....	390	425	444	444
Talent Group .....	-	221	193	193
TARGET Center .....	80	101	104	104
USDA Enterprise Data Analytics Services .....	276	-	-	-
Total, Department-Wide Reimbursable Programs .....	2,574	2,545	2,592	2,592
<b>E-Gov:</b>				
Budget Formulation and Execution Line of Business .....	7	6	6	6
E-Rulemaking .....	13	-	-	-
Financial Management Line of Business .....	6	6	7	7
Hiring Assessment Tool .....	14	-	-	-
Human Resources Line of Business .....	18	18	17	17
Integrated Acquisition Environment .....	36	55	52	51
Total, E-Gov .....	94	85	82	81
Agency Total .....	46,768	67,701	60,006	59,089

**ADVERTISING EXPENDITURES**

*Table ARS-8 Advertising Expenditures (thousands of dollars)*

<b>Item</b>	<b>2023 Actual Number of Contracts</b>	<b>2023 Actual Dollars Obligated</b>	<b>2024 Estimated Number of Contracts</b>	<b>2024 Estimated Dollars Obligated</b>	<b>2025 Estimated Number of Contracts</b>	<b>2025 Estimated Dollars Obligated</b>
Total Contracts for Advertising Services.....	9	\$344	3	\$258	3	\$86
Contracts for Advertising Services to Socially and Economically Disadvantaged Small Businesses .....	2	110	1	80	1	80
Contracts for Advertising Services to Women-Owned and Minority-Owned Small Businesses .....	2	110	1	80	1	80

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**ACCOUNT I: SALARIES AND EXPENSES**

**APPROPRIATIONS LANGUAGE**

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

*Salaries and Expenses*

For necessary expenses of the Agricultural Research Service and for acquisition of lands by donation, exchange, or purchase at a nominal cost not to exceed \$100, and for land exchanges where the lands exchanged shall be of equal value or shall be equalized by a payment of money to the grantor which shall not exceed 25 percent of the total value of the land or interests transferred out of Federal ownership, [~~\$1,938,303,000~~]\$1,755,512,000:

*Provided*, That appropriations hereunder shall be available for the operation and maintenance of aircraft and the purchase of not to exceed one for replacement only: *Provided further*, That appropriations hereunder shall be available pursuant to 7 U.S.C. 2250 for the construction, alteration, and repair of buildings and improvements, but unless otherwise provided, the cost of constructing any one building shall not exceed \$500,000, except for headhouses or greenhouses which shall each be limited to \$1,800,000, except for 10 buildings to be constructed or improved at a cost not to exceed \$1,100,000 each, and except for four buildings to be constructed at a cost not to exceed \$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 appropriations hereunder shall be available for entering into lease agreements at any Agricultural Research Service location for the construction of a research facility by a non-Federal entity for use by the Agricultural Research Service and a condition of the lease shall be that any facility shall be owned, operated, and maintained by the non-Federal entity and shall be removed upon the expiration or termination of the lease agreement: *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: *Provided further*, That appropriations hereunder shall be available for the Experienced Services Program at the Agricultural Research Service (16 U.S.C. 3851)

**LEAD-OFF TABULAR STATEMENT**

***Table ARS-9. Lead-Off Tabular Statement (In dollars)***

<b>Item</b>	<b>Amount</b>
Estimate, 2024	\$1,744,279,000
Change in Appropriation	+11,233,000
Budget Estimate, 2025	<u>1,755,512,000</u>

**PROJECT STATEMENT APPROPRIATIONS**

*Table ARS-10. Project Statement on Basis of Appropriations (thousands of dollars, FTEs)*

Item	2022		2023		2024		2025		Inc. or Dec.	FTEs Inc. or Dec.
	Actual	FTEs	Actual	FTEs	Estimated	FTEs	Estimated	FTEs		
Discretionary Appropriations:										
Salaries and Expenses .....	\$1,633,996	5,698	\$1,744,779	5,656	\$1,744,279	5,656	\$1,755,512	5,794	+\$11,233	+138
Subtotal .....	\$1,633,996	5,698	\$1,744,779	5,656	\$1,744,279	5,656	\$1,755,512	5,794	+\$11,233	+138
Mandatory Appropriations										
Human Nutrition .....	18,860	-	-	-	-	-	-	-	-	-
Subtotal .....	18,860	-	-	-	-	-	-	-	-	-
Offsetting Collections:										
Modernizing Government										
Technology Act.....	-374	-	-	-	-	-	-	-	-	-
Subtotal .....	-374	-	-	-	-	-	-	-	-	-
Total Adjusted Approp .....	1,652,482	5,698	1,744,779	5,656	1,744,279	5,656	1,755,512	5,794	+11,233	+138
Add back:										
Transfers In and Out, Rescissions....	374	-	-	-	-	-	-	-	-	-
Sequestration.....	1,140	-	-	-	-	-	-	-	-	-
Total Appropriation .....	1,653,996	5,698	1,744,779	5,656	1,744,279	5,656	1,755,512	5,794	+11,233	+138
Transfers Out:										
Modernizing Government										
Technology Act.....	-374	-	-	-	-	-	-	-	-	-
Total Transfers Out .....	-374	-	-	-	-	-	-	-	-	-
Sequestration	-1,140	-	-	-	-	-	-	-	-	-
Recoveries, Other.....	25,847	-	22,098	-	-	-	-	-	-	-
Bal. Available, SOY .....	88,406	-	112,949	-	133,430	-	-	-	-133,430	-
Total Available <sup>1</sup> .....	1,766,735	5,698	1,879,826	5,656	1,877,709	5,656	1,755,512	5,794	-122,197	+138
Lapsing Balances .....	-3,212	-	-2,158	-	-	-	-	-	-	-
Bal. Available, EOY .....	-112,949	-	-133,430	-	-	-	-	-	-	-
Total Obligations .....	1,650,574	5,698	1,744,238	5,656	1,877,709	5,656	1,755,512	5,794	-122,197	+138
<b>FTEs:</b>										
Direct .....		5,698		5,656		5,656		5,794		
Other.....		471		563		563		563		
Total, FTEs .....		6,169		6,219		6,219		6,357		

**FUNDING DETAIL APPROPRIATIONS**

*Table ARS-11. Additional Funding Detail Appropriations (thousands of dollars, FTEs)*

Allocations	2022 Actual		2023 Actual		2024 Estimated		2025 Estimated		Inc. or Dec.	FTEs Inc. or Dec.
	Actual	FTEs	Actual	FTEs	Estimated	FTEs	Estimated	FTEs		
<b>Salaries and Expenses</b>										
New Product Quality/ Value Added .....	\$125,635	527	\$135,271	522	\$135,220	522	\$132,113	525	-\$3,107	+3
Livestock Production .....	134,218	436	144,513	432	144,459	432	136,050	432	-8,409	-
Crop Production .....	325,014	1,129	349,943	1,119	349,813	1,119	354,566	1,140	+4,753	+21
Food Safety .....	121,300	711	134,625	711	134,625	711	136,218	723	+1,593	+12
Livestock Protection .....	144,230	443	155,293	439	155,233	439	154,069	439	-1,164	-
Crop Protection .....	234,815	829	252,825	822	252,730	822	231,451	834	-21,279	+12
Human Nutrition .....	122,740	331	110,843	331	110,843	331	126,433	370	+15,590	+39
Environmental Stewardship	271,917	1,138	292,773	1,128	292,663	1,128	302,310	1,179	+9,647	+51
National Agricultural Library	29,074	72	29,579	70	29,579	70	29,859	70	+280	-
National Bio and Agro-Defense Facility (O&M).....	118,909	82	112,558	82	112,558	82	125,887	82	+13,329	-
Repair and Maintenance .....	26,144	-	26,556	-	26,556	-	26,556	-	-	-
Total Allocations .....	1,653,996	5,698	1,744,779	5,656	1,744,279	5,656	1,755,512	5,794	+11,233	+138

<sup>1</sup> Discrepancy between project statement and MAX schedule X is the reimbursables.



**PROJECT STATEMENT OBLIGATIONS**

*Table ARS-12. Project Statement on Basis of Obligations (thousands of dollars, FTEs)*

Item	2022		2023		2024		2025		Inc. or Dec.	FTEs Inc. or Dec.
	Actual	FTEs	Actual	FTEs	Estimated	FTEs	Estimated	FTEs		
Discretionary Obligations:										
Salaries and Expenses .....	\$1,631,884	5,698	\$1,744,238	5,656	\$1,877,709	5,656	\$1,755,512	5,794	-\$122,197	+138
Subtotal .....	1,631,884	5,698	1,744,238	5,656	1,877,709	5,656	1,755,512	5,794	-122,197	+138
Mandatory Appropriations										
Human Nutrition .....	18,690	-	-	-	-	-	-	-	-	-
Subtotal .....	18,690	-	-	-	-	-	-	-	-	-
Total Obligations .....	1,650,574	5,698	1,744,238	5,656	1,877,709	5,656	1,755,512	5,794	-122,197	+138
Add back:										
Lapsing Balances .....	3,212	-	2,158	-	-	-	-	-	-	-
Balances Available, EOY:										
Balance Available, EOY .....	112,949	-	133,430	-	-	-	-	-	-	-
Total Balance Available, EOY ....	112,949	-	133,430	-	-	-	-	-	-	-
Total Available <sup>2</sup> .....	1,766,735	5,698	1,879,826	5,656	1,877,709	5,656	1,755,512	5,794	-122,197	+138
Less:										
Total Transfers Out .....	374	-	-	-	-	-	-	-	-	-
Sequestration .....	1,140	-	-	-	-	-	-	-	-	-
Recoveries, Other .....	-25,847	-	-22,098	-	-	-	-	-	-	-
Balance Available, SOY .....	-88,406	-	-112,949	-	-133,430	-	-	-	+133,430	-
Total Appropriation .....	1,653,996	5,698	1,744,779	5,656	1,744,279	5,656	1,755,512	5,794	+11,233	+138
<b>FTEs:</b>										
Direct .....		5,698		5,656		5,656		5,794		
Other .....		471		563		563		563		
Total, FTEs .....		6,169		6,219		6,219		6,357		

**FUNDING DETAIL OBLIGATIONS**

*Table ARS-1113. Additional Funding Detail Obligations (thousands of dollars, FTEs)*

Allocations	2022		2023		2024		2025		Inc. or Dec.	FTEs Inc. or Dec.
	Actual	FTEs	Actual	FTEs	Estimated	FTEs	Estimated	FTEs		
<b>Salaries and Expenses</b>										
New Product Quality/Value										
Added .....	\$124,700	527	\$135,216	522	\$148,785	522	\$132,113	525	-\$16,672	+3
Livestock Production .....	133,288	436	144,454	432	158,950	432	136,050	432	-22,900	-
Crop Production .....	324,354	1,129	349,801	1,119	384,904	1,119	354,566	1,140	-30,338	+21
Food Safety .....	121,300	711	134,625	711	134,625	711	136,218	723	+1,593	+12
Livestock Protection .....	143,305	443	155,229	439	170,805	439	154,069	439	-16,736	-
Crop Protection .....	233,937	829	252,723	822	278,803	822	231,451	834	-46,632	+12
Human Nutrition .....	121,430	331	110,843	331	110,843	331	126,433	370	+15,590	+39
Environmental Stewardship .....	271,059	1,138	292,654	1,128	322,021	1,128	302,310	1,179	-19,711	+51
National Agricultural Library .....	32,148	72	29,579	70	29,579	70	29,859	70	+280	-
National Bio and Agro-Biodefense Facility (O&M) .....	118,909	82	112,558	82	112,558	82	125,887	82	+13,329	-
Repair and Maintenance .....	26,144	-	26,556	-	26,556	-	26,556	-	-	-
Total Allocations .....	1,650,574	5,698	1,744,238	5,656	1,877,709	5,656	1,755,512	5,794	-122,197	+138

<sup>2</sup> Discrepancy between project statement and MAX schedule X is the reimbursables.

**JUSTIFICATION OF CHANGES*****Salaries and Expenses*****ARS is requesting \$1,755,512,000 in 2025 for its Salaries and Expenses account, an increase of \$11,233,000 from 2024.**

The 2025 Budget includes an increase of \$47,000,000 for high priority program initiatives. There is also an increase of \$13,000,000 for operations/maintenance 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 \$22,670,000 for increases for pay costs. The Budget proposes to shift \$71,437,000 in ongoing research to meet higher priority research demands.

***New Products/Product Quality/Value Added***

- (1) A decrease of \$3,107,000 and an increase of 3 FTEs for New Products/Product Quality/Value Added research (\$135,271,000 and 522 FTEs available in 2024).

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 that satisfy consumer needs in the United States and abroad.

Continuing New Products/Product Quality/Value Added base funding is essential for ARS to carry out 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 and products 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/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 \$2,093,000 for 2025 Pay.  
This increase will support the annualization of the 2024 5.2 percent Cost of Living pay increase and the 2025 2 percent Cost of Living pay increase. Funding for pay 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 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 \$7,000,000 for Smart Plants (Symbiont Technology for Sensing, Reporting, and Self-Treating Plants) of which \$1,000,000 and 3 FTEs is for ARS' New Products/Product Quality/Value Added Program.  
This is a crosscutting, multidisciplinary initiative which supports the following programs: New Products/Product Quality/Value Added and Crop Protection. A full description of the initiative is presented on title page, "Crosscutting/Multidisciplinary Initiatives" at the conclusion of the "Justification of Changes."
- C) A decrease of \$6,200,000 from ongoing research projects to support higher priority research.  
The goal of ARS' research programs is to make the most effective use of taxpayer dollars within available resources. In order to respond to priority national needs, it is often necessary to reset priorities within the existing portfolio of projects. As a result, some projects no longer qualify for continued support. The 2025 Budget has identified the following ongoing projects for elimination given that the majority of their research is carried out by other research institutions including universities and land grant institutions.
- Maryland, Beltsville – Forest Products Research (\$3,500,000)

- Mississippi, Oxford – Natural Products (\$2,318,000)
- Mississippi, Oxford – Appalachian Natural Products Research Program (\$382,000)

### ***Livestock Production***

- (2) A decrease of \$8,409,000 for Livestock Production research (\$144,513,000 and 432 FTEs available in 2024).

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 mission and 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 \$1,732,000 for 2025 Pay.

This increase will support the annualization of the 2024 5.2 percent Cost of Living pay increase and the 2025 2 percent Cost of Living pay increase. Funding for pay 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 costs would require ARS to absorb these costs and reduce planned hiring levels, eroding USDA's ability to meet key Administration priorities.

- B) A decrease of \$10,141,000 from ongoing research projects to support higher priority research.

The goal of ARS' research programs is to make the most effective use of taxpayer dollars within available resources. In order to respond to priority national needs, it is often necessary to reset priorities within the existing portfolio of projects. As a result, some projects no longer qualify for continued support. The 2025 Budget has identified the following ongoing projects for elimination given that the majority of their research is carried out by other research institutions including universities and land grant institutions.

- Florida, Fort Pierce - Marine Aquaculture Seedstock (\$2,170,000)
- Idaho, Aberdeen - Aquaculture Systems (Rainbow Trout) (\$289,000)
- Kentucky, Lexington - Improved Forage Livestock Production (\$809,000)
- Maryland, Beltsville - Bovine Genetics (\$194,000)
- Mississippi, Stoneville - Aquaculture Research National Warmwater Aquaculture Center (Catfish Health) (\$980,000)
- Mississippi, Stoneville - Aquaculture Warmwater Aquaculture (\$2,289,000)
- Nebraska, Clay Center - Rangeland Precision Livestock Management (\$450,000)

- West Virginia, Leetown - Aquaculture Research Coldwater Aquaculture/Precision Aquaculture (\$2,639,000)
- West Virginia, Leetown - Aquaculture Systems (Rainbow Trout) (\$145,000)
- Wisconsin, Madison- Great Lakes Aquaculture Research (\$176,000)

### ***Crop Production***

- (3) An increase of \$4,753,000 and 21 FTEs for Crop Production research (\$349,943,000 and 1,119 FTEs available in 2024).

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 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 out activities 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 \$4,486,000 for 2025 Pay.  
This increase will support the annualization of the 2024 5.2 percent Cost of Living pay increase and the 2025 2 percent Cost of Living pay increase. Funding for pay 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 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 \$4,000,000 for Circular Economy that Reimagines Corn (CERCA) of which \$3,300,000 and 12 FTEs is for ARS' Crop Production Program.  
This is a crosscutting, multidisciplinary initiative which supports the following programs: Crop Production and Environmental Stewardship. A full description of the initiative is presented on title page, "Crosscutting/Multidisciplinary Initiatives" at the conclusion of the "Justification of Changes."
- C) An increase of \$8,000,000 for per- and polyfluoroalkyl (PFAS) of which \$800,000 and 9 FTEs is for ARS' Crop Production Program.  
This is a crosscutting, multidisciplinary initiative which supports the following programs: Crop Production, Food Safety, and Environmental Stewardship. A full description of the initiative is presented on title page, "Crosscutting/Multidisciplinary Initiatives" at the conclusion of the "Justification of Changes."

D) An increase of \$3,000,000 for Plant Genetic Resources.  
*Need for Change*

The 2018 Farm Bill directed USDA to “develop and implement a national strategic germplasm and cultivar collection assessment and utilization plan that takes into consideration the resources and research necessary to address the significant backlog of characterization and maintenance of existing accessions considered to be critical to preserve the viability of, and public access to, germplasm and cultivars.” This National Strategic Germplasm and Cultivar Collection Assessment and Utilization Plan (hereafter the “National Plant Germplasm System Plan,” or NPGS) will contribute to the 2023-2026 USDA Science and Research Strategy Priority 4: “Cultivating Resilient Ecosystems, specifically the Key Strategy “Genetically characterize plants and animals within the USDA’s National Genetic Resources Program to better identify and catalog traits that enable future generations to adapt to climate change and to implement innovative solutions that improve sustainability.” The NPGS FY 2025 Initiative will begin to implement the Congressionally directed NPGS Plan and support the 2023-2026 USDA Science and Research Strategy Priority 2: Driving Climate-Smart Solutions, specifically Key Strategy “Continue to develop new crop germplasm, nursery seed stock, and animal breeds that are better adapted to climate-induced stresses.” This initiative will significantly support USDA Strategic Goal 1: Combat Climate Change to Support America’s Working Lands, Natural Resources and Communities; Goal 2: Ensure America’s Agricultural System is Equitable, Resilient, and Prosperous; and Goal 4: Provide All Americans Safe, Nutritious Food.

The preceding priorities and directive reflect U.S. agriculture’s and the U.S. government’s recognition that, for U.S. agricultural research, and crop production in general, to succeed, they need ready access to ample supplies of plant genetic resources (PGR) and associated descriptive information to deliver superior crop cultivars to U.S. producers, and abundant and safe food, fiber, fuel to U.S. and global consumers. But as the Congress and USDA have recognized, the NPGS genebanks, the paramount U.S. sources for those PGR and information, lack the capacity to meet the current increased demands. An external program review in 2021 by scientist, producer, commodity group, and seed industry customers and stakeholders, and a review of the NPGS Plan by the National Genetic Resources Advisory Council concluded that the quality of current NPGS PGR and associated information was superior, but the NPGS’s available capacity and budgetary resources to address all of its numerous responsibilities were judged as inadequate, and a proximate cause for serious operational backlogs facing the NPGS.

The Initiative focuses on increasing NPGS PGR maintenance capacities and beginning to expand PGR characterization and evaluation efforts. It will substantially influence the Agency’s performance in reducing and avoiding operational backlogs especially in the NPGS’s overall PG management program. The additional funds will enable the NPGS to serve U.S. agriculture more effectively, and to meet international standards for PGR genebank operations. They will increase NPGS capacity for PGR backing-up, quality testing, regeneration, and data management.

Diseases, pests, droughts, extreme temperatures, and market challenges threaten U.S. crops, whose farm gate value in 2020 was estimated as \$159 billion. The genes and traits in the NPGS PGR furnish the genetic raw material for researchers, breeders, and producers to meet those challenges. Unavailability of the NPGS PGR and associated descriptive information therefore represents a severe economic threat for the U. S. agricultural economy.

In addition to safeguarding and distributing invaluable PGR, the applied research conducted as part of the NPGS Plan will contribute to increasing the efficiency of managing the 605,000+ different samples in NPGS genebanks. Cost-benefit assessments conducted by the NPGS Plan documented that vegetatively propagated germplasm are the costliest to manage per sample. Consequently, research to perfect and apply long-term storage methods for such samples will be initial priorities because they are expected to generate the greatest immediate operational benefits. Similar cost-benefit assessments revealed that NPGS research should target developing more effective germplasm regeneration/seed increase methods for highly genetically-variable, outcrossing PGR that are the most expensive per sample to regenerate.

Implementing the initial phases of the NPGS Plan will:

- Safeguard more PGR via new cryopreservation methods and increase the quality and quantity of safety duplications;
- Regenerate problematic PGR requiring specialized methods;
- Identify additional seedborne and propagule-borne pathogens through testing, and “clean-up” such pathogens from more PGR;
- Conduct more comprehensive PGR germination and viability testing;
- Begin to develop and apply leading edge genotypic characterization approaches to generate genetic data crucial for optimal PGR management and utilization in research, breeding, and production; and
- Begin to devise and implement novel high through-put PGR evaluation methods to generate priority trait information that can catalyze crop research and accelerate genetic gain through plant breeding.

#### *Means to Achieve Change*

To meet increasing demands from researchers, breeders, and producers for PGR and associated information, plus reduce and avoid backlogs in PGR management operations, ARS will implement the following initial phases of the Congressionally directed NPGS Plan:

- Through research and expanded NPGS PGR management capacity, increase the proportion of NPGS PGR and associated information adequately maintained and available, thereby reducing and avoiding key PGR management backlogs (\$3,000,000).

#### *Partnerships and Collaborations*

20+ land-grant universities and state agricultural experiment stations (via cooperative and research support agreements); major commodity groups/research boards for 50+ crops economically important to the U.S.; and numerous crop breeding, genomics, and data science companies (e.g., American Seed Trade Association) who strongly support increased funding to expand NPGS research and genebank operations.

#### E) A decrease of \$6,833,000 from ongoing research projects to support higher priority research.

The goal of ARS’ research programs is to make the most effective use of taxpayer dollars within available resources. In order to respond to priority national needs, it is often necessary to reset priorities within the existing portfolio of projects. As a result, some projects no longer qualify for continued support. The 2025 Budget has identified the following ongoing projects for elimination given that the majority of their research is carried out by other research institutions including universities and land grant institutions.

- Hawaii, Hilo - Tropical Crops Research (\$354,000)
- Hawaii, Hilo - U.S. Pacific Basin Agriculture Research Center (\$134,000)
- Iowa, Ames - Bioinformatics Institute for Model Plants (\$841,000)
- Maryland, Beltsville - Cocoa, Coffee, and Alternative Crops Research (\$494,000)
- Maryland, Beltsville - Evaluation of Germplasm of Horticulture and Sugar Crops (\$278,000)
- Maryland, Beltsville Information Transfer - Genetic Resources (\$48,000)
- Maryland, Beltsville - National Clonal Repositories for Plant Germplasm (\$52,000)
- Mississippi, Poplarville - Woody Ornamentals (\$715,000)
- Mississippi, Stoneville - Agricultural Genomics (\$641,000)
- Mississippi, Stoneville - Kenaf and Medicinal Plants (\$418,000)
- North Carolina, Raleigh - Germplasm Enhancement of Maize (\$838,000)
- Ohio, Wooster - Greenhouse and Hydroponics (\$96,000)
- Ohio, Wooster - Greenhouse and Hydroponics/Great Lakes Aquaculture Research (\$96,000)
- Oregon, Corvallis - Hops (\$75,000)
- Utah, Logan - Alfalfa Pollinator Research Initiative (\$34,000)
- West Virginia, Kearneysville - Pollinator Recovery, Education, and Research Center (\$1,719,000)

**Food Safety**

- (4) An increase of \$1,593,000 and 12 FTEs for Food Safety research (\$134,625,000 and 711 FTEs available in 2024).

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 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 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.

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 \$2,850,000 for 2025 Pay.  
This increase will support the annualization of the 2024 5.2 percent Cost of Living pay increase and the 2025 2 percent Cost of Living pay increase. Funding for pay 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 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 \$8,000,000 for PFAS of which \$1,600,000 and 12 FTEs is for ARS' Food Safety Program.  
This is a crosscutting, multidisciplinary initiative which supports the following programs: Crop Production, Food Safety, and Environmental Stewardship. A full description of the initiative is presented on title page, "Crosscutting/Multidisciplinary Initiatives" at the conclusion of the "Justification of Changes."
- C) A decrease of \$2,857,000 from ongoing research projects to support higher priority research.  
The goal of ARS' research programs is to make the most effective use of taxpayer dollars within available resources. In order to respond to priority national needs, it is often necessary to reset priorities within the existing portfolio of projects. As a result, some projects no longer qualify for continued support. The 2025 Budget has identified the following ongoing projects for elimination given that the majority of their research is carried out by other research institutions including universities and land grant institutions.
- Louisiana, New Orleans - Hyperspectral Imaging Technique (\$391,000)
  - Mississippi, Stoneville - Umbrella Project for Food Safety (\$1,015,000)
  - Pennsylvania, Wyndmoor - Food Safety Engineering (\$1,451,000)

**Livestock Protection**

- (5) A decrease of \$1,164,000 for Livestock Protection research (\$155,293,000 and 439 FTEs available in 2024).

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 pests and 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 \$1,759,000 for 2025 Pay.

This increase will support the annualization of the 2024 5.2 percent Cost of Living pay increase and the 2025 2 percent Cost of Living pay increase. Funding for pay 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 costs would require ARS to absorb these costs and reduce planned hiring levels, eroding USDA's ability to meet key Administration priorities.

B) A decrease of \$2,923,000 from ongoing research projects to support higher priority research.

The goal of ARS' research programs is to make the most effective use of taxpayer dollars within available resources. In order to respond to priority national needs, it is often necessary to reset priorities within the existing portfolio of projects. As a result, some projects no longer qualify for continued support. The 2025 Budget has identified the following ongoing projects for elimination given that the majority of their research is carried out by other research institutions including universities and land grant institutions.

- Iowa, Ames - Bovine Pleuropneumonia (\$654,000)
- Maryland, Beltsville - Histomonas (\$432,000)
- Maryland, Beltsville - Emerging Animal Diseases that Exist Offshore (\$199,000)
- Maryland, Beltsville - Develop Alternatives to Antibiotics for Priority Diseases in Animal Agriculture (\$500,000)
- Maryland, Beltsville - Microbial Ecology of Antimicrobial Resistance (\$500,000)
- Mississippi, Stoneville - Red Imported Fire Ants (\$638,000)



***Crop Protection***

- (6) A decrease of \$21,279,000 and an increase of 12 FTEs for Crop Protection research (\$252,825,000 and 822 FTEs available in 2024).

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 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 from arthropods, 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 functions consistent 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 \$3,293,000 for 2025 Pay.  
This increase will support the annualization of the 2024 5.2 percent Cost of Living pay increase and the 2025 2 percent Cost of Living pay increase. Funding for pay 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 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 \$7,000,000 for Smart Plants (Symbiont Technology for Sensing, Reporting, and Self-Treating Plants) of which \$6,000,000 and 12 FTE is for ARS' Crop Protection Program.  
This is a crosscutting, multidisciplinary initiative which supports the following programs: New Product Quality/Value Added and Crop Protection. A full description of the initiative is presented on title page, "Crosscutting/Multidisciplinary Initiatives" at the conclusion of the "Justification of Changes."
- C) A decrease of \$30,572,000 from ongoing research projects to support higher priority research.  
The goal of ARS' research programs is to make the most effective use of taxpayer dollars within available resources. In order to respond to priority national needs, it is often necessary to reset priorities within the existing portfolio of projects. As a result, some projects no longer qualify for continued support. The 2025 Budget has identified the following ongoing projects for elimination given that the majority of their research is carried out by other research institutions including universities and land grant institutions.
- Florida, Gainesville - Biological Control and Agricultural Research (\$44,000)
  - Hawaii, Hilo - Fruit Fly Eradication (Tephritid Fruit Fly) (\$232,000)
  - Hawaii, Hilo - Minor Crop Pest Control (\$165,000)
  - Hawaii, Hilo - Papaya Ringspot (\$174,000)
  - Hawaii, Hilo - U.S. Pacific Basin Agriculture Research Center (\$280,000)
  - Indiana, West Lafayette - Oat Virus (\$56,000)
  - Maryland, Beltsville - Minor Use Pesticides Umbrella Project (\$336,000)
  - Maryland, Beltsville - Area-Wide Management of Agricultural Pests (\$5,246,000)
  - Maryland, Beltsville - Potato Research (\$1,342,000)

- Maryland, Beltsville - Fusarium Head Blight of Wheat and Barley (\$9,715,000)
- Maryland, Beltsville - Floriculture and Nursery Research Initiative (\$3,681,000)
- Maryland, Beltsville - Small Fruit and Nursery Research (\$2,349,000)
- Maryland, Beltsville - National Plant Diseases Recovery System (\$1,384,000)
- Maryland, Beltsville - Wheat Stripe Rust Initiative (\$200,000)
- Maryland, Beltsville - National Predictive Modeling Tool Initiative (\$3,795,000)
- Mississippi, Stoneville - Cotton Genomics and Breeding (\$431,000)
- Mississippi, Stoneville - Cropping Systems Research (\$103,000)
- New York, Ithaca - Pear Thrips (Knapweed) (\$48,000)
- New York, Ithaca - Golden Nematode (\$141,000)
- Oregon, Corvallis - Eastern Filbert Blight (\$40,000)
- Oregon, Pendleton - Herbicide Resistance (\$76,000)
- Washington, Pullman - Herbicide Resistance (\$734,000)

### ***Human Nutrition***

- (7) An increase of \$15,590,000 and 39 FTEs for Human Nutrition research (\$110,843,000 and 331 FTEs available in 2024).

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 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 Americans 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 and related 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 \$1,327,000 for 2025 Pay.

This increase will support the annualization of the 2024 5.2 percent Cost of Living pay increase and the 2025 2 percent Cost of Living pay increase. Funding for pay 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 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 \$15,000,000 for Precision Nutrition and 30 FTEs.  
*Need for Change*

Our understanding of the relationship between food-related physiologic processes underlying health and the prevention of diet-related disease is constantly expanding, but still incomplete. It is increasingly recognized that there is large variability in individual responses to diets and environment and such variability is not well characterized. There is also appreciation that individual genetic, epigenetic, phenotypic, and microbiome differences influence how dietary intake and physical activity affect health.

In the past, dietary guidance has used a “one-size-fits-all” approach, but emerging evidence suggests that many subpopulations have different responses to diets and chronic disease risk. As an example, present dietary guidelines address general recommendations for reducing the risk of type-2 diabetes, but some ethnic groups such as Native Americans have rates of diabetes much higher than the average. There is a need to understand this disparity and determine the best dietary guidance for such groups as well as subpopulations delineated by age, sex, physiologic status (e.g. pregnancy), ethnicity, health, genetics, epigenetics, and activity level. Achieving this will require new research techniques and approaches.

An emerging area of nutrition, precision nutrition, seeks to understand needs and variability for different sub-populations. Precision nutrition requires expertise and integration of multiple data sources including data on diet, genetics, epigenetics, microbiomes, environmental factors, and other factors. Machine learning and artificial intelligence approaches are needed to structure and integrate the large amounts of data, and for the development of algorithms to better understand and predict interactions between food- and nutrition-related data and health outcomes. ARS scientists are uniquely qualified to address these gaps. This research will address USDA Strategic Goal 4: Provide All Americans Safe, Nutritious Food and the Agency Equity Action Plan, and Tribal commitments.

As a result of this initiative ARS will provide:

- Previously unavailable scientific data for specific subgroups and populations that show the unique health outcomes resulting from changes to healthier diets.
- Better tailored nutritional recommendations such as the Dietary Guidelines for Americans to be more inclusive of data representing subpopulations.
- Enhanced nutritional guidance that improves the health of all U.S. citizens.
- Improved knowledge of how precision nutrition approaches can be applied to improve human health and prevent diet-related chronic diseases.
- Data on sources of inter-individual variability (phenotype, genotype, previous dietary intake, microbiota, etc.) with respect to responses to intake of food and its components, to inform algorithms for predicting optimal intake of foods and food components.
- More data on nutrient adequacy and requirements in specific population groups, including underserved and rural populations.
- Development of algorithms and programs that predict individual responses to food and dietary patterns.

*Means to Achieve Change*

- Improve metrics and standards like the U.S. Dietary Guidelines for Americans (DGA) to be more inclusive of data representing underserved populations: ARS researchers will develop and validate innovative methods of determining food intake, assessing nutrient status, and relating nutrient status to health outcomes in subpopulations (\$10,000,000). ARS will:
  - Conduct rigorous human studies in distinct subgroups and populations that assess the impact of healthy dietary patterns on physical, clinical, and biochemical markers of health and well-being.
  - Conduct analysis of foods consumed by underserved populations.
  - Develop innovative research tools and approaches (e.g. metabolomics) that enable precise determination of nutritional status in distinct subgroups and populations.

- Conduct research to understand the unique physiologic, metabolic and genetic/epigenetic profiles/responses of vulnerable subgroups and at-risk and underserved populations, and how diets alter those responses.
- Improve ARS capacity to interrogate multidimensional data: ARS supports machine learning and artificial intelligence technologies focused on developing algorithms to predict interactions between food- and nutrition-related chronic diseases (\$3,000,000). ARS will:
  - Utilize artificial intelligence, machine learning and Big Data approaches in combination with extensive datasets to uncover diet-disease relationships in distinct subgroups and populations.
- Increase healthy lifestyle and eating habits in children since the origins of many diet-related chronic diseases may begin in childhood: ARS supports research to understand what motivates children's diets and develop techniques to alter motivation towards healthy diets and whether this varies among subpopulation (\$2,000,000). ARS will:
  - Conduct research to understand the social, environmental, and cultural processes that guide children to adopt and sustain healthful food choices and eating patterns, and whether these barriers differ among subpopulations.
  - Evaluate methods of promoting diet and physical activity change in diverse populations.

#### *Partnerships and Collaborations*

This initiative will require partnership and collaboration among the six Human Nutrition Research Centers (HNRCs), and the Institute for Advancing Health through Agriculture at Texas A&M University and the Foods Systems Research Unit. Outside collaborations will be developed with NIH, the National Academies, Robert Wood-Johnson, Historically Black Colleges and Universities (HBCUs), Native American tribal councils, tribal colleges, community colleges with predominately Native American populations, state colleges and community colleges with predominantly Hispanic populations, investigational cohorts and other federal programs focusing on rural and urban poor.

#### C) An increase of \$2,000,000 for Nutrition Hubs and 9 FTEs. *Need for Change*

The COVID pandemic brought into sharp focus the health disparities of underserved communities in the U.S. Nutrition-related chronic disease is a special disparity; Native Americans and Hispanics have diabetes rates 1.8 and 1.7 times greater, respectively, than non-Hispanic whites, and African Americans are 30 percent more likely to die of heart disease than non-Hispanic white Americans. These disparities call attention to the need to both gather more information on the role of diet in these sub-populations as well as better disseminate current nutrition policy and advice. The President has focused on the need to better serve underserved communities, and this proposal is focused on the specific nutritional needs of these communities.

“Nutrition Hubs” established within the USDA will allow outreach and contact with underserved communities. The USDA operates six Human Nutrition Research Centers (HNRC) across the United States and each of these centers has access to unique populations with unique nutritional needs and problems. The hubs will connect and cooperate with the centers in Grand Forks, ND to access Native American populations, Boston, MA to access inner-city urban poor, Little Rock, AR to access rural poor, Beltsville, MD to access African American populations, Houston, TX to access the Hispanic population and Davis, CA to access farm workers and Asians. These connections will be important for: 1 – gathering data to understand unique nutritional barriers and challenges and more precisely define unique nutritional requirements and guidance; and 2 – disseminate nutrition policy, guidance, and advice. The hubs will work closely with 1890's schools, tribal colleges, HBCUs, minority serving community colleges and other federal research and outreach programs targeting underserved populations. Nutrition hubs will serve to connect research in support of the Cancer Moonshot with education, extension, and program efforts to turn specific science outcomes into knowledge transfer with improved and more equitable outcomes.

A new program will be created that includes a Nutrition Hub coordinating center with a program leader that will be located at an HNRC. The program leader will coordinate targeted activities at all of the HNRCs as well as establish grants and contracts with groups outside of USDA (e.g., 1890's colleges, tribal colleges). One nutrition scientist, who communicates with the program leader, will be placed at each of the six HNRCs. These scientists will develop specific collaborations and partnerships, focusing on institutions and programs that predominately serve the population of interest (e.g., Native American tribal councils, Cankdeska Cikana Community College, ND; Bowie State University, MD; University of Arkansas Pine Bluff, AR, investigational cohorts, food banks). These scientists will develop programs that gather information regarding specific nutritional concerns and disseminate current nutrition understanding, policy and guidance to the specific populations served by the center. These connections and collaborations will be fundamental to reducing health disparities and health care costs for a significant portion of the American population.

This research will address USDA Strategic Goal 4: Provide All Americans Safe, Nutritious Food and the Agency Equity Action Plan, and Tribal commitments.

*Expected Outcomes:*

- Foster relationships between ARS Human Nutrition Research Centers and underrepresented populations to enable human nutrition studies in underrepresented communities. Ensure that information collected is delivered back to them.
- Partner with Minority-Serving Institutions (MSI) to create training and developmental opportunities that increase MSI capacity to conduct research in underserved communities.
- Foster training and educational opportunities in precision nutrition and social/behavioral sciences, particularly for members from underrepresented communities.
- Support development of new technologies and approaches that increase data collection in communities. e.g., biosensors, mobile health units, etc.

*Means to Achieve Change*

- Nutrition hub coordinating centers (\$1,500,000). ARS will:
  - Hire a Program Director/Coordinator at the newly established Nutrition Hubs.
- Regional nutrition coordinators (\$500,000). ARS will:
  - Develop a program to place postdoctoral fellows in partnership (one at each institution) with existing nutrition centers/units and the Nutrition Hubs.

*Partnerships and Collaborations*

This initiative will require partnership and collaboration among each of the six HNRCs. Outside collaborations will be developed with Historically Black Colleges and Universities (HBCUs), Native American tribal councils, tribal colleges, community colleges with predominately Native American populations, state colleges and community colleges with predominantly Hispanic populations, investigational cohorts and other federal programs focusing on rural and urban poor.

D) A decrease of \$2,737,000 from ongoing research projects to support higher priority research.

The goal of ARS' research programs is to make the most effective use of taxpayer dollars within available resources. In order to respond to priority national needs, it is often necessary to reset priorities within the existing portfolio of projects. As a result, some projects no longer qualify for continued support. The 2025 Budget has identified the following ongoing projects for elimination given that the majority of their research is carried out by other research institutions including universities and land grant institutions.

- Maryland, Beltsville - Healthy Eating and Lifestyle for Total Health (HEALTH) (\$2,578,000)
- Massachusetts, Boston- Geriatric Nutrition Research (\$159,000)

*Environmental Stewardship*

- (8) An increase of \$9,647,000 and 51 FTEs for Environmental Stewardship research (\$292,773,000 and 1,128 FTEs available in 2024).

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.

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 and other industrial byproducts that maximize their potential benefits while protecting the environment and 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. 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' Environmental Stewardship 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 \$4,521,000 for 2025 Pay.  
This increase will support the annualization of the 2024 5.2 percent Cost of Living pay increase and the 2025 2 percent Cost of Living pay increase. Funding for pay 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 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 \$4,000,000 for Circular Economy that Reimagines Corn (CERCA) of which \$700,000 is for ARS' Environmental Stewardship Program).  
This is a crosscutting, multidisciplinary initiative which supports the following programs: Crop Production and Environmental Stewardship. A full description of the initiative is presented on title page, "Crosscutting/Multidisciplinary Initiatives" at the conclusion of the "Justification of Changes."
- C) An increase of \$8,000,000 and 45 FTEs for Greenhouse Gas Monitoring and Measuring.  
*Need for Change*

President Joe Biden on January 27, 2021 signed the "[Executive Order on Tackling the Climate Crisis at Home and Abroad](#)" affirming this administration's priority to place the climate crisis at the forefront of this Nation's foreign policy and national security planning, which included being leaders who promote ambitious approaches to meet the climate challenge. ARS has been a highly visible national and global leader for more than two decades in advancing the quantification and modeling of greenhouse gas (GHG) emissions and soil carbon storage in agricultural systems. Priorities have included developing key decision support tools that inform land and livestock managers about practices that can reduce GHG emissions and increase soil carbon storage, and by providing critical science and data for the National Greenhouse Gas

Inventory. The current need will enable ARS to make critical advances in the measurement, models and monitoring tools. ARS will conduct innovative research to improve the sensitivity, durability and accessibility of real time sensors and monitors; create automated data collection tools for GHG phenomena - such as those that currently exist for monitoring weather conditions; and develop and leverage new AI and other Big Data analytics tools to increase the capability, power and accuracy of our GHG monitoring, measurement, and inventory. A key outcome of these efforts will be to increase our capacity to quantify and/or predict the GHG impact of changing management strategies or developing new production technologies that are GHG neutral and that are climate smart.

Taken together, ARS will conduct critical research to address the climate challenge to enable U.S. production systems to be more adaptive and climate smart while also providing the tools needed to quantify and account for the benefits to the environment and society. The research will fill a critical need to improve our ability to accurately measure and monitor the agricultural contributors to GHG emissions and climate change (e.g., advanced approaches to provide more and better data for GHG emissions) and opportunities for the sector to reduce net emissions and become net neutral (e.g., practices that sequester carbon or that reduce GHG promoting chemicals, such as emissions of carbon dioxide, methane, or nitrous oxide). It is critical to our agricultural enterprise and to our national security that we have the tools and resources to better understand and measure GHG emissions and remediation approaches, as well as to better monitor them (and the effectiveness of our efforts to reduce them) so that GHG concerns can be adeptly addressed.

These new funds will allow ARS to establish a new research initiative developing the next generation of highly automated, Internet of Things (IoT) enabled GHG sensor design and deployment, and the Big Data and AI tools needed to integrate and analyze that data in support of the national research community. This constitutes the next generation advancement of existing ARS instrumentation and research networks such as GRACEnet and Livestock GRACEnet. Developing advanced data pipelines capable of moving standardized salient data from the field to an appropriate and diverse set of end users including researchers, policymakers and producer decision support communities to fully understand the utility and impact of agricultural GHG mitigation options. The overarching goal of this funding is to enable: (1) advanced sensors and measurement approaches for addressing all critical aspects of GHG emissions, and (2) optimized measurement and monitoring of these and related processes to address climate change. This will include development and optimization of sensors that measure and monitor outcomes of processes that seek to lower or abate emissions (e.g., via carbon sequestration, optimized nitrogen fertilization to combat nitrous oxide emissions, and others). It will also include research that seeks to make these sensors both more sensitive/accurate and less expensive, so that they can be widely deployed and used. Finally, this effort will include development and deployment of advanced data pipelines and end user applications such as geospatial decision support tools and GHG flux quantifiers. The outcome will be improved understanding of GHG fluxes and related processes, improved decision support tools and apps for a variety of end user communities, more accurate National GHG Inventory reporting, and ultimately a more resilient and climate smart agricultural sector producing ample food, feed, fiber, fuels and environmental services.

#### *Means to Achieve Change*

- Establish an ARS Agricultural Measurement and Monitoring Innovation Lab with a focus on sensor design and deployment and data integration across the ARS field network (\$1,382,000). ARS will:
  - Upgrade and expand current instrumentation and develop new instruments and low-cost sensor technologies, distributed initially to LTAR, GRACEnet and Livestock GRACEnet partner locations.
  - Leverage the historical power of GRACEnet, LTAR and other GHG efforts, and develop powerful tools for enhancing these via development of next generation Internet of Things (IoT), AI and Big Data capabilities and tools.
- Improve local, regional and national scale models and tools for quantifying GHG emissions and carbon storage resulting in new apps, tools and models adapted to the needs of a variety of public and industry stakeholders including producer decision support (\$918,000). ARS will:
  - Enhance the historically powerful GRACEnet network to lead in GHG assessment and modeling efforts and enable additional engagement with the measurement and monitoring data for facile data handling, storage and access via development of next generation IoT and Big Data capabilities and tools.

- Develop effective data pipelines and data standardization protocols to ensure maximum impact, functionality and accessibility of GHG measurement and monitoring data.
- Catalyze the innovation of soil carbon measurement and GHG emissions quantification through deployment of new sensor and data tools, improved data management and standardization, and tools for data sharing (\$700,000). ARS will:
  - Improve local, regional and national scale GHG monitoring data standardization and connectivity through enhancement of existing protocols and standards (e.g., LTAR and GRACEnet and PDI) and establishment of new efforts to streamline data delivery and increase impact. This will ensure network connectivity for widespread GHG measurement and monitoring coherence that further enables GHG assessment accuracy.
  - Enhance the LTAR network system for highly sensitive GHG measurement and monitoring that provides more accurate, regionally relevant outcomes from different practices seeking to mitigate GHG emissions, with a focus on advanced GHG sensor development and deployment, leveraging advances in the IoT.
- Enhance GHG measurement network data acquisition and processing by enabling leadership in Eddy Covariance (EC) system and other IoT instrumented data collection, assessment, and tool development for automated data processing (\$1,200,000). ARS will:
  - Establish the ARS Agricultural EddyFlux Network of high speed and IoT and Artificial Intelligence (AI) enabled EC measurement sensors and technologies for enhanced data collection, handling, assessment – all within a common and scientifically valid standardization environment. This will enable more rapid and powerful analysis from EC towers and the EddyFlux Network for better assessments of GHG mitigating practices and effects on emissions.
- Conduct systems-level data collection and analyses on livestock enteric methane, grazinglands soil carbon storage, and manure management emissions mitigation by creating a new GRACEnet site at the Meat Animal Research Center. (\$2,000,000). ARS will:
  - Establish a new GRACEnet partner site with a focus on beef production systems and evaluating opportunities to monitor and measure emissions and carbon storage across the livestock system and exploring opportunities to adapt the system to optimize productivity while shifting toward net neutrality with regards to GHG emissions.
  - Enable sensor developments that better assess and that enhance animal welfare for 1) respiratory exhaled methane and 2) digestive system emitted methane, and that seek to 3) measure and assess the entire livestock (initially cattle) digestive system for determining opportunities to reduce all livestock methane production and subsequent emissions.
- Develop or enhance technologies for methane measurement in livestock production systems (instrumented sites/animal sensors) resulting in forage and animal management strategies that mitigate GHG emissions and optimize carbon capture and storage across livestock, rangeland, pasture, feedlot and manure management systems. (\$1,800,000). ARS will:
  - Leverage sensor development to address animal in pasture and rangeland grazing systems and engage with GRACEnet Livestock network to implement robust sensor systems for these settings.

*Partnership and Collaborations*

Funding will create nationwide coordination among projects in ARS, and opportunities for collaboration with USDA Climate Hubs, USFS, NRCS, APHIS, and NIFA, as well as with BLM, NASA, Land Grant Universities (including 1890 and 1994 LGUs), and Tribal Nations. Through these partnerships, ARS will lead the way for conducting research to measure, monitor, and safeguard the most resilient production systems in the world.

D) An increase of \$8,000,000 for PFAS of which \$5,600,000 and 6 FTEs is for ARS' Environmental Stewardship Program.

This is a crosscutting, multidisciplinary initiative which supports the following programs: Crop



Production, Food Safety, and Environmental Stewardship. A full description of the initiative is presented on title page, “Crosscutting/Multidisciplinary Initiatives” at the conclusion of the “Justification of Changes.”

E) A decrease of \$9,174,000 from ongoing research projects to support higher priority research.

The goal of ARS’ research programs is to make the most effective use of taxpayer dollars within available resources. In order to respond to priority national needs, it is often necessary to reset priorities within the existing portfolio of projects. As a result, some projects no longer qualify for continued support. The 2025 Budget has identified the following ongoing projects for elimination given that the majority of their research is carried out by other research institutions including universities and land grant institutions.

- Arkansas, Booneville - Agroforestry (\$955,000)
- Kentucky, Bowling Green - Waste Management (\$405,000)
- Maryland, Beltsville - Global Change Research (\$125,000)
- Maryland, Beltsville - Air Quality Associated with Agricultural Operations (\$628,000)
- Mississippi, Oxford - Acoustics (\$695,000)
- Missouri, Columbia - Mid-West/Mid-South Irrigation (\$152,000)
- Montana, Miles City - Rangeland Precision Livestock Management (\$431,000)
- North Dakota, Mandan - Cover Crop and Grain Variety (\$872,000)
- Oklahoma, El Reno - Missouri River Basin Water Resource Management (\$450,000)
- Oregon, Burns - Rangeland Precision Livestock Management (\$450,000)
- Oregon, Pendleton - Herbicide Resistance (\$39,000)
- Texas, Bushland - Ogalla Aquifer (\$1,071,000)
- Washington, Pullman - Herbicide Resistance (\$363,000)
- Wisconsin, Madison - Cover Crop Outreach (\$1,453,000)
- Wisconsin, Madison - Dairy Forage Research (\$1,085,000)

### ***Library and Information Services***

(9) An increase of \$280,000 for Library and Information Services (\$29,579,000 and 70 FTEs available in 2024).

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 for 2025 Pay.

This increase will support the annualization of the 2024 5.2 percent Cost of Living pay increase and the 2025 2 percent Cost of Living pay increase. Funding for pay 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 costs would require ARS to absorb these costs and reduce planned hiring levels, eroding USDA’s ability to meet key Administration priorities.

***National Bio and Agro-Defense Facility - Operations and Maintenance***

- (10) An increase of \$13,329,000 for the National Bio and Agro-Defense Facility Operations and Maintenance (\$112,558,000 and 82 FTEs available in 2024).

The funding change is requested for the following items:

- A) An increase of \$329,000 for 2025 Pay.

This increase will support the annualization of the 2024 5.2 percent Cost of Living pay increase and the 2025 2 percent Cost of Living pay increase. Funding for pay 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 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 \$13,000,000 for the National Bio and Agro-Defense Facility -- Operations and Maintenance.

*Need for Change*

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.

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 the operation of NBAF.

*Means to Achieve Change*

- Operations and Maintenance (\$13,000,000). ARS will:
  - Increase training efforts to support this one-of-a-kind sophisticated biocontainment infrastructure to house large animals.
  - Increase operations and maintenance testing, and verification to ensure process readiness to meet NBAF mission. These efforts will provide subject matter expertise for facilities operations assessments on:
    - Critical infrastructure spare parts requirements,
    - Preventative Maintenance Program,
    - Standard Operating Procedure Program,
    - Computerized maintenance management system workflow,
    - Developing/optimizing current procedures/processes/documents for the NBAF Campus.

*Partnership and Collaborations*

With regards to Operations and Maintenance, NBAF will work closely with the National Centers for Animal Health and collaborate with other high containment facilities across the United States (Federal and University) to share best practices and lessons learned through operating unique and complex facilities.

## CROSSCUTTING/MULTIDISCIPLINARY INITIATIVES

**Smart Plants (Symbiont Technology for Sensing, Reporting, and Self-Treating Plants)**

ARS requests an increase of \$7,000,000 and 15 FTEs for this crosscutting, multidisciplinary initiative that will integrate research conducted in multiple agency program areas to achieve the expected outcomes. Funding increases for this initiative are located under the New Product Quality/Value Added and Crop Protection sections of this document.

*Need For Change*

Plants respond to attack, but can they report that they are under attack to the grower for treatment, and can the plant, itself, self-treat? That is, can plants be made more intelligent? DARPA recently completed its Advanced Plant Technology (APT) program, in which scientists successfully used synthetic biology (synbio) to arm plants with the ability to sense explosives or nerve agents, and even radiation, and to report the agents via leaf fluorescence changes (using anthocyanin pigments) sensed by field monitors, drones, and satellites. DARPA's purpose was to create a warning system for warfighters. For agriculture, there are clear applications.

Coincident with DARPA APT work, ARS laboratories in Ft. Pierce, FL, and Ithaca, NY, with partners at Albany, CA, Wapato, WA, developed a patented "Symbiont Technology" system. Symbionts are a new type of plant organ in which agrobacteria are used to produce small clusters of plant tissue that grow on the sides of plants and produce a benefit for them. The symbiont harmonizes with the biology of the plant and delivers therapy to the plant via vascular connections. For example, greenhouse studies have demonstrated that antibacterial peptides produced and delivered by a symbiont attack the bacterial pathogen that causes citrus greening, thus saving an infected tree. Field trials are planned for 2023, depending on APHIS permit approval. The symbiont cells can be easily cultured in low-cost media, and efficiently produce and secrete desirable proteins that can be continuously harvested, thus creating a new plant-based fermentation method for biomolecule production. Desired proteins and secondary metabolites can be engineered to accumulate in on-plant symbionts, and as such, these symbionts could be used as harvestable biofactories for producing chemicals for the bioeconomy, or for edible or injectable therapies for animals.

Symbiont technology represents a special plant self-treatment solution, one that comes with its own delivery mechanism. This technology is being developed for constitutive production of therapeutics to protect citrus trees from citrus greening; however, it might be possible to make plant "decisions" facultative, i.e., only producing therapeutics when under attack, and even have the plant decide among ways to report or among treatment options. The latter would be the final "self-treating" goal. To create plants that sense, report, and self-treat is now achievable, but will require extensive research.

The proposed research supports the following USDA Strategic Goals: Goal 1: Combat Climate Change to Support America's Working Lands, Natural Resources and Communities; Goal 2: Ensure America's Agricultural System is Equitable, Resilient, and Prosperous; Goal 3: Foster an Equitable and Competitive Marketplace for All Agricultural Producers; Goal 4: Provide All Americans Safe, Nutritious Food; Goal 5: Expand Opportunities for Economic Development and Improve Quality of Life in Rural and Tribal Communities; and Goal 6: Attract, Inspire, and Retain an Engaged and Motivated Workforce that's Proud to Represent USDA. It also supports the Administration's Executive Order on Environmental Justice.

*Expected Outcomes:*

- Development of the symbiont biofactory for production of biomolecules.
- A rapidly deployable (3-year commercial delivery goal for crops with an established symbiont system) plant improvement strategy that will revolutionize food security and support the Presidential Executive Order on Advancing Biotechnology and Biomanufacturing Innovation for a Sustainable, Safe, and Secure American Bioeconomy, with the potential of invigorating the economics of rural America.
- Ultimately, Smart Plants: An early warning system that can alert growers to problems before a plant has symptoms. Plants that can report disease, pests, or drought threats to the grower, and respond to those threats by self-treating.

*Means to Achieve Change*

This capacity-building proposal has two main thrusts. First, ARS scientists will build capacity to advance the plant symbiont system to provide solutions in multiple cropping systems, with the goal of solutions to insect-transmitted plant vascular bacterial diseases. This will open the door to expand the use of this system in developing “smart plants” that can adapt to stressors that limit crop productivity. Second, ARS scientists will create the capacity to produce functional nanobodies and demonstrate the capabilities of nanobodies for controlling plant bacterial and viral diseases. Both symbiont and nanobody research activities will be targeted at delivering therapeutic solutions to protect citrus, grape, cherry and olives from vascular diseases. It is expected that successful delivery of these solutions will drive the expanded application of both thrusts into other agricultural areas. As examples, the symbiont therapeutic strategy could expand into other cropping systems to provide solutions to other stressors (abiotic stress, for example) and to improve crop performance in general. The nanobody thrust would create a resource that could produce nanobody-based solutions to a great number of agricultural issues, including other plant diseases as well as animal and human diseases. In combination, these biotechnology tools could provide the basis for a general rapid-response plant biosecurity platform and a plant-based biomanufacturing capability supporting a sustainable, safe, and secure bioeconomy.

- Develop self-treating citrus and other key crop plants using symbiont technology (\$5,700,000). ARS will:
  - Develop a single, biologically-based platform, already patented by USDA ARS as symbionts that can be directly deployed to the field that uses peptides, nanobodies (MantaBodies, i.e., small, single domain antibodies), or other therapeutic molecules to protect crops from biotic and abiotic stresses in real time, with a focus on citrus greening in citrus, Pierce’s disease in grape, olive quick decline, and X-disease in cherry.
  - The symbiont platform will be adapted as a biofactory for low-cost production of desirable biomolecules in fermentation systems.
  - Develop reporting, facultatively self-curing plants using symbiont or plant expression of therapeutic molecules.
- Create a MantaBody production capability that provides biotherapeutic molecules used in creating self-treating plants (\$1,300,000). ARS will:
  - Demonstrate ability to produce functional MantaBodies that target and block components of the citrus greening disease bacterium.
  - Combine the MantaBody research with plant symbiont research and show: 1) ability to produce the antibodies in Symbionts to target plant diseases; 2) ability to produce them in symbiont biofactory systems as a mechanism to harvest the MantaBodies for alternative uses such as to treat plant or animal (veterinary and human medicine) diseases.
  - The symbiont platform will be adapted as a biofactory for low-cost production of MantaBody biomolecules in on-plant systems.

*Partnerships and Collaborations*

Ongoing collaborations exist among ARS researchers in FL, NY, CA, MD, WA and the ARS European Biological Control Laboratory in Montpellier, France. External partners include university collaborators at University of Florida, Harbor Branch Oceanographic Institute (Florida Atlantic University), and Cornell University; and industry partners Telesis Bio, Agrosource Inc, and Codex DNA Inc.

**Circular Economy that Reimagines Corn Agriculture (CERCA)**

ARS requests an increase of \$4,000,000 and 12 FTEs for this crosscutting, multidisciplinary initiative that will integrate research conducted in multiple agency program areas to achieve the expected outcomes. Funding increases for this initiative are located under the Crop Production and Environmental Stewardship sections of this document.

*Need for Change*

U.S. grain farms are the most productive agricultural systems on earth, generating over \$120 billion in farm gate revenue per year, and supporting the global food supply as well as portions of the energy system. However, corn production comes at a severe cost. Excess nitrogen results in extreme water pollution including “Dead Zones,” and six percent of total U.S. greenhouse gas (GHG) emissions (55% of total agricultural GHG emissions), are in the

form of nitrous oxide. In a strategic pivot, a growing number of U.S. leaders in corn genetics and breeding, physiology and agronomy, biochemistry and phenomics, are adopting a radical new vision for corn research, breeding, and ultimately corn production in the U.S. CERCA, a Circular Economy that Reimagines Corn Agriculture, is dedicated to converting corn to an earlier season annual crop with reduced environmental impacts through increased uptake and recycling of nitrogen and phosphorus fertilizer, thereby transforming U.S. grain farmland into a net-negative component of a circular bioeconomy and reducing global greenhouse gases.

This initiative supports USDA Strategic Goal 1: Combat Climate Change to Support America's Working Lands, Natural Resources and Communities; Goal 2: Ensure America's Agricultural System is Equitable, Resilient, and Prosperous; and the White House Executive Order on Environmental Justice.

#### Expected Outcomes:

- Transform U.S. farmland that is a net-negative component of a circular bioeconomy and reduce global greenhouse gasses.
- New field-trained models for corn at the plant, farm, and regional scales to predict the impact of traits across a wide-range of cropping systems and environments.
- National and international collaborations to create an intellectual, scientific hub leveraging global research to achieve this transformation of corn agriculture; the hub will advise and support stakeholders and policymakers working to align US strategy with research outcomes.
- A new workforce of scientists who will integrate systems approaches with genetics, genomics, physiology, agronomy, and breeding, and are positioned to become leaders in public and private-sector research.
- Corn varieties with CERCA intermediate traits will result in greater on-farm nutrient recycling and reimagining the cycle of planting and fertilization.

#### *Means to Achieve Change*

ARS is a world leader in corn germplasm, genetics, genomics, and trait improvement. CERCA today is a 27-laboratory project team (nine ARS laboratories and eighteen university laboratories) focused on enhancing on-farm nutrient recycling and reimagining the seasonal cycle of corn planting and fertilization. CERCA trait research includes a) the genetic identification of loci and underlying genes for nutrient recycling and the seasonal choreography of protein and phosphorus remobilization from aerial structures (grain, leaf, and stem) to roots, and the inhibition of nitrification; b) the genetic identification of loci and underlying genes responsible for cold adaptation traits and genes for making different planting and rotation scenarios possible including fall or late winter planting. CERCA research incorporates modeling, evolutionary allele mining, genetic analyses and trait mapping of corn wild relatives, molecular and physiological trait characterization, and finally trait development with industry.

To develop the necessary knowledge, tools, and genetic resources necessary for advancing corn physiology and production CERCA will implement the following thrusts:

- Model plants, farms, environments, and economics to determine the most important combinations of traits and U.S. environments likely to benefit from new corn cropping systems (\$1,000,000).
- Evaluate corn landraces and related wild species that have frost/cold tolerance (seedling survival, germination, and establishment) and recycle nutrients (remobilization of nitrogen and phosphorus from grain to roots); germplasm sources and genetic complexity will be determined for each target trait (\$1,100,000).
- Develop target traits through stacking of genetic improvements predicted to have substantial impact (based on modeling) and high genetic/physiological tractability; lines with these novel trait combinations will be tested across the U.S. via coordinated trials and collaborations with seed companies and growers (\$1,900,000).

#### *Partnerships and Collaborations*

USDA/ARS, Urbana, Illinois, C4 plant physiology and modeling; Michigan State University, East Lansing, Michigan, farm scale modeling; USDA/ARS, Ithaca, NY, corn genetics and genomics; Salk Institute, San Diego, California, root biology; Iowa State University, Ames, Iowa, nitrogen cycling; USDA/ARS, Lubbock, Texas, corn abiotic stress tolerance; Cornell University, Ithaca, New York, andropogoneae and corn germplasm diversity; University of Wisconsin, Madison, Wisconsin, multi-location maize field trials, silage, breeding; USDA/ARS, Ames, Iowa, N<sub>2</sub>O emissions, plant-microbial interactions; USDA/ARS, Columbia, Missouri, teosinte diversity,

kernel composition; Cornell University, corn genetics, root and aerial phenomics; University of Illinois, Urbana, Illinois, remote sensing, farm ecosystem modeling; Cornell University, cold tolerance, molecular biology; USDA/ARS, Raleigh, North Carolina, perennials, breeding, seed quality; Iowa State University, Ames, Iowa, evolutionary genomics; University of Wisconsin, Madison, maize transformation, genome editing, corn genetics; University of Florida, Gainesville, Florida, crop modeling; Salk Institute, genomics, comparative genomics; Texas A&M University, College Station, Texas, perennials, breeding, remote sensing; USDA/ARS, Ithaca, New York, phosphorus molecular biology; USDA/ARS (Retired), phosphorus genetics and seed biology; North Carolina State University, Raleigh, North Carolina, Zea diversity, cold and phosphorus genetics; Cornell University, germplasm diversity, cold tolerance breeding; University of Nebraska, Lincoln, Nebraska, cold tolerance biochemistry; Lancaster University, Lancaster, United Kingdom, farming systems from crop to livestock; USDA/ARS, seed storage protein and engineering; University of Minnesota, St Paul, Minnesota, gene expression profiling, remote sensing, cold tolerance; USDA/ARS, Columbia, Missouri, C4 photosynthesis adaptation and evolution.

### **PFAS – Innovative Agricultural Solutions to PFAS and Other Emerging Contaminants of Concern.**

ARS requests an increase of \$8,000,000 and 27 FTE's for this crosscutting, multidisciplinary initiative that will integrate research conducted in multiple agency program areas to achieve the expected outcomes. Funding increases for this initiative are located under Crop Production, Food Safety, and Environmental Stewardship sections of this document.

#### *Need for Change*

Rural communities - and the farmers and ranchers and their families who live in them – are facing an emerging problem in their agricultural landscapes caused by the presence of a class of chemical contaminants referred to as “forever chemicals”. The chemicals are commonly referred to as PFAS, which is an acronym for per- and polyfluoroalkyl (pronounced: “poly-floral-al-ka-lil”) substances. They have been placed in the category of “forever chemicals” because they are synthetic chemicals that bioaccumulate in animals and plants and do not breakdown naturally in the animals or plants or in the environment. PFAS is not a single chemical, but the term refers to a broad array of thousands of chemicals in the PFAS family. These chemicals have been in worldwide use since the 1950s in many consumer and industrial products including firefighting foams, cosmetics, nonstick cookware, water-repellent clothing, fast food wrappers, and other products that resist grease, water, and oil, including a wide array of different food packaging. Furthermore, they have human and animal and plant effects, but definitive scientific evidence around the toxicity of PFAS is still developing. To date, many PFAS chemicals have been found to be toxic, even at extremely low levels of exposure.

Over the past ~70 years, PFAS and related chemicals have entered the agricultural and food systems in a variety of ways, including via the application and use of impacted waters for irrigation or livestock watering; the application of municipal or industrial solid wastes (that unknowingly contain forever chemicals) as fertilizers; industrial processes; or via atmospheric deposition. These chemicals are present in virtually every part of our environment in some concentration. As these PFAS travel throughout the environment and onto the farm, they're consumed by livestock, taken up by crops, and can make their way into the food system. PFAS has been shown to present in some livestock, animal feed, soil, irrigation and drinking water, and a host of other media.

PFAS in agricultural landscapes is causing or will cause producers manifold problems – problems that require innovative solutions that can be provided through innovative agriculture developments and partnerships. Addressing their production needs and dealing with PFAS lies in producers having information and tools that enable them to address their specific practices and environments to eliminate PFAS from their landscapes, interrupt their transport, or extensively reduce the exposure of their plants and animals and families and workers to these chemicals. Research is needed on emerging factors that address the detection of PFAS presence, model their movement in the environment, predict exposure, and mitigate their impact by elimination on agricultural landscapes or interruption of the transport mechanisms. Innovative approaches are needed that couple engineering advances being developed by government and private entities that are offering possible solutions – but that need to be economically and feasibly enabled for producers at all scales of operations. The problem space includes the entire agricultural landscape, plant, and livestock operations, food processing, agricultural and family and workers safety, and which all need economic and implementable opportunities.

Conducting this critical and timely research will increase food safety and security and help ensure the sustainability of our production systems into the future, addressing the USDA Strategic Plan, Strategic Goal 1: Combat Climate Change to Support America's Working Lands, Natural Resources, and Communities, especially Objective 1.1: Use Climate-Smart Management and Sound Science to Enhance the Health and Productivity of Agricultural Lands; Strategic Goal 2: Ensure America's Agricultural System is Equitable, Resilient, and Prosperous, especially Objective 2.2: Build Resilient Food Systems, Infrastructure, and Supply Chain; Strategic Goal 4: Provide All Americans Safe, Nutritious Food, especially Objective 4.3: Prevent Foodborne Illness and Protect Public Health; and, Strategic Goal 5: Expand Opportunities for Economic Development and Improve Quality of Life in Rural and Tribal Communities, especially Objective 5.4: Promote Environmental Justice by Maximizing Sustainable and Green Economic Development in Rural and Tribal Communities.

ARS proposes:

- Implementing advanced agricultural landscape environmental studies to address the fate and transport of PFAS in representative regional agricultural operations impacted by PFAS;
- Conducting innovative research to develop cost effective ways to prevent PFAS from entering the agricultural production system (e.g., plants and animals) and to immobilize and render non-bioavailable, existing PFAS found in and around agricultural production systems;
- Developing (or identify existing) methods of remediating or managing PFAS impacted soils and waters. This could be means of extracting the chemical contaminants, accelerating its decay into other less harmful compounds, or engineering crop varieties or livestock breeds that don't uptake or transfer the chemicals. The innovations need to be economical and create opportunities for maintaining the productive use of impacted soils and waters.
- Conducting advanced studies on agricultural animal absorption, distribution, metabolism, and elimination (ADME) studies to further advance our understanding of the critical biological interfaces in agricultural animals and food production to better address management and feeding strategies to lower pfas uptake.
- Identifying and developing food packaging and processing alternatives that do not rely on PFAS and related chemical compounds.

*Means to Achieve Change:*

- Establish (jointly with the University of Maine) a *Center of Excellence for PFAS Solutions throughout Agricultural and Food Systems* (\$3,500,000). ARS will:
  - Develop a multifaceted PFAS but coordinated *Center of Excellence for PFAS Solutions throughout Agricultural and Food Systems* to address PFAS issues in the agricultural landscape, animal uptake, adsorption, distributions, metabolism, and excretion, as well as the fate of PFAS residues in meat and dairy products as well as in animal urine and feces and subsequent distribution in the environment.
- Establish the *PFAS Technology Development and Transfer Acceleration Incubator* (\$500,000). ARS will:
  - Develop a project that will enable engagement of producers with ARS Agricultural Engineers, Technology Developers, Economists, Sociologists, and ARS tech transfer and agreements experts – along with independent technology developers and experts to enable engagement with the public, private, and farmer communities for more rapidly implementing evolving revolutionary treatment technologies for solving PFAS problems in Maine, the Northeast, and the nation.
- ARS innovative solutions to intercept contaminants in the environment (\$1,600,000). ARS will:
  - Enhance two Innovative Contaminant Solutions projects that identify and develop contaminant intercept and removal solutions such as biochar production from various feedstocks; develop understanding of soil phenomena (chemical, physical, biological) that can ameliorate PFAS in agricultural soils and use those to develop fate and transport models for PFAS in different regional agroecosystems.
- ARS plant innovation breeding center (\$800,000). ARS will:
  - Develop new projects to examine the feasibility for biological breeding innovations that limit or prevent plants or animals from taking up any PFAS from what they ingest (water or feed for animals; soil soluble materials for plants) via innovative assessment of plant germplasm, animal germplasm and even the soil microbiome and animal gut microbiomes.

- ARS food packaging and processing to develop alternatives to PFAS (\$800,000). ARS will:
  - Support research on food packaging and processing to develop alternative to the use of PFAS and develop food packaging processing approaches that ensure lowered amounts of residual PFAS in packaging materials.
- ARS Expanded agricultural animal PFAS ADME studies (\$800,000). ARS will:
  - Expand the understanding of livestock animal and poultry absorption distribution metabolism and elimination of PFAS and similar chemicals;
  - Evaluate management or other animal processes – that can be used to enhance diets (and to restrict PFAS ingestion), to reduce PFAS uptake, and to determine methods to accelerate depuration of PFAS from animals that do ingest.

Expected Outcomes:

- These scientific advances for PFAS research will enable fundamentally important and impactful outcomes to be generated for the US agricultural community, consumers - and they will have global impacts. These fundamentally positive outcomes expected by ARS research include:
- Highly specific and regionally relevant understanding of the environmental behavior of the complex composition of chemicals grouped as PFAS - that lead to
- Specific and regionally relevant management approaches to eliminate/abate PFAS entry into agroecosystems and to sequester/remediate PFAS that is already in agroecosystems;
- Groundbreaking understanding in plant and animal PFAS related biology that lead to
- Advances in plant and animal breeding and management that result in PFAS-free foods produced from crops and animals; and
- Economical and efficient alternatives to eliminate from packaging used for food or other materials that have historically led to unintended exposures to humans, agroecosystems, and other environments.

*Partnerships and Collaborations:*

NRCS, EPA, state environmental agencies, universities, NGOs, PFAS technology providers, producers.

**PROPOSED LEGISLATION**

Program: Experienced Services Program, 16 U.S.C. 3851

Current legislative authority to be amended: 2025 Budget Request – Salaries and Expenses

Proposed legislative language (general provision): *Provided further*, That appropriations hereunder shall be available for the Experienced Services Program at ARS (16 U.S.C. 3851)

Proposal: The reason for this proposed legislative language is that funding has to be authorized, in accordance with the authorizing legislation at 16 U.S.C. 3851(c) 3.

Rationale: The proposed change will achieve the Secretary of Agriculture’s requirements set forth in 16 U.S.C. 3851, which specifies that the Secretary shall establish an Experienced Services Program (program) to enter into agreements on behalf of the Agricultural Research Service (ARS) with nonprofit private agencies and organizations eligible to receive Cooperative Agreements under the Community Service Senior Opportunities Act (42 U.S.C. 3056 et seq.) Participants for the program are to provide technical, professional, or administrative services, as applicable, to support the Research Education and Economics (REE) Mission Area, including ARS, and such services include: supporting agricultural research and information; advancing scientific knowledge relating to agriculture; enhancing access to agricultural information; providing statistical information and research results to farmers, ranchers, agribusiness, and public officials; and assisting research, education, and extension programs in land-grant colleges and universities (as defined in section 3103 of Title 7).

Goal: To use ARS Salaries and Expenses account for the Experienced Services Program



**GEOGRAPHIC BREAKDOWN OF OBLIGATIONS AND FTEs****Table ARS-14. Geographic Breakdown of Obligations and FTEs (thousands of dollars, FTEs)**

State/Territory/Country	2022		2023		2024		2025	
	Actual	FTEs	Actual	FTEs	Estimated	FTEs	Estimated	FTEs
<b>Alabama</b>								
Auburn.....	\$21,462	44	\$23,889	45	\$26,498	45	\$27,382	45
Total.....	21,462	44	23,889	45	26,498	45	27,382	45
<b>Arizona</b>								
Maricopa.....	10,778	58	11,164	56	12,214	56	12,418	56
Tucson.....	6,411	45	6,849	43	6,817	43	6,974	43
Total.....	17,189	103	18,013	99	19,031	99	19,392	99
<b>Arkansas</b>								
Booneville.....	4,310	28	4,696	30	4,114	30	3,268	30
Fayetteville.....	3,234	13	3,548	15	3,214	15	3,269	15
Jonesboro.....	1,320	10	1,322	8	1,493	8	2,602	14
Little Rock.....	10,413	3	11,127	5	11,368	5	13,186	8
Stuttgart.....	12,196	52	9,297	49	8,603	49	8,781	49
Total.....	31,473	106	29,990	107	28,792	107	31,106	116
<b>California</b>								
Albany.....	40,148	166	41,056	171	42,034	171	42,657	171
Davis.....	20,209	76	21,418	78	20,923	78	24,897	84
Parlier.....	11,833	76	15,676	82	15,806	82	17,364	85
Riverside.....	6,010	31	5,954	30	6,154	30	6,264	30
Salinas.....	8,032	47	9,284	51	9,055	51	9,240	51
Total.....	86,232	396	93,388	412	93,972	412	100,422	421
<b>Colorado</b>								
Akron.....	1,788	9	-	1	-	-	-	-
Fort Collins.....	21,192	135	25,859	140	24,915	141	26,570	147
Total.....	22,980	144	25,859	141	24,915	141	26,570	147
<b>Delaware</b>								
Newark.....	2,657	14	2,114	13	2,129	13	2,177	13
Total.....	2,657	14	2,114	13	2,129	13	2,177	13
<b>District of Columbia</b>								
National Arboretum.....	12,684	60	14,176	61	15,152	61	15,375	61
Headquarters Federal Administration <sup>3</sup> .....	182,003	481	193,147	490	169,351	490	140,531	490
Total.....	194,687	541	207,323	551	184,503	551	155,906	551
<b>Florida</b>								
Canal Point.....	3,926	32	4,447	29	4,706	29	4,812	29
Fort Lauderdale.....	3,071	31	2,980	30	2,589	30	2,698	30
Fort Pierce.....	18,072	91	19,841	85	19,098	85	19,667	91
Gainesville.....	11,392	78	12,039	77	12,708	77	12,945	77
Miami.....	5,614	30	5,686	27	6,331	27	6,430	27
Total.....	42,075	262	44,993	248	45,432	248	46,552	254
<b>Georgia</b>								
Athens.....	37,922	149	43,845	148	45,704	148	46,244	148
Byron.....	7,313	29	7,769	32	9,415	32	9,532	32
Dawson.....	5,583	27	6,635	28	7,225	28	7,327	28
Griffin.....	2,615	16	4,233	16	2,560	16	2,933	16
Tifton.....	11,408	73	11,148	69	11,515	69	11,766	69
Total.....	64,841	294	73,630	293	76,419	293	77,802	293
<b>Hawaii</b>								
Hilo.....	15,138	68	16,339	72	16,441	72	15,365	72
Total.....	15,138	68	16,339	72	16,441	72	15,365	72
<b>Idaho</b>								
Aberdeen.....	8,036	36	8,081	37	8,640	37	8,486	37
Boise.....	2,805	24	3,215	18	3,053	18	3,119	18
Dubois.....	2,974	13	2,923	15	3,137	15	3,192	15
Kimberly.....	5,622	41	5,873	41	5,911	41	6,061	41

<sup>3</sup> Federal Administration contains GP funding for NOAA Working Group on Kelp and Seagrass in 2022 and 2023.

2025 USDA EXPLANATORY NOTES - AGRICULTURAL RESEARCH SERVICE

State/Territory/Country	2022		2023		2024		2025	
	Actual	FTEs	Actual	FTEs	Estimated	FTEs	Estimated	FTEs
Total.....	19,437	114	20,092	111	20,741	111	20,858	111
Illinois								
Peoria.....	32,023	158	36,223	157	35,721	157	36,294	157
Urbana.....	7,660	33	6,764	30	5,959	30	6,518	33
Total.....	39,683	191	42,987	187	41,680	187	42,812	190
Indiana								
West Lafayette.....	8,688	52	8,252	52	8,414	52	8,547	52
Total.....	8,688	52	8,252	52	8,414	52	8,547	52
Iowa								
Ames.....	59,329	324	58,258	322	62,792	322	63,281	325
Total.....	59,329	324	58,258	322	62,792	322	63,281	325
Kansas								
Manhattan.....	144,760	261	153,897	289	162,773	291	175,534	291
Total.....	144,760	261	153,897	289	162,773	291	175,534	291
Kentucky								
Bowling Green.....	2,961	15	2,692	15	2,764	15	2,413	15
Lexington.....	4,494	12	4,476	12	4,512	12	3,746	12
Total.....	7,455	27	7,168	27	7,276	27	6,159	27
Louisiana								
Baton Rouge.....	2,685	17	3,490	20	3,258	20	3,330	20
Houma.....	5,239	41	6,610	43	6,275	43	6,432	43
New Orleans.....	23,543	91	25,478	89	26,690	89	26,623	89
Total.....	31,467	149	35,578	152	36,223	152	36,385	152
Maine								
Orono.....	10,653	25	9,576	26	10,031	26	13,276	32
Total.....	10,653	25	9,576	26	10,031	26	13,276	32
Maryland								
Beltsville.....	122,987	510	130,072	513	132,611	513	138,625	519
National Ag Library.....	31,975	72	31,670	70	28,474	70	28,729	70
Frederick.....	6,898	30	6,777	27	6,828	27	6,927	27
Total.....	161,860	612	168,519	610	167,913	610	174,281	616
Massachusetts								
Boston.....	16,657	8	17,247	6	17,123	6	18,336	12
Total.....	16,657	8	17,247	6	17,123	6	18,336	12
Michigan								
East Lansing.....	2,262	12	2,794	11	2,521	11	2,561	11
Total.....	2,262	12	2,794	11	2,521	11	2,561	11
Minnesota								
Morris.....	4,455	16	3,005	18	3,103	18	3,799	24
St. Paul.....	12,699	53	13,656	61	13,077	61	13,299	61
Total.....	17,154	69	16,661	79	16,180	79	17,098	85
Mississippi								
Mississippi State.....	18,145	62	22,412	66	24,159	66	24,399	66
Oxford.....	15,241	65	15,421	61	16,671	61	13,500	61
Poplarville.....	5,825	30	6,109	30	6,160	30	5,555	30
Stoneville.....	49,307	215	50,715	217	57,145	217	52,197	220
Total.....	88,518	372	94,657	374	104,135	374	95,651	377
Missouri								
Columbia.....	12,967	60	14,542	58	14,357	58	14,912	58
Total.....	12,967	60	14,542	58	14,357	58	14,912	58
Montana								
Miles City.....	5,189	24	5,252	24	4,872	24	4,529	24
Sidney.....	5,690	41	5,585	38	5,995	38	6,133	38
Total.....	10,879	65	10,837	62	10,867	62	10,662	62
Nebraska								
Clay Center.....	23,433	107	27,562	105	25,323	105	27,056	111
Lincoln.....	8,390	50	12,321	55	12,645	55	14,449	67
Total.....	31,823	157	39,883	160	37,968	160	41,505	178
Nevada								
Reno.....	2,337	12	2,400	11	2,410	11	2,451	11
Total.....	2,337	12	2,400	11	2,410	11	2,451	11
New Mexico								

2025 USDA EXPLANATORY NOTES - AGRICULTURAL RESEARCH SERVICE

State/Territory/Country	2022		2023		2024		2025	
	Actual	FTEs	Actual	FTEs	Estimated	FTEs	Estimated	FTEs
Las Cruces .....	11,595	46	9,098	47	9,616	47	9,787	47
Total .....	11,595	46	9,098	47	9,616	47	9,787	47
New York								
Geneva .....	7,459	30	7,172	33	7,711	33	8,147	33
Orient Point.....	7,436	22	-	2	-	-	-	-
Ithaca.....	16,116	52	21,664	51	14,351	51	18,443	69
Total .....	31,011	104	28,836	86	22,062	84	26,590	102
North Carolina								
Raleigh.....	13,385	72	14,615	69	14,542	69	14,406	69
Total .....	13,385	72	14,615	69	14,542	69	14,406	69
North Dakota								
Fargo .....	30,718	108	37,247	104	39,649	104	40,748	110
Grand Forks .....	9,097	33	8,962	28	10,233	28	11,236	31
Mandan .....	6,944	37	7,544	40	7,125	40	6,399	40
Total .....	46,759	178	53,753	172	57,007	172	58,383	181
Ohio								
Columbus.....	1,826	18	2,103	15	2,294	15	2,349	15
Wooster .....	9,433	50	10,058	51	8,539	51	8,534	51
Total .....	11,259	68	12,161	66	10,833	66	10,883	66
Oklahoma								
El Reno .....	6,687	37	17,832	78	17,154	83	18,627	92
Stillwater.....	6,421	25	-	3	-	-	-	-
Woodward.....	2,058	15	-	2	-	-	-	-
Total .....	15,166	77	17,832	83	17,154	83	18,627	92
Oregon								
Burns.....	5,120	32	5,319	37	5,524	37	5,209	37
Corvallis.....	25,764	106	23,913	100	21,561	100	22,125	100
Newport .....	-	-	2,636	4	2,731	4	2,808	4
Pendleton .....	4,850	16	5,525	21	5,864	21	5,764	21
Total .....	35,734	154	37,393	162	35,680	162	35,906	162
Pennsylvania								
University Park.....	7,047	36	6,933	38	7,242	38	8,101	44
Wyndmoor .....	34,220	140	34,119	143	34,495	143	34,286	143
Total .....	41,267	176	41,052	181	41,737	181	42,387	187
South Carolina								
Charleston.....	10,982	34	11,668	33	12,351	33	12,472	33
Florence .....	4,106	24	5,434	26	5,903	26	5,997	26
Total .....	15,088	58	17,102	59	18,254	59	18,469	59
South Dakota								
Brookings.....	3,313	24	4,332	25	3,685	25	3,776	25
Total .....	3,313	24	4,332	25	3,685	25	3,776	25
Texas								
Bushland .....	6,905	37	7,568	39	7,655	39	6,726	39
College Station <sup>4</sup> .....	31,307	73	19,610	73	19,902	73	21,338	76
Houston.....	16,650	7	15,887	7	16,070	7	17,896	16
Kerrville.....	12,021	40	11,268	42	12,257	42	12,410	42
Lubbock .....	9,933	65	10,332	64	11,033	64	11,491	67
Temple .....	4,645	34	4,462	29	4,930	29	5,036	29
Total .....	81,461	256	69,127	254	71,847	254	74,897	269
Utah								
Logan .....	10,175	72	10,801	73	10,838	73	11,071	73
Total .....	10,175	72	10,801	73	10,838	73	11,071	73
Vermont								
Burlington.....	8,851	4	11,266	5	12,623	5	12,641	5
Total .....	8,851	4	11,266	5	12,623	5	12,641	5
Washington								
Pullman .....	25,780	114	27,556	116	28,323	116	27,918	116
Wapato .....	8,712	48	8,956	55	8,237	55	8,618	55

<sup>4</sup> Human Nutrition Mandatory funding of \$20M is reflected in 2022.

2025 USDA EXPLANATORY NOTES - AGRICULTURAL RESEARCH SERVICE

State/Territory/Country	2022		2023		2024		2025	
	Actual	FTEs	Actual	FTEs	Estimated	FTEs	Estimated	FTEs
Wenatchee.....	3,666	19	3,595	22	3,965	22	4,045	22
Total.....	38,158	181	40,107	193	40,525	193	40,581	193
West Virginia								
Kearneysville.....	9,295	44	11,018	46	10,177	46	8,625	46
Leetown.....	9,298	32	9,398	30	9,951	30	7,276	30
Total.....	18,593	76	20,416	76	20,128	76	15,901	76
Wisconsin								
Madison.....	30,520	108	31,728	119	32,646	119	30,365	119
Total.....	30,520	108	31,728	119	32,646	119	30,365	119
Puerto Rico								
Mayaguez.....	3,549	32	3,990	30	3,744	30	3,853	30
Total.....	3,549	32	3,990	30	3,744	30	3,853	30
Other Countries								
France, Montpellier.....	4,243	1	6,986	1	3,148	1	3,332	1
Total.....	4,243	1	6,986	1	3,148	1	3,332	1
Extramural & Funds Administered from Headquarters Held Funds.....	39,640	-	48,201	-	183,548	-	50,118	-
Repair & Maintenance of Facilities ..	26,144	-	26,556	-	26,556	-	26,556	-
Obligations .....	1,650,574	6,169	1,744,238	6,219	1,877,709	6,219	1,755,512	6,357
Lapsing Balances .....	3,212	-	2,158	-	-	-	-	-
Bal. Available, EOY.....	112,949	-	133,430	-	-	-	-	-
Total, Available .....	1,766,735	6,169	1,879,826	6,219	1,877,709	6,219	1,755,512	6,357

**CLASSIFICATION BY OBJECTS**

**Table ARS-126 Classification by Objects (thousands of dollars)<sup>5</sup>**

Item No.	Item	2022 <sup>6</sup> Actual	2023 <sup>7</sup> Actual	2024 Estimated	2025 Estimated
Personnel Compensation:					
	Washington D.C. ....	\$48,494	\$46,439	\$47,118	\$48,505
	Personnel Compensation, Field .....	476,601	492,626	499,832	514,541
11	Total personnel compensation .....	525,095	539,065	546,950	563,046
12	Personal benefits.....	208,218	214,150	218,123	224,697
13.0	Benefits for former personnel.....	539	184	-	-
	Total, personnel comp. and benefits.....	733,852	753,399	765,073	787,743
Other Objects:					
21.0	Travel and transportation of persons .....	3,745	11,202	13,295	11,564
22.0	Transportation of things .....	532	959	646	562
23.1	Rental payments to GSA .....	4,648	4,506	3,506	3,424
23.2	Rental payments to others .....	1,381	2,664	1,676	1,458
23.3	Communications, utilities, and misc. charges .....	48,918	49,237	61,507	53,124
24.0	Printing and reproduction .....	1,868	389	2,267	1,972
25.1	Advisory and assistance services.....	48,866	66,366	59,309	51,587
25.2	Other services from non-Federal sources .....	39,431	53,999	47,858	41,627
25.3	Other goods and services from Federal sources .....	11,900	57,936	65,057	56,587
25.4	Operation and maintenance of facilities .....	14,508	11,287	17,609	15,316
25.5	Research and development contracts.....	421,859	388,846	452,651	393,715
25.6	Medical Care .....	454	448	551	479
25.7	Operation and maintenance of equipment.....	50,736	42,420	61,579	53,561
25.8	Subsistence and Support of Persons .....	-	2	-	-
26.0	Supplies and materials .....	101,022	96,458	122,612	106,647
31.0	Equipment.....	81,522	95,048	98,944	86,062
32.0	Land and Structures.....	47,182	59,384	57,266	49,810
41.0	Grants, subsidies, and contributions .....	38,150	49,688	46,303	40,274
	Total, Other Objects .....	916,722	990,839	1,112,636	967,769
99.9	Total, new obligations .....	1,650,574	1,744,238	1,877,709	1,755,512
	DHS Building Security Payments (included in 25.3).....	\$244	\$229	\$229	\$229
Information Technology Investments:					
	Major Investments .....	-	\$11,143	13,343	11,843
	Mission Area Non-Major Investment Totals.....	\$41,401	-	-	-
	Mission Area Standard Investment Totals .....	14,768	60,226	60,226	56,626
25.3	Mission Area WCF Transfers.....	39,232	42,883	52,454	56,280
	Total Non-Major Investment .....	95,401	103,109	112,680	112,906
	<b>Total IT Investments .....</b>	<b>95,401</b>	<b>114,252</b>	<b>126,023</b>	<b>124,749</b>
Cybersecurity					
	Identify .....	n/a	\$535	\$500	\$550
	Protect.....	n/a	1,542	1,775	1,725
	Detect.....	n/a	310	185	185
	Respond .....	n/a	200	200	200
	Recover.....	n/a	150	152	152
	<b>Total Cybersecurity .....</b>	<b>-</b>	<b>2,737</b>	<b>2,812</b>	<b>2,812</b>
Position Data:					
	Average Salary (dollars), ES Position .....	\$177,912	\$184,973	\$187,679	\$187,164
	Average Salary (dollars), GS Position.....	\$78,463	\$79,845	\$81,013	\$81,591
	Average Grade, GS Position.....	10.8	10.8	10.8	10.8

<sup>5</sup> General Provision funding for kelp and seagrass is reflected in 2022 and 2023.

<sup>6</sup> Human Nutrition mandatory funding of \$20M is reflected in 2022.

<sup>7</sup> Large differences in funding between 2022 and 2023 are due to the Budget Object Class restructuring within USDA.

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## **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 2023 accomplishments and current activities, including the National Agricultural Library, are detailed below.

### ***Program Evaluations***

In 2023, ARS conducted retrospective reviews of its Veterinary, Medical and Urban Entomology; Aquaculture; and Crop Production Program. 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***

Compostable food-safe adhesive for fruit and vegetable stickers. U.S. agricultural exports worth millions of dollars are at risk because several countries or regions, including France, Flanders, and New Zealand, enacted legislation that will require all price look up labels on produce to be certified for home composting. At the request of the Foreign Agricultural Service, ARS researchers in Albany, California, and industry collaborators developed a food-safe, compostable adhesive formulation that solved a key coating issue of uneven spreading on the back of the labels. This formulation was tested on a variety of produce and met the requisite standards. The additive that was identified to solve the coating issue will be submitted in an invention disclosure. Research results will help U.S. fruit and vegetable exporters meet the more stringent international standards.

Novel freezing technology yields safer quality juice products. Processes for conserving natural juices need new systems that maintain sensory and nutritional quality and prolong shelf life with reduced microbial loads. ARS researchers in Albany, California, discovered that isochoric freezing, a new preservation technology, reduced native microbial loads below detection limits in pomegranate and carrot juice, extended the shelf life of both products, and resulted in better overall juice quality. Isochoric freezing is a promising alternative to conventional pasteurization for addressing key consumer and food safety factors for juice products.

### **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:*

First complete mammalian X- and Y-chromosome assembly for cattle, sheep, and goats. Sex chromosomes (X and Y in mammals) contain the unique and essential genes that define and differentiate females and males of a species. Precision mapping and gene identification on sex chromosomes has been hampered due to technical limitations in sequencing technology, significantly slowing genetic improvement in livestock. ARS scientists in Clay Center, Nebraska, and Beltsville, Maryland, collaborated with researchers at the University of Idaho, Utah State University, University of Missouri, and the National Institutes of Health to create and analyze the first complete sex chromosome assembly map in cattle, sheep, and goat species. Their findings identified surprising differences in the genes, their varied arrangement in ruminants, and how they vary between ruminants and primates. This pioneering research opens the door for improving analyses of sex-specific trait expression (e.g., milk yield, semen volume) and inheritance patterns, increasing the accuracy of genetic selection, and increasing the fundamental knowledge of species similarity and differentiation in sex chromosomes. Livestock producers will immediately benefit from using new genomic information in genetic evaluation and selection programs, which will advance the accuracy and rate of genetic improvement for reproduction, growth and development, and production efficiency traits that influence economic, environmental, welfare, and societal outcomes.

Using artificial intelligence to detect fish mortalities. Early detection of elevated mortalities in aquaculture systems is crucial for timely management to prevent mortality escalation. Conventional mortality detection approaches rely on human observation and tracking that is sometimes augmented with underwater cameras. However, this approach can delay responding, especially when personnel are mostly or entirely off-site and might not provide the timely monitoring needed to prevent a significant mortality event. In addition, higher stocking densities and cloudy water can obscure visual observation of mortalities. Extramural ARS scientists in Shepherdstown, West Virginia, developed MortCam, an Artificial Intelligence- and Internet of Things (IoT)-enabled fish mortality detection and alert system that provides 24-hour surveillance for recirculating aquaculture system (RAS) conditions and reliably sends email and text alerts to fish production staff about mortality events. This technology will provide RAS farmers with a critical tool for reliable early-mortality detection and notification, which will support effective and timely treatments to prevent mortality escalation, improve fish welfare, and prevent economic losses.

## **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:*

Reducing agricultural greenhouse gas production. More than 80 percent of the natural and synthetic nitrogen incorporated into our food systems is lost before it reaches the consumer. This inefficiency accounts for 97 percent of U.S. agricultural greenhouse gas emissions (nitrous oxide, methane) and more than 60 percent of water pollution by nitrates. The CERCA (Circular Economy for Reimagining Corn Agriculture) project, launched in 2023 by ARS, focuses on corn, the single largest player in the U.S. agricultural nitrogen system. The goal of CERCA is to develop corn genetic resources that, in concert with agronomic practices, can shift the corn growing season earlier to capture natural soil nitrogen more efficiently, reduce corn's intrinsic need for nitrogen, and recycle nitrogen back to the soil



at the end of season (currently the case with perennial plants). The CERCA project is led by ARS scientists from across the country and university collaborators (27 total labs, led by Cornell) whose integrated research program encompasses crop modeling, agronomy, genetics, and physiology to accomplish these goals.

Spotted lanternfly threatens specialty crops. The spotted lanternfly (SLF) is an invasive pest in the United States that feeds on more than 103 different plant species, but more information is needed about its potential threat to specialty crops and forest species. ARS scientists in Kearneysville, West Virginia, and collaborators conducted laboratory and field trials that expanded available information about SLF host plants. They found wine grapes (*Vitis vinifera*) is a preferred host in the field and supports strong development and survivorship, while cultivated apple and peach do not support SLF development. Among wild hosts, black walnut, riverbank grape, and invasive tree of heaven all support strong development and survivorship. These results indicate SLF poses a threat to the winegrape industry, and wild hosts such as black walnut, riverbank grape and tree of heaven can likely support its establishment in new regions. This information will help growers develop effective management strategies for this emerging and invasive insect pest.

## **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 new antibody to treat foodborne illness. Shiga toxin (Stx) is the predominant cause of the life-threatening associated hemolytic uremic syndrome (HUS). The toxin is produced by Shiga toxigenic *Escherichia coli* (STEC), a critical food safety pathogen. Currently there are no U.S. Food and Drug Administration (FDA) approved medical intervention therapies to treat HUS. ARS researchers in Albany, California, developed a humanized antibody against Stx2, the most lethal variant of the toxin, and determined that this antibody, which caused no allergic reaction, was highly effective in mitigating Stx2 in vitro and in vivo, and protected mice from mortality and any HUS-related tissue damage. With FDA approval, this discovery should provide a medical therapeutic intervention option to combat the HUS disease in humans, especially infants and children.

Per/Poly-fluoroalkyl substances (PFAS). PFAS are known as "forever chemicals" due to their persistence in the environment and bioaccumulation in animals, humans, and plants, and can be toxic to human health. Diet has been considered a major source of PFAS exposure, but efficient analytical methods are needed to measure their levels in foods. ARS scientists in Wyndmoor, Pennsylvania, developed a new method to analyze 34 PFAS in foods regulated by the USDA Food Safety Inspection Service (FSIS), including chicken, pork, beef, catfish, and liquid eggs. Results demonstrated the new method is robust, accurate, and precise; it is also fast and simple and outperformed two official methods used by the FDA and FSIS. This method will be readily implemented for routine use by national and international food safety regulatory agencies already analyzing pesticides, veterinary drugs, and environmental contaminants.

## **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:*

First gene-edited calf with resistance to common cattle virus. Bovine viral diarrhea virus (BVDV) is one of the most widespread and economically important viral infections in cattle, with annual losses approaching \$1 billion in the United States alone. The BVD virus infects cattle through a receptor on cattle cells. ARS researchers in Clay Center, Nebraska, showed that a small genome edit modifying only six amino acids in the receptor caused a dramatic reduction in BVDV susceptibility in a calf with no adverse effects in the first 2 years of life. This provides the first example of gene editing in cattle to reduce the impact of a major viral disease. This approach could significantly improve animal welfare, increase the long-term sustainability of cattle production, and, because BVDV infection puts calves at risk for secondary bacterial diseases, it provides an opportunity to reduce antibiotic use in agriculture.

Interfering with critical receptors to control fire ant colonies. Controlling and mitigating fire ants and their damage costs \$8.75 billion per year. G-Protein Coupled Receptors (GPCRs) are cell receptors essential to ant health and GPCR interference has been the subject of research for decades. ARS scientists in Gainesville, Florida, finally developed "Receptor-i" technology producing small peptides that block GPCR receptors. This technological breakthrough, which has the potential to provide biodegradable control products to a wide range of insect pests, used fire ants as a model system. Studies found that receptor-i isolated peptides can control field-collected fire ant colonies, workers, and queens. This species-specific and organic technology can be applied to other pest ants and pest insects, which will benefit a broad range of USDA customers. There has been considerable commercial interest in this technology.

## **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:*

Release of a potato cultivar resistant to potato cyst nematodes. Potato cyst nematodes (PCN; golden nematode and pale cyst nematode) are devastating pests for U.S. potato production, which is valued at \$4.6 billion. Utilizing host resistance is the most effective and sustainable approach for PCN control. ARS researchers in Ithaca, New York, and Cornell University collaborators developed and released 'Bliss', a potato cultivar that is resistant to golden nematodes. The new cultivar, which is described in the *American Journal of Potato Research*, can serve as an effective tool for golden nematode control and eradication in the United States. It can also be utilized by potato breeders as parent material in genetic crosses to develop more resistant cultivars.

Asian citrus psyllid control using ethyl formate. Asian citrus psyllid (ACP) is a devastating pest of citrus, as it spreads the disease Huanglongbing that curtails fruit yield and quality. Southern California is impacted by ACP quarantines, but the packing and juicing operations in California's San Joaquin Valley are not. ARS scientists in Parlier, California, developed a postharvest fumigation treatment with ethyl formate to control ACP after fruit is binned and loaded on a trailer and before it is transported from the grove. This innovative treatment limits ACP spread and reduces broad-spectrum insecticide use. ARS scientists also developed an ethyl formate treatment that will begin replacing methyl bromide treatments of table grapes imported from Chile, which represents the greatest U.S. usage of this fumigant on fresh fruit. Data generated by this research was submitted to the U.S. Environmental Protection Agency and California Department of Pesticide Regulation to support Section 3, Federal Insecticide, Fungicide, and Rodenticide Act registration.

## **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:***

Pregnant mother's physical activity and newborn's brain development. ARS-funded researchers in Little Rock, Arkansas, studied how physical activity during pregnancy affects infant brain development. They tracked six interludes of physical activity by pregnant women and subsequently conducted MRIs on their infants' brains 2 weeks after birth. Results showed significant relationships between maternal physical activity during the first and second trimester and brain cortical development in newborns. The study also identified that higher physical activity levels were associated with greater brain cortical thickness, suggesting an indication of better cortical development. This study provides the first direct evidence that physical activity during uncomplicated pregnancy may be beneficial for the brain development of offspring.

A new way to reduce eating. Hunger can drive humans and animals to eat, but in the absence of hunger, eating can also be triggered by the hedonic (pleasant sensations) value of foods. This "pleasure-driven" eating is a contributing factor to obesity. Researchers at the Children's Nutrition Research Center in Houston, Texas, discovered that a certain type of brain cells called 5-hydroxytryptamine (5-HT) neurons can suppress hedonic feeding. They found how 5-HT cells are regulated by nutrient intake and how these cells send signals to regulate feeding behaviors. These significant findings provide a framework to potentially target these specific cells for preventing and/or treating obesity.

## **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:*

Reducing methane emissions from swine manure. Typical swine manure management using anaerobic lagoons causes substantial methane emissions and increases agriculture's GHG footprint. Retrofitting lagoons with solid-liquid separation to remove volatile solids modules could help reduce methane emissions, but quantitative reduction measurements are needed to design best management practices. ARS researchers in Florence, South Carolina, quantified methane emissions using two full-scale swine waste treatment systems, a conventional lagoon-based system and an experimental lagoon-based system retrofitted with a solid-liquid separation module. Methane emissions were 65.9 percent less with the solid-liquid separation treatment, and average annual methane emissions were 20.3 kg in the baseline scenario and 6.9 kg methane per finishing pig in the experimental scenario. This new information will help effectively mitigate methane emissions from regional manure management.

Conservation practices improve soil health and provide economic benefits to farmers. Adopting conservation practices has been hampered by the lack of regionally relevant soil health information and lack of a demonstrated relationship between soil health measurements and crop yields. ARS scientists in Columbia, Missouri, and University of Missouri collaborators collected data from more than 5,300 production fields in Missouri and showed that biological and physical soil health status was greater in systems with increased rotational diversity (three or more crops) and reduced tillage. In related work with public and private partners, they used data collected from 96 farms in 9 Midwestern states for 5 years to link soil health scores to corn and soybean yield and demonstrated improved soil health had economic benefits. Furthermore, Missouri data indicated soil health variability within a field was linked to corn yield, and a threshold level of active carbon, a popular soil health indicator, was identified for optimal corn grain productivity. These results support farmers by providing them with science-based information on the economic and soil health benefits of conservation management 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:*

USDA public access implementation plan and Open Science. In June 2023 the National Agricultural Library (NAL) in Beltsville, Maryland, on behalf of USDA, published the plan "Implementation Plan to Increase Public Access to USDA-Funded Research Results." This plan was developed to meet the requirements of the White House Office of Science and Technology Policy (OSTP) memorandum "Ensuring Free, Immediate, and Equitable Access to Federally Funded Research", issued August 25, 2022, that will reshape public access policy across the U.S. government. During the 4th quarter of 2023, NAL published a public notice about the plan's implementation and began stakeholder listening sessions that will be used to develop and implement new policies ahead of OSTP's December 2025 deadline. The Public Access and Open Science at USDA was launched by NAL as a web resource and is located at <https://www.nal.usda.gov/services/public-access>.

Ag Data Commons and Protocols expand public access to USDA-funded research. The Ag Data Commons is a scientific research data catalog and repository that helps the agricultural research community share and discover data generated from research funded by USDA. The platform is a Federal resource that is open to the public and is

available at <https://data.nal.usda.gov/>. Ag Data Commons works closely with the USDA research community to meet Federal open-access requirements to support scientific integrity and data reuse. In 2023 Ag Data Commons transitioned to the technology platform Figshare to ensure the scalability required for implementing the White House OSTP memorandum “Ensuring Free, Immediate, and Equitable Access to Federally Funded Research.”

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**ACCOUNT 2: BUILDINGS AND FACILITIES**

**APPROPRIATIONS LANGUAGE**

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

For the acquisition of land, construction, repair, improvement, extension, alternation, 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, [~~\$41,405,000~~]\$28,405,000 to remain expended.

**LEAD-OFF TABULAR STATEMENT**

**Table ARS-17. Lead-Off Tabular Statement (In dollars)**

<u>Item</u>	<u>Amount</u>
Estimate, 2024	\$74,297,000
Change in Appropriation	-45,892,000
Budget Estimate, 2025	<u>28,405,000</u>

**PROJECT STATEMENT APPROPRIATIONS**

**Table ARS-13. Project Statement on Basis of Appropriations (thousands of dollars, FTEs)**

<u>Item</u>	<u>2022 Actual</u>	<u>2023 Actual</u>	<u>2024 Estimated</u>	<u>2025 Estimated</u>	<u>Inc. or Dec.</u>	<u>Chg Key</u>
Discretionary Appropriations:						
<u>Buildings and Facilities</u>						
Buildings and Facilities.....	\$45,405	\$17,600	\$17,600	\$28,405	+\$10,805	(1)
ARS Co-Located Facilities .....	20,000	-	-	-	-	
Community Based Projects.....	62,400	56,697	56,697	-	-56,697	
Subtotal .....	<u>127,805</u>	<u>74,297</u>	<u>74,297</u>	<u>28,405</u>	<u>-45,892</u>	
Supplemental Appropriations:						
Disaster Relief.....	-	58,000	58,000	-	-58,000	
Subtotal .....	<u>-</u>	<u>58,000</u>	<u>58,000</u>	<u>-</u>	<u>-58,000</u>	
Total Adjusted Approp.....	127,805	132,297	132,297	28,405	-103,892	
Recoveries, Other.....	3,248	1,448	-	-	-	
Bal. Available, SOY.....	100,449	61,441	146,826	200,489	+53,663	
Total Available.....	231,502	195,186	279,123	228,894	-50,229	
Bal. Available, EOY .....	-61,441	-146,826	-200,489	-201,915	-1,426	
Total Obligations.....	<u>170,061</u>	<u>48,360</u>	<u>78,634</u>	<u>26,979</u>	<u>-51,655</u>	

**FUNDING DETAIL APPROPRIATIONS****Table ARS-19. Additional Funding Detail Appropriations (thousands of dollars, FTEs)**

Allocations	2022 Actual	2023 Actual	2024 Estimated	2025 Estimated	Inc. or Dec.
<b>Buildings and Facilities</b>					
Beltsville, MD, Beltsville Area Research Center, Building 002....	\$34,805	\$500	\$500	-	-\$500
Beltsville, MD, Beltsville Area Research Center, Building 005....	-	11,200	11,200	-	-11,200
Beltsville, MD, Beltsville Area Research Center, Building 308....	-	500	500	-	-500
Beltsville, MD, Beltsville Area Research Center, Infrastructure ...	-	5,400	5,400	\$17,805	+12,405
Manhattan, KS, National Bio and Agro-Defense Facility.....	10,600	-	-	10,600	+10,600
Subtotal.....	45,405	17,600	17,600	28,405	+10,805
<b>ARS Co-Located Facilities</b>					
Lincoln, NE, University of Nebraska.....	20,000	-	-	-	-
Subtotal.....	20,000	-	-	-	-
<b>Community Based Projects</b>					
Athens, GA, U.S. National Poultry Research Center .....	-	1,000	1,000	-	-1,000
Booneville, AR, Wastewater Treatment Plant Rehabilitation .....	-	117	117	-	-117
Burns, OR, Range and Meadow Forage Management Research ...	-	408	408	-	-408
Columbia, MO, Center for Agricultural Animal Genetic Engineering and Health.....	4,000	4,000	4,000	-	-4,000
Dubois, ID, U.S. Sheep Experiment Station.....	4,200	-	-	-	-
El Reno, OK, Grazinglands Research Laboratory .....	-	1,260	1,260	-	-1,260
Hilo, HI, U.S. Pacific Basin Agricultural Research Center .....	-	1,215	1,215	-	-1,215
Houma, LA, Sugarcane Research.....	10,000	4,000	4,000	-	-4,000
Houston, TX, Children's Nutrition Research Center.....	-	7,115	7,115	-	-7,115
Kimberly, ID, Idaho Center for Agriculture, Food, and the Environment .....	-	1,000	1,000	-	-1,000
Las Cruces, NM, Range Management Research Unit.....	-	2,831	2,831	-	-2,831
Madison, WI, Marshfield Agricultural Research Station .....	-	6,000	6,000	-	-6,000
Madison, WI, Plant Germplasm Research Facility.....	39,700	-	-	-	-
Maricopa, AZ, U.S. Arid Land Agricultural Research Center .....	-	1,478	1,478	-	-1,478
Orono, ME, National Cold Water Marine Aquaculture Center .....	-	3,500	3,500	-	-3,500
Pendleton, OR, Columbia Plateau Conservation Research Center	-	700	700	-	-700
Peoria, IL, Capital Improvements.....	-	3,500	3,500	-	-3,500
Peoria, IL, National Center for Agricultural Utilization Research Center.....	4,500	-	-	-	-
Raleigh, NC, Central Crops Research Station.....	-	1,000	1,000	-	-1,000
St. Paul, MN, Cereal Disease Laboratory .....	-	7,000	7,000	-	-7,000
Stillwater, OK, Hydraulic Engineering Research Unit .....	-	3,254	3,254	-	-3,254
Stillwater, OK, Wheat, Peanut, and Other Field Crops Research Unit .....	-	4,177	4,177	-	-4,177
Tucson, AZ, Facility Upgrades.....	-	698	698	-	-698
Urbana, IL, Capital Improvements .....	-	500	500	-	-500
Wenatchee, WA, Deferred Maintenance.....	-	400	400	-	-400
Woodward, OK, Southern Plains Range Research Center .....	-	1,544	1,544	-	-1,544
Subtotal.....	62,400	56,697	56,697	-	-56,697
<b>Disaster Relief Supplemental</b>					
Auburn, AL, National Soil Dynamics Research Laboratory .....	-	28,000	28,000	-	-28,000
Madison, WI, U.S. Dairy Forage Research Center .....	-	10,000	10,000	-	-10,000
Pullman, WA, Crop and Land Management Research Laboratory	-	20,000	20,000	-	-20,000
Subtotal .....	-	58,000	58,000	-	-58,000
<b>Total Allocations .....</b>	<b>127,805</b>	<b>132,297</b>	<b>132,297</b>	<b>28,405</b>	<b>-103,892</b>



**PROJECT STATEMENT OBLIGATIONS****Table ARS-20. Project Statement on Basis of Obligations (thousands of dollars, FTEs)**

Item	2022 Actual	2023 Actual	2024 Estimated	2025 Estimated	Inc. or Dec.
Discretionary Obligations:					
<b>Buildings and Facilities</b>					
Buildings and Facilities.....	\$63,957	\$16,384	\$4,709	\$3,500	-\$1,209
ARS Co-Located Facilities .....	56,981	796	-	-	-
Community Based Projects.....	43,700	10,785	34,725	22,779	-11,946
Subtotal Disc Obligations .....	164,638	27,965	39,434	26,279	-13,155
Supplemental Obligations:					
Emergency Supplemental.....	5,423	395	2,700	-	-2,700
Disaster Relief.....	-	20,000	36,500	700	-35,800
Subtotal Supp Obligations.....	5,423	20,395	39,200	700	-38,500
Total Obligations.....	170,061	48,360	78,634	26,979	-51,655
Balances Available, EOY: .....	61,441	146,826	200,489	201,915	+1,426
Total Available.....	231,502	195,186	279,123	228,894	-50,229
Recoveries, Other .....	-3,248	-1,448	-	-	-
Bal. Available, SOY.....	-100,449	-61,441	-146,826	-200,489	-53,663
Total Appropriation.....	127,805	132,297	132,297	28,405	-103,892

**FUNDING DETAIL OBLIGATIONS****Table ARS-14. Additional Funding Detail Obligations (thousands of dollars, FTEs)**

Allocations	2022 Actual	2023 Actual	2024 Estimated	2025 Estimated	Inc. or Dec.
<b>Buildings and Facilities</b>					
Athens, GA, Southeast Poultry Research Center .....	\$1,313	\$2,023	\$1,012	\$100	-\$912
Beltsville, MD, Beltsville Area Research Center, Buildings 002, 005 and 308.....	1,202	1,753	-	-	-
Beltsville, MD, Beltsville Area Research Center, Building 002 .....	24,500	-	500	-	-500
Beltsville, MD, Beltsville Area Research Center, Building 005 .....	-	11,321	-	-	-
Beltsville, MD, Beltsville Area Research Center, Building 307 .....	388	97	-	-	-
Beltsville, MD, Beltsville Area Research Center, Building 308 .....	-	-	500	-	-500
Beltsville, MD, Beltsville Area Research Center, Building 005 and Infrastructure.....	34,805	-	-	-	-
Beltsville, MD, Beltsville Area Research Center, Infrastructure.....	-	-	2,000	3,400	+1,400
Kerrville, TX, Knipling Bushland Research Center.....	227	-	-	-	-
Salinas, CA, U.S. Agricultural Research Station.....	878	821	348	-	-348
Temple, TX, Grassland, Soil and Water Research Laboratory.....	578	98	-	-	-
Tucson, AZ, Southwest Watershed Res. Laboratory .....	66	271	349	-	-349
Subtotal .....	63,957	16,384	4,709	3,500	-1,209
<b>ARS Co-Located Facilities</b>					
Auburn, AL, National Soil Dynamics Laboratory.....	21	24	-	-	-
Columbia, MO, University of Missouri.....	-	772	-	-	-
Davis, CA, University of California .....	4,338	-	-	-	-
Lexington, KY, University of Kentucky.....	10,422	-	-	-	-
Lincoln, NE, University of Nebraska .....	20,000	-	-	-	-
Pullman, WA, Pullman ARS Research Laboratory .....	22,200	-	-	-	-
Subtotal .....	56,981	796	-	-	-
<b>Community Based Projects</b>					
Athens, GA, U.S. National Poultry Research Center .....	-	739	161	100	-61
Booneville, AR, Wastewater Treatment Plant Rehabilitation.....	-	-	117	-	-117
Burns, OR, Range and Meadow Forage Management Research.....	-	-	408	-	-408
Columbia, MO, Center for Agricultural Animal Genetic Engineering and Health .....	4,000	-	500	500	-
Dubois, ID, U.S. Sheep Experiment Station.....	-	290	3,375	150	-3,225
El Reno, OK, Grazinglands Research Laboratory .....	-	105	1,029	63	-966
Hilo, HI, U.S. Pacific Basin Agricultural Research Center.....	-	-	175	965	+790

2025 USDA EXPLANATORY NOTES - AGRICULTURAL RESEARCH SERVICE

Allocations	2022 Actual	2023 Actual	2024 Estimated	2025 Estimated	Inc. or Dec.
Houma, LA, Sugarcane Research .....	-	735	11,400	300	-11,100
Houston, TX, Children's Nutrition Research Center .....	-	526	5,824	400	-5,424
Kimberly, ID, Idaho Center for Agriculture, Food, and the Environment.....	-	6	150	800	+650
Las Cruces, NM, Range Management Research Unit .....	-	407	2,018	200	-1,818
Madison, WI, Marshfield Agricultural Research Station .....	-	-	1,000	4,000	+3,000
Madison, WI, Plant Germplasm Research Facility.....	39,700	-	-	-	-
Maricopa, AZ, U.S. Arid Land Agricultural Research Center ..	-	-	200	1,200	+1,000
Orono, ME, National Cold Water Marine Aquaculture Center.....	-	-	300	3,000	+2,700
Pendleton, OR, Columbia Plateau Conservation Research Center .....	-	-	650	50	-600
Peoria, IL, Capital Improvements.....	-	-	500	3,000	+2,500
Peoria, IL, National Center for Agricultural Utilization Research Center.....	-	400	600	3,500	+2,900
Raleigh, NC, Central Crops Research Station .....	-	-	100	850	+750
St. Paul, MN, Cereal Disease Laboratory .....	-	7,000	-	-	-
Stillwater, OK, Hydraulic Engineering Research Unit.....	-	213	1,400	1,641	+241
Stillwater, OK, Wheat, Peanut, and Other Field Crops Research Unit ..	-	306	1,936	1,935	-1
Tucson, AZ, Facility Upgrades.....	-	58	592	48	-544
Urbana, IL, Capital Improvements .....	-	-	500	-	-500
Wenatchee, WA, Deferred Maintenance .....	-	-	400	-	-400
Woodward, OK, Southern Plains Range Research Center.....	-	-	1,390	77	-1,313
Subtotal .....	43,700	10,785	34,725	22,779	-11,946
<b>Disaster Relief Supplemental</b>					
Auburn, AL, National Soil Dynamics Research Laboratory.....	-	-	27,000	500	-26,500
Madison, WI, U.S. Dairy Forage Research Center.....	-	-	9,500	200	-9,300
Pullman, WA, Crop and Land Management Research Laboratory .....	-	20,000	-	-	-
Subtotal .....	-	20,000	36,500	700	-35,800
<b>Emergency Hurricane Supplemental</b>					
Subtotal .....	5,423	395	2,700	-	-2,700
Total .....	170,061	48,360	78,634	26,979	-51,655

**JUSTIFICATION OF CHANGES**

*Buildings and Facilities*

ARS operates laboratories and facilities that have a capitalization value of \$6 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 some of the highest priority facilities.

1. An increase of \$10,600,000 for capital improvement and maintenance at the National Bio and Agro-Defense Facility in Manhattan, Kansas.

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. Beginning in 2023, USDA will own and operate the only large animal BSL-4 laboratory in the United States. 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.

2. An increase of \$17,805,000 to fully fund the upgrade of major infrastructure at the Beltsville Agricultural Research Center (BARC) in Beltsville, Maryland.

The existing underground steam and electrical substation and secondary feeders are in poor condition and in need of replacement. The systems are 40 plus years old and causing outages that affect research at the Center. The steam system is also a major source of energy loss. The sanitary and water systems are upwards of 50 years old and require urgent repairs and upgrade. Currently the water and sanitary systems are impacting the research and quality of services at BARC. There are also concerns that eventually, these systems can create environmental problems that could lead to state and Federal violations.

**CLASSIFICATION BY OBJECTS**

*Table ARS-22 Classification by Objects (thousands of dollars)*

<b>Item No.</b>	<b>Item</b>	<b>2022 Actual</b>	<b>2023 Actual</b>	<b>2024 Estimated</b>	<b>2025 Estimated</b>
Other objects:					
32.0	Land and structures .....	\$170,061	\$48,360	\$78,634	\$26,979
99.9	Total, new obligations.....	170,061	48,360	78,634	26,979

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**STATUS OF CONSTRUCTION**

Status of Construction Projects as of December 2023. Status of research facilities authorized or funded in prior years and reported as uncompleted in the 2024 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 percent - or a complete design designated as 100 percent. 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 [2023 Supplemental]	\$43,300,000 <u>[28,000,000]</u>	New funding was provided in 2019. Project transferred to USACE for managing the design and construction. New sites determined at Research Park for Land Swap. Land Swap to be finalized for 2nd Quarter 2024. Design to be complete 2nd Quarter 2024. Projected Contract Award for 3rd Quarter 2024.
	Total	71,300,000	
Arkansas, Booneville Waste Water Treatment Plant Rehabilitation	2023 Planning	\$117,000	ARS Location is putting a plan together to use these funds for repairs at the waste water treatment plant.
Arizona, Maricopa U.S Arid Land Agricultural Research Center	2023 Planning	\$1,478,000	ARS Location is putting a plan together to split these funds between 5 projects.
Arizona, Tucson Southwest Watershed Research Center	2016 Design and Construction	\$12,400,000	Design/Programming completed 1st Quarter 2018. Construction contract awarded 4th Quarter 2018. Construction completion date is scheduled for 3rd Quarter 2024.
Arizona, Tucson Facility Upgrades	2023 Planning	\$698,000	ARS Location is developing projects to use these funds.
California, Albany Western Regional Research Center (Research and Development Facility)	2000 Planning and Design	\$2,600,000	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 1st Quarter 2010. Construction contract award for the final phases 3 through 6 was awarded for 3rd Quarter 2010 with ARRA funding and was completed 3rd Quarter 2015.
	2001 Construction	4,889,220	
	2002 Construction	3,800,000	
	2009 ARRA	15,624,460	
	2015 Rescission	(166)	
Total	26,913,514		
California, Davis Center for Advanced Viticulture and Tree Crop Research	2004 Planning and Design	\$2,684,070	POR completed 2nd Quarter 2007. Project transferred to USACE for managing the design and construction in June 2020. Land purchased for an off-campus site adjacent to UC-Davis was completed 3rd Quarter 2022. Award of A-E contract 4th Quarter 2021. Design completed 2nd Quarter 2023. Projected Construction Contract Award planned for 3rd Quarter 2024. Construction completion planned for 1st Quarter 2027.
	2005 Construction	2,976,000	
	2006 Construction	3,588,750	
	2008 Construction	1,869,819	
	2009 Construction	2,192,000	
	2010 Construction	3,000,000	
	2011 Rescission	(16,062,114)	
	2020 Design and Construction	<u>76,200,000</u>	
Total	76,448,525		
California, Salinas Agricultural Research Station	2004 Planning and Design	\$4,473,450	A design update was awarded 1st Quarter 2017 and completed 4th Quarter 2018. Contract awarded 4th Quarter 2020. Construction completion date is scheduled for 4th Quarter 2024.
	2005 Planning and Design	2,976,000	
	2006 Construction	3,588,750	
	2008 Construction	1,869,819	
	2009 Construction	2,192,000	
	2010 Construction	3,654,000	
	2011 Rescission	(14,937,644)	
	2016 Design	1,300,000	
	2017 Construction	30,200,000	
	2018 Construction	<u>71,200,000</u>	
Total	106,516,375		

2025 USDA EXPLANATORY NOTES - AGRICULTURAL RESEARCH SERVICE

Location and Purpose	Year	Amount of Funds Provided	Description
Connecticut, Storrs Center of Excellence for Vaccine Research	2008 Planning and Design	\$1,869,819	POR completed 4th Quarter 2010. Lease agreement was not executed.
	2009 Design and Construction	2,192,000	
	2010 Construction	3,654,000	
	2011 Rescission	<u>(7,221,296)</u>	
	Total	494,523	
District of Columbia U.S. National Arboretum	2000 Planning and Design	\$500,000	Design (100 percent) of Bladensburg Road Entrance completed 1st Quarter 2006. The Administrative Building Modernization design completed 1st Quarter 2006. Construction of Phase 2, Greenhouse and mechanical support space completed 1st Quarter 2009. ARRA funds were used to award a construction contract for Administrative Building Modernization 4th Quarter 2010. Construction completed 2nd Quarter 2013.
	2001 Design and Construction	3,322,674	
	2002 Design and Construction	4,600,000	
	2003 Design and Construction	1,688,950	
	2008 Construction	695,100	
	2009 ARRA	8,041,842	
	2011 Rescission	<u>(2,066,637)</u>	
Total	16,781,929		
Florida, Canal Point Agricultural Research Service Laboratory	2008 Planning and Design	\$521,325	POR completed 2nd Quarter 2011. Land purchases complete. Historic preservation consultation completed and building demolition contract awarded 4th Quarter 2016. Demolition was completed 4th Quarter 2017.
	2009 Planning and Design	1,096,000	
	2010 Construction	3,422,000	
	2011 Rescission	(4,106,211)	
	2015 Rescission	<u>(149,125)</u>	
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 3rd Quarter 2015 and completed 4th Quarter 2015. POR/Bridging documents were awarded 4th Quarter 2015 and completed 3rd Quarter 2016. Design Build Construction Contract was awarded 4th Quarter 2017. Total contract duration from notice to proceed to completion is expected to take 7 1/2 years with all work completed by the 3rd Quarter 2025. The Government has taken ownership of buildings and infrastructure as they are completed. See list below for status: - B43A Hatchery/Brooding - 4th Quarter 2019 (actual) - B45 Laboratory/Office/Administration – 1st Quarter 2022 (actual) - B47 BLS-3 Animal Holding/Laboratory – 4th Quarter 2022 (actual) - B46 BSL-2 Animal Holding – 1st Quarter 2025 - Finalize Roadways, Sidewalks etc. - 2nd Quarter 2025
	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	
	2023 Planning	<u>1,000,000</u>	
Total	160,152,502		
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 completed 2nd Quarter 2023. Construction award by 2nd Quarter 2024. Construction completion by 2nd Quarter 2026.

2025 USDA EXPLANATORY NOTES - AGRICULTURAL RESEARCH SERVICE

Location and Purpose	Year	Amount of Funds Provided	Description
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)	
	2023 Planning	<u>1,215,000</u>	
Total	33,023,304		
Idaho, Dubois U.S. Sheep Experiment Station	2022 Construction Design	\$4,200,000	Multiple projects in planning/design phase with award for construction planned for 4 <sup>th</sup> Quarter 2024.
Idaho, Hagerman Aquaculture Facility	2005 Planning and Design	\$992,000	Lease agreement is in place. POR completed 3 <sup>rd</sup> Quarter 2007.
	2006 Construction	990,000	
	2008 Construction	695,100	
	2009 Construction	544,000	
	2011 Rescission	<u>(2,907,600)</u>	
Total	313,500		
Idaho, Kimberly Idaho Center for Agriculture, Food, and the Environment	2023 Planning	\$1,000,000	In planning stage.
Illinois, Peoria National Center for Agricultural Utilization Research (Central Wing)	2000 Construction Design	\$1,800,000	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 2 <sup>nd</sup> Quarter 2010 using ARRA funding and completed 3 <sup>rd</sup> Quarter 2012.
	2002 Construction	6,500,000	
	2004 Construction	2,684,070	
	2005 Construction	2,976,000	
	2006 Construction	3,588,750	
	2008 Construction	1,869,819	
	2009 Construction	2,192,000	
	2009 ARRA	16,237,165	
	2015 Rescission	<u>(142,565)</u>	
Total	37,705,239		
Illinois, Peoria New Greenhouse	2022 Construction Design	\$4,500,000	In design phase.
Illinois, Peoria Capital Improvements	2023 Planning	\$3,500,000	Planned award design by December 2023 and a construction award planned for January 2025.
Illinois, Urbana Capital Improvements	2023 Planning	\$500,000	In planning stage.

2025 USDA EXPLANATORY NOTES - AGRICULTURAL RESEARCH SERVICE

Location and Purpose	Year	Amount of Funds Provided	Description
Iowa, Ames National Centers for Animal Health	1999 Design and Construction	\$4,475,805	All major components of the modernization are complete. - Phase 1 Lab/Office (APHIS) completed in 2004. - Large Animal BSL-3Ag facilities construction completed 2 <sup>nd</sup> Quarter 2007. - Central Utility Plant and Infrastructure, Phase 1 and 2 construction is complete. Phase 3 construction completed 1 <sup>st</sup> Quarter 2009. - Construction of the Consolidated Laboratory Facility completed 2 <sup>nd</sup> Quarter 2009. - Low Containment Large Animal Facility construction completed 1 <sup>st</sup> Quarter 2009. - Demolition of existing facilities on 1 <sup>st</sup> and 2 <sup>nd</sup> Street completed 3 <sup>rd</sup> Quarter 2012. - Buildings 1 and 2 demolitions completed.
	2001 Design and Construction	8,980,200	
	2002 Design and Construction	40,000,000	
	2002 Construction	50,000,000	
	2002 APHIS Transfers	15,753,000	
	[Supplemental]	[14,081,000]	
	[Other Transfers]	[1,672,000]	
	2002 Construction	25,000,000	
	2003 Construction	32,785,500	
	2003 Construction	110,000,000	
	2005 Construction	121,024,000	
	2006 Construction	58,212,000	
	2009 Construction	10,500,000	
2015 Rescission	<u>(1,108,686)</u>		
Total	491,374,819		
National Laboratory for Agricultural and the Environment	2016 Design and Construction	\$13,500,000	Design awarded 4 <sup>th</sup> Quarter 2016 and bridging documents were completed 4 <sup>th</sup> Quarter 2017. Construction awarded 4 <sup>th</sup> Quarter 2018 and completed 4 <sup>th</sup> Quarter 2020. Balance of funds from completed projected reassigned to BARC Building 005.
	2023 Reassigned to BARC	<u>(138,941)</u>	
	Building 005	13,361,059	
Kansas, Manhattan National Bio and Agro- Defense Facility (NBAF) Laboratory	2022 Design and Construction	\$10,600,000	Project managed by NBAF. Schedule to be determined.
Kentucky, Bowling Green Animal Waste Management Research Laboratory	2005 Planning and Design	\$2,281,600	POR is complete for total project. Design (100 percent) for the Headhouse/Greenhouse only was completed 3 <sup>rd</sup> Quarter 2008. Lease agreement is in place. Construction of the Headhouse/Greenhouse awarded 4 <sup>th</sup> Quarter 2010 and completed 2 <sup>nd</sup> Quarter 2012.
	2006 Construction	2,970,000	
	2008 Construction	1,390,200	
	2009 Construction	1,088,000	
	2010 Construction	2,000,000	
	2011 Rescission	<u>(5,880,338)</u>	
Total	3,849,462		
Kentucky, Lexington Forage Animal Research Laboratory	2005 Planning and Design	\$2,976,000	Lease agreement terminated 2016. Design (100 percent) was completed 2 <sup>nd</sup> Quarter 2011. Project transferred to USACE for managing the design and construction. Project reactivated by 2020. Lease agreement for the new Lab office and Animal Facilities are ongoing. POR completed 2 <sup>nd</sup> Quarter 2022. Design completion planned 4 <sup>th</sup> Quarter 2023. Construction award planned for 3 <sup>rd</sup> Quarter 2024. All work completion planned for 1 <sup>st</sup> Quarter 2027.
	2006 Construction	3,960,000	
	2008 Construction	2,085,300	
	2009 Construction	1,632,000	
	2010 Construction	2,000,000	
	2011 Rescission	(9,678,689)	
	2020 Construction	<u>65,900,000</u>	
Total	68,874,611		
Louisiana, Houma Sugarcane Research Unit	2004 Planning and Design	\$1,342,035	Design (100 percent) completed 4 <sup>th</sup> Quarter 2007. Repackaging of design to allow for construction of some elements within the available funding that was completed 2 <sup>nd</sup> Quarter 2008. Phase 1A construction completed 4 <sup>th</sup> Quarter 2010. Phase 1B construction awarded 2 <sup>nd</sup> Quarter 2011 and completed 3 <sup>rd</sup> Quarter 2013. Awarded A-E for design for Greenhouses 2 <sup>nd</sup> Quarter 2023. Design planned completion is May 2024.
	2005 Construction	2,976,000	
	2006 Construction	3,588,750	
	2008 Construction	1,869,819	
	2009 Construction	2,505,000	
	2010 Construction	3,654,000	
	2015 Rescission	(100)	
	2022 Construction	10,000,000	
	2023 Planning	<u>4,000,000</u>	
Total	29,935,504		



2025 USDA EXPLANATORY NOTES - AGRICULTURAL RESEARCH SERVICE

Location and Purpose	Year	Amount of Funds Provided	Description
Louisiana, New Orleans Southern Regional Research Center (Industrial Wing)	1998 Planning and Design	\$1,100,000	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 percent) for the LTR of facilities completed 4 <sup>th</sup> Quarter 2008. Construction of the LTR awarded 3 <sup>rd</sup> Quarter 2009 and completed 3 <sup>rd</sup> Quarter 2011.
	1999 Modernization	6,000,000	
	2000 Modernization	5,500,000	
	[2006 Supplemental (design)]	[4,900,000]	
	[2006 Supplemental (construct.)]	[20,000,000]	
Total	37,500,000		
Maine, Orono National Cold Water Marine Aquaculture Center	2001 Planning and Design	\$2,494,500	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. Selected A-E Designer.
	2002 Construction	3,000,000	
	2003 Construction	9,090,525	
	2004 Design and Construction	2,684,070	
	2005 Design and Construction	2,976,000	
	2006 Design and Construction	2,475,000	
	2011 Rescission	(2,012,504)	
	2023 Planning	<u>3,500,000</u>	
Total	24,207,591		
Maryland, Beltsville Beltsville Agricultural Research Center, (BARC)	1988 Design and Construction	\$5,750,000	Study to evaluate boiler plants, steam lines, and electrical distribution completed 4 <sup>th</sup> Quarter 2009. Construction contract for repairs to boiler plants and portions of the steam distribution system awarded 4 <sup>th</sup> Quarter 2010 with ARRA funding and completed 2 <sup>nd</sup> Quarter 2012. Design-Build contract for major renovations to Building 306 awarded 4 <sup>th</sup> Quarter 2010 with ARRA funding and completed 4 <sup>th</sup> Quarter 2012.
	1989 Design and Construction	6,100,000	
	1990 Design and Construction	9,860,000	
	1991 Design and Construction	15,999,792	
	1992 Design and Construction	16,000,000	
	1993 Design and Construction	13,547,000	
	1994 Design and Construction	19,700,000	
	1995 Design and Construction	3,960,000	
	1996 Design and Construction	8,000,000	
	1997 Design and Construction	4,500,000	
	1998 Design and Construction	3,200,000	
	1999 Design and Construction	2,500,000	
	2000 Design and Construction	13,000,000	
	2001 Design and Construction	13,270,740	
	2002 Design and Construction	3,000,000	
	2003 Design and Construction	4,152,830	
	2004 Design and Construction	2,684,070	
	2005 Design and Construction	2,976,000	
2006 Design and Construction	3,588,750		
2009 Design and Construction	2,192,000		
2009 ARRA	21,513,046		
2010 Construction	3,000,000		
2011 Rescission	<u>(9,831,954)</u>		
Total	168,662,274		
Maryland, Beltsville (BARC) Renovate Building 307	2016 Design and Construction	\$37,100,000	Preparation of design bridging documents for Building 307 was awarded 4 <sup>th</sup> Quarter 2016 and completed 1 <sup>st</sup> Quarter 2018. Construction was awarded 1 <sup>st</sup> Quarter 2020 and beneficial occupancy was taken in July 2022. Balance of funds from completed project reassigned to BARC Building 002.
	2023 Reassigned to BARC Building 002	<u>(1,583,624)</u>	
		35,516,376	
Maryland, Beltsville (BARC) Renovate Buildings 002, 005, and 308	2020 Design	\$12,300,000	Design awarded for Building 002 was awarded for 4 <sup>th</sup> Quarter 2020 and was completed in the 4 <sup>th</sup> Quarter 2021 (\$2,829,000). Design awarded for Building 005 was awarded 4 <sup>th</sup> Quarter 2020 and was completed 3 <sup>rd</sup> Quarter 2022 (\$4,305,000). Award for 35 percent design of Building 308 executed in 4 <sup>th</sup> Quarter 2020 and was completed in the 3 <sup>rd</sup> Quarter 2022 (5,166,000).

2025 USDA EXPLANATORY NOTES - AGRICULTURAL RESEARCH SERVICE

Location and Purpose	Year	Amount of Funds Provided	Description
Maryland, Beltsville (BARC) Renovate Building 002	2016 Reassigned from BARC Building B307	\$1,583,624	Construction awarded 3 <sup>rd</sup> Quarter 2022. Construction completion planned for 2 <sup>nd</sup> Quarter 2025.
	2021 Construction	<u>24,500,000</u>	
	2023 Construction (Reassigned from BARC Infrastructure)	26,583,624	
Maryland, Beltsville (BARC) Renovate Building 005	2016 Reassigned from Ames, Iowa National Lab for Agri and Envir	\$138,941	Construction award planned for 4 <sup>th</sup> Quarter 2023. Construction completion planned for 2 <sup>nd</sup> Quarter 2026.
	2022 Construction	34,805,000	
	2023 Construction (Reassigned from BARC Infrastructure)	<u>11,200,000</u> 46,143,941	
Maryland, Beltsville (BARC) Renovate Building 308	2023 Design (Reassigned from BARC Infrastructure)	\$500,000	Awarded for development of Design Build Bridging Documents executed 4 <sup>th</sup> Quarter 2020 and completed 4 <sup>th</sup> Quarter 2022 using \$12,300,000 funds provided in 2020 for Renovate 002, 005, 308 of which \$5,166,000 was designated for design renovation of BARC 308. Design will be completed while waiting for construction funding. Currently ARS is working with USACE to modify A-E contract to complete the design. The 500,000 in 2023 will be used along with the remaining 2020 funds for this modification to the A-E contract.
Maryland, Beltsville BARC Infrastructure	2023 Planning	\$17,600,000	FY 2023 Appropriations provide \$17.6M. \$12.2M assigned to BARC 002, 003 and 308 projects. Working with USACE to manage infrastructure projects.
	2023 Reassigned to BARC Building 002	(500,000)	
	2023 Reassigned to BARC Building 005	(11,200,000)	
	2023 Reassigned to BARC Building 308	<u>(500,000)</u> 5,400,000	
Maryland, Beltsville National Agricultural Library	1998 Design and Construction	\$2,500,000	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 3rd Quarter 2012.
	1999 Design and Construction	1,200,000	
	2001 Design and Construction	1,766,106	
	2002 Construction	1,800,000	
	2003 Design and Construction	1,490,250	
	2004 Design and Construction	894,690	
	2009 ARRA	6,357,422	
	2011 Rescission	<u>(115,175)</u>	
Total	15,893,293		
Maryland, Frederick (Fort Detrick) Foreign Disease-Weed Science Research Laboratory	2016 Design	\$4,900,000	Design/Programming awarded for the 4th Quarter 2016 and completed 2nd Quarter 2018. Project transferred to USACE for managing the design and construction. Construction was scheduled to be awarded in the 4th Quarter 2021, but funding was insufficient for award. ARS has determined that the BS-3 Green House project cannot be descoped to bring within available funding and still have a usable facility. ARS has abandoned the construction of the BSL-3 Greenhouses and will use the remaining funding to modernize existing Ft. Detrick facilities.
	2017 Construction	<u>64,300,000</u>	
	Total	69,200,000	

2025 USDA EXPLANATORY NOTES - AGRICULTURAL RESEARCH SERVICE

<b>Location and Purpose</b>	<b>Year</b>	<b>Amount of Funds Provided</b>	<b>Description</b>
Michigan, East Lansing Avian Disease and Oncology Laboratory	1992 Planning	\$250,000	Design (100 percent) for this multi-phased facility modernization is complete with no funds provided for modernization. ADOL will move to Southeast Poultry Research Center (SEPRL) when their modernization program is complete in 3rd Quarter of 2025 and this facility will be closed.
	1993 Planning	212,000	
	1998 Planning and Design	1,800,000	
	2011 Rescission	<u>(63,193)</u>	
	Total	2,198,807	
Minnesota, St. Paul Cereal Disease Laboratory	2023 Planning	\$7,000,000	Design funds only for a new \$91K GSF Lab/Office building, \$6K GSF Headhouse, \$22.5K Greenhouse. Award of A-E contracts for Planning and Design is planned for March 2024.
Mississippi, Lorman Biotechnology Laboratory Alcorn State University	2006 Planning and Design	\$1,980,000	A lease agreement with Alcorn State University for the new facility completed 4th Quarter 2009. POR completed 3rd Quarter 2008.
	2008 Planning and Design	1,390,200	
	2009 Construction	1,176,000	
	2010 Construction	1,500,000	
	2011 Rescission	<u>(5,798,055)</u>	
Total	248,145		
Mississippi, Poplarville Thad Cochran Southern Horticulture Laboratory	2002 Design	\$800,000	Construction of the Headhouse/Greenhouse awarded for 4th Quarter 2007 and completed 1st Quarter 2008.
	2003 Construction	9,140,200	
	[2006 Supplemental]	<u>[4,300,000]</u>	
	2011 Rescission	<u>(9,178)</u>	
Total	14,231,022		
Mississippi, Starkville Poultry Science Research Facility	2005 Planning and Design	\$2,976,000	Lease agreement is in place. Design (100 percent) completed 1st Quarter 2008.
	2006 Construction	4,950,000	
	2008 Construction	1,390,200	
	2009 Construction	3,177,000	
	2011 Rescission	<u>(10,345,645)</u>	
Total	2,147,555		
Mississippi, Stoneville Jamie Whitten Delta States Research Center	2004 Construction	\$4,831,326	Design (100 percent) completed. Construction of Phase 1 completed. Construction of mechanical, electrical, and plumbing systems for phases 2 through 5 (of 5 total) and repair of deteriorated building envelope awarded for 3rd Quarter 2010. Phase 2 and 3 completed 1st Quarter 2013, Phase 4 completed 2nd Quarter 2015, and Phase 5 completed 2nd Quarter 2016.
	2005 Construction	2,976,000	
	2008 Construction	2,780,400	
	2009 ARRA	36,347,783	
	2010 Construction	4,000,000	
	2011 Rescission	<u>(6,047,327)</u>	
	2015 Rescission	<u>(134)</u>	
Total	44,888,048		
Missouri, Columbia National Plant and Genetics Security Center	2004 Planning and Design	\$2,415,663	Initial Design completed 4th Quarter 2008. Funding for redesign and construction in 2020. Project transferred to USACE for managing the design and construction. A-E contract awarded 3rd Quarter 2021 and design completed 4th Quarter of 2022. Construction award planned for 3rd Quarter 2023 and construction completion planned for 1st Quarter of 2025.
	2005 Construction	4,960,000	
	2006 Construction	3,687,750	
	2008 Construction	2,085,300	
	2009 Construction	1,633,000	
	2010 Construction	3,500,000	
	2011 Rescission	<u>(15,590,075)</u>	
	2020 Design and Construction	<u>24,800,000</u>	
Total	27,491,638		
Missouri, Columbia Center for Agricultural Animal Genetic Engineering and Health	2022 Planning and Design	\$4,000,000	Project transferred to USACE for managing the planning and design. Schedule still to be determined.
	2023 Planning and Design	<u>4,000,000</u>	
	Total	8,000,000	

2025 USDA EXPLANATORY NOTES - AGRICULTURAL RESEARCH SERVICE

Location and Purpose	Year	Amount of Funds Provided	Description
Montana, Bozeman Animal Bioscience Facility	2005 Planning and Design	\$1,984,000	Lease agreement in place. Conceptual Design (35 percent) completed in the 3rd Quarter 2008.
	2006 Construction	3,960,000	
	2008 Construction	1,869,819	
	2009 Construction	2,192,000	
	2010 Construction	3,654,000	
	2011 Rescission	<u>(12,720,879)</u>	
	Total	938,940	
Montana, Sidney Northern Plains Agricultural Research Laboratory	1998 Planning and Design	\$606,000	Construction of Phase 1 (Lab/Office Building) completed 2003 and Phase 2 (Quarantine Lab) completed 4th Quarter 2008.
	1999 Construction	7,300,000	
	2004 Design and Construction	2,505,132	
	2011 Rescission	<u>(29,505)</u>	
	Total	10,381,627	
Nebraska, Lincoln Systems Biology Research Facility	2008 Planning and Design	\$1,390,200	POR completed 3rd Quarter 2011.
	2009 Planning and Design	1,088,000	
	2010 Construction	3,760,000	
	2011 Rescission	<u>(5,782,528)</u>	
	Total	455,672	
Nebraska, Lincoln University of Nebraska National Center for Resilient Precision Agriculture	2021 Design	\$11,200,000	Project transferred to USACE for managing the design and construction. Lease should be finalized by 3rd Quarter 2023. A-E contract awarded for 2nd Quarter 2022. POR completed 1st Quarter 2023. Design planned completion 4th Quarter 2023. Current funding is only sufficient for construction of Greenhouse/Headhouse and award is planned for 4th Quarter 2024 and construction completion planned for 4th Quarter 2026.
	2022 Construction	<u>20,000,000</u>	
	Total	31,200,000	
New Mexico, Las Cruces Range Management Research Unit	2023 Planning	\$2,831,000	Deferred maintenance of the Southwest Climate Hub.
New York, Geneva Grape Genetics Research Center	2004 Planning and Design	\$2,415,663	Project transferred to USACE for managing the design and construction. A-E contract awarded in 4th Quarter 2020. Design to be completed by 1st Quarter 2024. Projected contract award 4th Quarter 2024 and final acceptance 4th Quarter 2026.
	2005 Construction	2,976,000	
	2006 Construction	3,588,750	
	2008 Construction	1,869,819	
	2009 Construction	2,192,000	
	2010 Construction	3,654,000	
	2011 Rescission	<u>(14,806,870)</u>	
	2019 Design and Construction	<u>68,900,000</u>	
Total	70,789,362		
New York, Ithaca Crop-Based Health Genomics	2004 Planning and Design	\$3,847,167	Design (100 percent) completed 2nd Quarter 2008.
	2005 Construction	2,976,000	
	2006 Construction	3,588,750	
	2011 Rescission	<u>(7,314,491)</u>	
	Total	3,097,426	
North Carolina, Raleigh Central Crops Research Station	2023 Planning	\$1,000,000	ARS is working to secure a lease for the land with the University. Currently planning for A-E Consulting firm.

2025 USDA EXPLANATORY NOTES - AGRICULTURAL RESEARCH SERVICE

<b>Location and Purpose</b>	<b>Year</b>	<b>Amount of Funds Provided</b>	<b>Description</b>
North Carolina, Raleigh Plant Science Research	2019 Design and Construction	\$30,600,000	Funding provided in 2019. Project transferred to USACE for design and construction. NCSU reserved 15-acre parcel at Lake Wheeler site for ARS; once the ARS project has been designed and a premises established, a lease agreement can be executed. A-E contract awarded 2nd Quarter 2021. Design completed 1st Quarter 2024. Anticipated construction contract award for 4th Quarter 2024. Final acceptance 1st Quarter 2027.
Ohio, Toledo University of Toledo	2005 Planning and Design	\$1,984,000	Design (100 percent) completed 1st Quarter 2010. Lease agreement in place.
	2006 Construction	1,584,000	
	2008 Construction	1,869,819	
	2009 Construction	2,192,000	
	2010 Construction	3,654,000	
	2011 Rescission	<u>(9,356,845)</u>	
	Total	1,926,974	
Oklahoma, El Reno Grazinglands Research Laboratory	2023 Planning	\$1,260,000	Facility Improvements
Oklahoma, Stillwater Hydraulic Engineering Research Unit	2023 Planning	\$3,254,000	Facility Improvements
Oklahoma, Stillwater Wheat, Peanut, and Other Field Crops Research Unit	2023 Planning	\$4,177,000	Facility Improvements
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	<u>(152,556)</u>	Facility Improvements
	2023 Planning	<u>1,544,000</u>	
Total	13,815,444		
Oregon, Burns Range and Meadow Forage Management Research	2023 Planning	\$408,000	Planning to use the funds to repair a building by replacement.
Oregon, Corvallis National Clonal Germplasm Repository	2020 Design and Construction	\$13,500,000	Project transferred to USACE for managing the design and construction. A-E Task Order Awarded 3rd Quarter 2021. Design completed by 4th Quarter 2022. Award construction contracts in 2nd Quarter 2023 and final acceptance 4th Quarter 2024.
Oregon, Pendleton Columbia Plateau Conservation Research Center	2023 Planning	\$700,000	Design awarded 3rd 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	<u>(2)</u>	
Total	36,784,484		

2025 USDA EXPLANATORY NOTES - AGRICULTURAL RESEARCH SERVICE

<b>Location and Purpose</b>	<b>Year</b>	<b>Amount of Funds Provided</b>	<b>Description</b>
Pennsylvania, University Park Pasture Systems & Watershed Management Research	2019 Design and Construction	\$21,900,000	New funding was provided in 2019. Project transferred to USACE for managing the design and construction. Design started in 1st Quarter 2021. Design completed 3rd Quarter 2022. Construction awarded for 2nd Quarter 2023 and final acceptance 3rd Quarter 2025.
South Carolina, Charleston U.S. Vegetable Laboratory	1988 Feasibility Study 1990 Planning and Construction 1994 Construction 1995 Construction 1996 Construction 1997 Construction 1998 Construction 2000 Construction 2002 Construction 2003 Design 2004 Construction 2005 Construction 2006 Construction 2011 Rescission Total	\$50,000 1,135,000 909,000 5,544,000 3,000,000 3,000,000 4,824,000 1,000,000 4,500,000 1,390,900 3,131,415 2,976,000 1,980,000 (517) 33,439,798	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.
Texas, Houston Children's Nutrition Research Center	2016 Design and Construction 2023 Planning Total	\$29,200,000 <u>7,115,000</u> 36,315,000	Design (bridging documents stage) awarded for 4th Quarter 2016 and completed 4th Quarter 2017. Project transferred to USACE to manage the design and construction. Project re-started in 4th Quarter 2020. Design completed by 2nd Quarter 2022. Design Build Contract awarded 2nd Quarter 2023. Construction completion planned for 3rd Quarter 2025.
Texas, Kerrville Knipling Bushland Laboratory	2008 Planning and Design 2009 Planning and Design 2011 Rescission 2017 Planning and Design 2018 Construction Total	\$1,390,200 1,957,000 (2,768,214) 3,700,000 <u>50,700,000</u> 54,978,986	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 completed 2nd Quarter 2021. Construction awarded in 1st Quarter 2022. Construction completion planned for 3rd Quarter 2025.
Texas, Temple Grassland Soil & Water Research Laboratory	2017 Planning and Design 2018 Construction Total	\$1,400,000 <u>18,700,000</u> 20,100,000	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 4th Quarter 2019. Funding was only sufficient to award modernization work at the Temple site. Construction awarded 4th Quarter 2020. Construction was completed 3rd Quarter 2023. Some remaining B&F funds being used for small projects at the Riesel facility.
Utah, Logan Agricultural Research Center	2008 Planning and Design 2009 Design and Construction 2010 Construction 2011 Rescission Total	\$5,560,800 4,351,000 4,527,000 (13,839,929) 598,871	Lease completed 3rd Quarter 2010. POR completed 4th Quarter 2010.

2025 USDA EXPLANATORY NOTES - AGRICULTURAL RESEARCH SERVICE

Location and Purpose	Year	Amount of Funds Provided	Description
Washington, Pullman Pullman ARS Research Laboratory Plant Biosciences Building	2004 Planning and Design	\$3,936,636	Lease agreement with Washington State University in place. Conceptual Design (35 percent) completed in 2011. New funding was provided in 2019. The previous design, completed to 35 percent cannot be used. Project transferred to USACE for managing the design and construction. A-E awarded for 4th Quarter 2020 and was completed 2nd Quarter of 2022. Design Build contract awarded 3rd Quarter 2023 with a beneficial occupancy 1st Quarter 2026.
	2005 Construction	2,976,000	
	2006 Construction	3,588,750	
	2008 Construction	1,869,819	
	2009 Construction	2,192,000	
	2010 Construction	3,740,000	
	2011 Rescission	(17,240,830)	
	2019 Design and Construction [2023 Supplement Construction]	104,900,000 <u>[20,000,000]</u>	
Total	125,962,375		
Washington, Wenatchee Deferred Maintenance	2023 Planning	\$400,000	Deferred Maintenance.
West Virginia, Kearneysville Appalachian Fruit Laboratory	2003 Planning and Design	\$471,913	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.
	2004 Construction	1,789,380	
	2005 Construction	3,608,896	
	2006 Construction	2,024,550	
	2008 Planning and Design	1,529,220	
	2009 Planning and Design	783,000	
	2010 Construction	2,000,000	
	2011 Rescission	<u>(3,430,725)</u>	
Total	8,776,234		
West Virginia, Leetown National Center for Cool and Cold Water Aquaculture (Broodstock Facility)	2002 Design and Construction	\$2,200,000	Construction completed 3rd Quarter 2008.
	2006 Construction	891,000	
	2011 Rescission	<u>(4,717)</u>	
	Total	3,086,283	
Wisconsin, Marshfield Nutrient Management Laboratory	2003 Planning, Design and Const.	\$2,980,500	Design (100 percent) of Phase 1 and Phase 2 completed. Phase 1 (Nutrient Lab) construction completed 4th Quarter 2008. Phase 2 construction (Animal Holding Facility) awarded for 4th Quarter 2007. Phase 2 construction completed 1st Quarter 2010.
	2004 Construction	3,668,229	
	2005 Construction	4,860,800	
	2006 Construction	7,920,000	
	2011 Rescission	<u>(18,229)</u>	
Total	19,411,300		
Wisconsin, Prairie du Sac Dairy Forage Agriculture Research Center	2008 Planning and Design	\$2,502,360	POR completed 3rd Quarter 2011. New funding was provided in 2019. Funds have been transferred to the USACE to manage design and construction of this project. A-E awarded in 3rd Quarter 2021. Design completed 4th Quarter 2023, but A-E is still being finalized and not expected until December 2023. Anticipated contract award for 3rd Quarter 2024 and final acceptance 1st Quarter 2026.
	2009 Construction	2,002,000	
	2010 Construction	4,000,000	
	2011 Rescission	(7,675,381)	
	2019 Design and Construction [Supplemental Construction]	71,700,000 <u>10,000,000</u>	
	Total	82,528,979	
Wisconsin, Madison Marshfield Agricultural Research Station	2023 Planning	\$6,000,000	Functional Statement complete. Area/Location developing plan for design and construction.
Wisconsin, Madison Plant Germplasm Research Facility	2022 Planning/Design and Construction	\$39,700,000	Project transferred to USACE for managing the planning/design and construction. A-E contract award planned for 1st Quarter 2024. Remaining schedule to be determined.
Emergency Hurricane Supplemental Funding	2018 Planning, Design and Construction	\$22,000,000	There was a \$395K unforeseen site condition modification to contracts in 2023 for Mayaguez and Isabela Underground Electrical Distribution. Remaining funds to be used on St. Croix Underground Electrical Distribution in 2024.

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**AGENCY-WIDE PERFORMANCE****Introduction**

The Agriculture Research Service (ARS) was established November 2, 1953, within the Department of Agriculture and is the chief scientific in-house research agency. The agency’s mission is to “deliver scientific solutions to national and global agricultural challenges.”

The purpose of the Summary of Performance section is to provide an update on Performance and Evidence and Evaluation efforts, facilitating compliance with the Government Performance Results Modernization Act (GPRMA) and the Evidence Act of 2018, as well as departmental Key Performance Indicators (KPI). The Office of Budget and Program Analysis (OBPA) leads the Department in performance, evaluation, evidence, and risk management and chairs the Performance, Evaluation, Evidence Committee (PEEC) and the Enterprise Risk Management (ERM) committee. Each USDA Mission Area is represented on these committees.

The Research, Education, and Economics (REE) mission area and the Office of the Chief Scientist are jointly represented through the OCS’ Strategic Planning, Program Evaluation, and Enterprise Risk Officer, whose team functions as the coordinating members on USDA’s PEEC and ERM committees.

The Research, Education, and Economics (REE) mission area of the U. S. Department of Agriculture has Federal leadership responsibility for advancing scientific knowledge related to agriculture through research, extension, and education. The mission area office is led by the Under Secretary for the Research, Education, and Economics (REE) and Chief Scientist for USDA, whose responsibilities include oversight of the four agencies that comprise OCS/REE, the Agricultural Research Service (ARS), National Institute for Food and Agriculture (NIFA), Economic Research Service (ERS), and National Agricultural Statistics Service (NASS.) The National Agriculture Library, National Arboretum, and the Office of the Chief Scientist also fall under this mission area.

The mission of the Office of the Chief Scientist (OCS) is to provide strategic coordination of the science that informs the Department's and the Federal government's decisions, policies, and regulations that impact all aspects of U.S. food and agriculture, related landscapes, and communities.

Therefore, REE performance, evaluation, evidence and risk management efforts are coordinated and led by the Office of the Chief Scientist on behalf of the Mission Area. The OCS Strategic Planning, Program Evaluation, and Enterprise Risk Officer leads the Mission Area by chairing two committees: the OCS/REE Performance, Evaluation and Evidence Committee (OCS/REE-PEEC) and the OCS/REE Enterprise Risk Management (ERM) Committee. The two Mission Area committees are comprised of REE agency leaders in performance, evaluation, evidence and risk management, as well as the Mission Area’s functional and operational leads as necessary.

**Alignment to USDA 2022 – 2026 Strategic Plan**

ARS contributes to Goal 2 of the Department’s Strategic Goals in the current 2022 – 2026 USDA Strategic Plan. Departmental KPIs are performance indicators that are aligned to the Strategic Objectives laid out in the USDA’s Strategic Plan.

- Strategic Goal 2: Ensure America’s Agricultural System is Equitable, Resilient, and Prosperous
  - Objective 2.3: Foster Agricultural Innovation

**SUMMARY OF PERFORMANCE**

A more detailed report of the performance plan can be found at <https://www.usda.gov/our-agency/about-usda/performance>. The following table summarizes the results for the Departmental Key Performance Indicators (KPIs) for which the ARS is responsible.

**Table ARS-23. Key Performance Indicators**

<b>Strategic Objective 2.3</b>	<b>Item</b>	<b>2024</b>	<b>2025</b>
<b>USDA Patents</b>	<b>Results</b>	-	-
Percent of USDA Patents Licensed per Patents Issued	<b>Target</b>	<b>35</b>	<b>35</b>

Strategic Objective 2.3	Item	2024	2025
<b>Peer Reviewed Publications</b>	<b>Results</b>	-	-
ARS Peer Reviewed Publications	<b>Target</b>	-	<b>3500</b>

*This KPI is being introduced in 2025.*

### Expected Performance Progress Towards the Achievement of Strategic Objectives:

Strategic Objective 2.3: Foster Agricultural Innovation.

**USDA Patents:** This target is constant over a multiple-year period based upon historical adoption of USDA’s research outcomes. Most of REE’s research outcomes are not transferred through a patent license. Because the REE mission is to transfer research outcomes for broad public use by the most effective mechanism, REE only pursues patents and licensing principally to incentivize commercialization and to facilitate adoption in the marketplace. This is usually the case when complementary investment by the private sector is necessary to commercialize a product, and patent protection is required to protect this investment. As a result, the ratio of the number of patents newly licensed per year over the number of patents issued that year would not be an indicator for the adoption of many REE research outcomes. Instead, the percent of patents licensed is an indicator of the commercialization of patented research outcomes. Because it is not possible to accurately predict the needs of the future, a high percent target may miss important research outcomes that would need to be protected for adoption and commercialization. A lower target would protect a higher number of research outcomes that would not be commercially viable. The current goal is to have approximately one-third of issued patents licensed. Although the year in which a license is signed is not typically the year in which the patent was issued, over time the ratio of newly signed licenses over the number of newly issued patents may be an indicator of “judicious” patenting contemplating among other things commercial viability of the technology.

**Peer Reviewed Publications:** The target is an average of the last five years of publications. In the ARS policies and procedures, the performance plan for ARS Category 1 scientists states, “The minimum requirement for report results can be met by authorship on two manuscripts of original research for refereed journals with authorship at any level, adhering to ARS guidelines on Authorship requirements.” ARS does not anticipate many more or less publications than 3,500 per year and anticipates reaching at least 3,500 publications with the two publication requirements written into the performance plans. The target was previously 4,000 publications but has been lowered to 3,500 because the average publications has decreased over the last five years due to disruptions due to COVID: in some instances, scientists were unable to access their data or labs during the pandemic resulting in delayed or decreased publications. ARS publications for both 2022 and 2023 were below 4,000 prompting the change in this KPI’s target.