



AGRICULTURE RESILIENCE ACT OF 2023

WORKSHOP IN APPLIED EARTH SYSTEMS MANAGEMENT, FALL TERM 2023

ACKNOWLEDGEMENTS

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EXECUTIVE SUMMARY

In the United States, agriculture is responsible for a significant portion of total greenhouse gas emissions. The challenges with accelerating climate change and resulting environmental degradation are of increasing concern in the United States, as the agriculture industry continues to contribute a significant proportion of total US greenhouse gas emissions, despite only accounting for a relatively small share of the US economy. It is estimated that 11 percent of all greenhouse gas emissions in the United States come from agriculture, far out of proportion to the 07 percent annual contribution of the agricultural sector to the US economy. While agriculture is a clear and major contributor to climate change, it is simultaneously vulnerable to the impacts of that climate change. Emissions warm the climate, which increases the frequency and intensity of droughts, contributes to excessive rainfall and flooding, and disrupts weather patterns, all of which create severe risks for farmers and their products.



It is for these reasons the Agricultural Resilience Act of 2023 (hereinafter referred to as the Act) was proposed by US Representative Chellie Pingree. In summary, the Act aims to significantly reduce greenhouse gas emissions across the agricultural system by setting a target of a 50 percent reduction in greenhouse gas emissions by no later than 2030 and for net zero emissions by 2040. The Act aims to improve the resilience of the agriculture system and reduce its emissions by establishing new policies across six key areas: expanding federal investment in agricultural research, expanding healthy soil practices to increase soil carbon sequestration, promoting the preservation of viable farmlands, providing economic advantages to pasture-based livestock systems,

supporting on-farm renewable energy development, and reducing food loss and waste.

A team of eleven Masters students at Columbia University's School of International and Public Affairs created a program to simulate operations of two specific grant programs for the first year after the passage of the Act. These two grant programs were chosen based on high predicted impact, and because together they demonstrate two different ways of building resilience.

The first grant program evaluated was the On-Farm Conservation Stewardship Innovation Grants Program which is part of a larger program focused on soil health. The second grant program evaluated was the Grants for Composting and Anaerobic Digestion Food Waste-to-Energy Projects, part of a larger program focusing on food loss and waste.



The Innovation Grants Program builds upon the existing Conservation Stewardship Program administered by the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS). The Conservation Stewardship Program provides technical assistance to farmers to improve land health and encourages new ways to farm sustainably. Five-year grants for crop and livestock related purposes are allocated by the NRCS and managed by existing USDA regional offices.

The staffing plan and organizational structure for the Innovation Program focuses on senior administration, with a Program Director and two to four Program Managers in each of the four USDA regions, with six to eight Program Associates to support each office. This program additionally works closely with local offices and technical support agents who directly work with farmers. The total budget for the Innovation Grants is \$200 million per year, drawn from an expanded Conservation Stewardship Program funded at \$4 billion per year. 57 percent of the Innovation Grant budget is allocated to technical assistance, as much of the on-farm innovation will be supported by new staff from an expanded NRCS.

Similarly, the Energy Grants Program will be run by staff under the National Institute of Food and Agriculture (NIFA), and the grants will be managed

by existing regional NIFA offices. The program will make grants for composter and anaerobic digester construction projects to process organic waste, specifically focused on food waste. Our staffing plan and organizational structure for the Energy Grants Program is led by a Program Director who is supported by regional offices, with one to two Program Managers and one to four Program Associates each.

The total budget for the Energy Grants is \$100 million per year distributed to a portfolio of four grants of \$10 million, eight grants of \$5 million, and 18 grants of \$1 million for each year of the program.

For both the Innovation Grants and Energy Grants Programs performance will be evaluated through an administrative report twice a year, and metrics relating to program impact will be reported quarterly. These summaries will assess how the programs are moving towards the larger goals of the bill and will identify potential areas for improvement.

This report outlines how two specific government grant programs within the Agriculture Resilience Act of 2023 can simultaneously improve the resilience of farmer's livelihoods in the face of climate change, while also reducing the impacts that agriculture has in propelling climate change.



INTRODUCTION

In the United States, agriculture and environmental degradation are inextricably linked. On the one hand, agriculture is significantly harmed by climate change. The impacts of climate change dramatically affect crops, livestock, soil, water resources, rural communities, and agricultural workers (EPA 2023). However, agriculture is also a major contributor to climate change, emitting greenhouse gasses into the atmosphere through the production of livestock and via farming techniques such as tilling and pesticide application (EPA 2023).

Climate change affects agriculture in the United States at both local and regional levels. One way in which climate change impacts American farms is by causing a change in temperature, rainfall, and frost leading to differences in growing seasons in almost every state (EPA 2023). Moreover, climate change is projected to increase the frequency of heavy precipitation in the United States, which can have a multitude of negative effects such as eroding soils and depleting nutrients, and increasing agricultural runoff thereby decreasing water quality (EPA 2023). Pollination, vital for over 100 crops that grow in the US, is also at risk in the face of warming temperatures and changing precipitation patterns, as changes to when plants flower and when pollinators emerge can lead to mismatches and decreased pollination events (EPA 2023).

In 2019, agriculture contributed more than \$1.1 trillion to the US gross domestic product (EPA 2023). The top-income producing commodities in the US include cattle, corn, soybeans, and dairy products—which are also some of the most environmentally damaging (Monbiot, 2022). This parallel creates a clear challenge. To maintain the economic benefits that are received in the US from agriculture, while also reducing its significant contribution to climate change, new strategies to reduce greenhouse gas emissions - such as those proposed by the Agricultural Resilience Act - can be seen as a mutually beneficial path forward.

The Agriculture Resilience Act of 2023 would provide a well-rounded array of solutions that attempt to make aspects of the agricultural sector more resilient to climate change. It does so by proposing programs designed to curb large contributions of greenhouse gas emissions from the most polluting practices of US agriculture and to increase carbon sequestration in agricultural systems.

The Act was most recently introduced in March of 2023 by Representative Chellie Pingree, a Democrat who has served as the representative for Maine’s congressional district since 2009. Previously, the Act was introduced in 2020 and in 2021. However, both times prior it was not successfully implemented due to lack of bipartisan support. While there are significant challenges to the passage of this legislation, it does serve an important purpose in influencing the passage of other agricultural policies. Segments of the Agriculture Resilience Act of 2023 could be incorporated into a future legislation such as the Farm Bill, a large legislative package that historically passes roughly every five years. Programs from previously proposed bills focused on climate and agriculture, have appeared in the Inflation Reduction Act of 2022, showing how similar climate programs can appear in both stand-alone legislation and in larger legislative packages.

The overarching goal of the Agriculture Resilience Act of 2023 is to reduce agriculture’s net greenhouse gas emissions by half by 2030 and to net zero by 2040. To achieve this national goal, the Bill focuses on research, soil health, farmland preservation, pasture-based livestock, on-farm renewable energy, and food loss and waste, with each section having their own set of specific sub goals. To achieve the 50 percent reduction and net zero emission target by 2040, the Agricultural Resilience Act of 2023 will need to support programs that significantly reduce the amount of greenhouse gas emissions from major agricultural sources.

Two subgoals of the bill that we found to be especially important and conducted in-depth research on are improving soil health practices and improving pasture-based grazing techniques—as both of these aspects of US agriculture contribute significant greenhouse gas emissions to the atmosphere. Within soil health we examined common challenges, proposed solutions and examples of implementable soil health practices and discussed a relevant case study from North Carolina. Similarly, for pasture-based grazing, we examined several implementable solutions for US cattle farms to adopt more pasture-based grazing techniques and measurement systems, as well as the associated controversies.

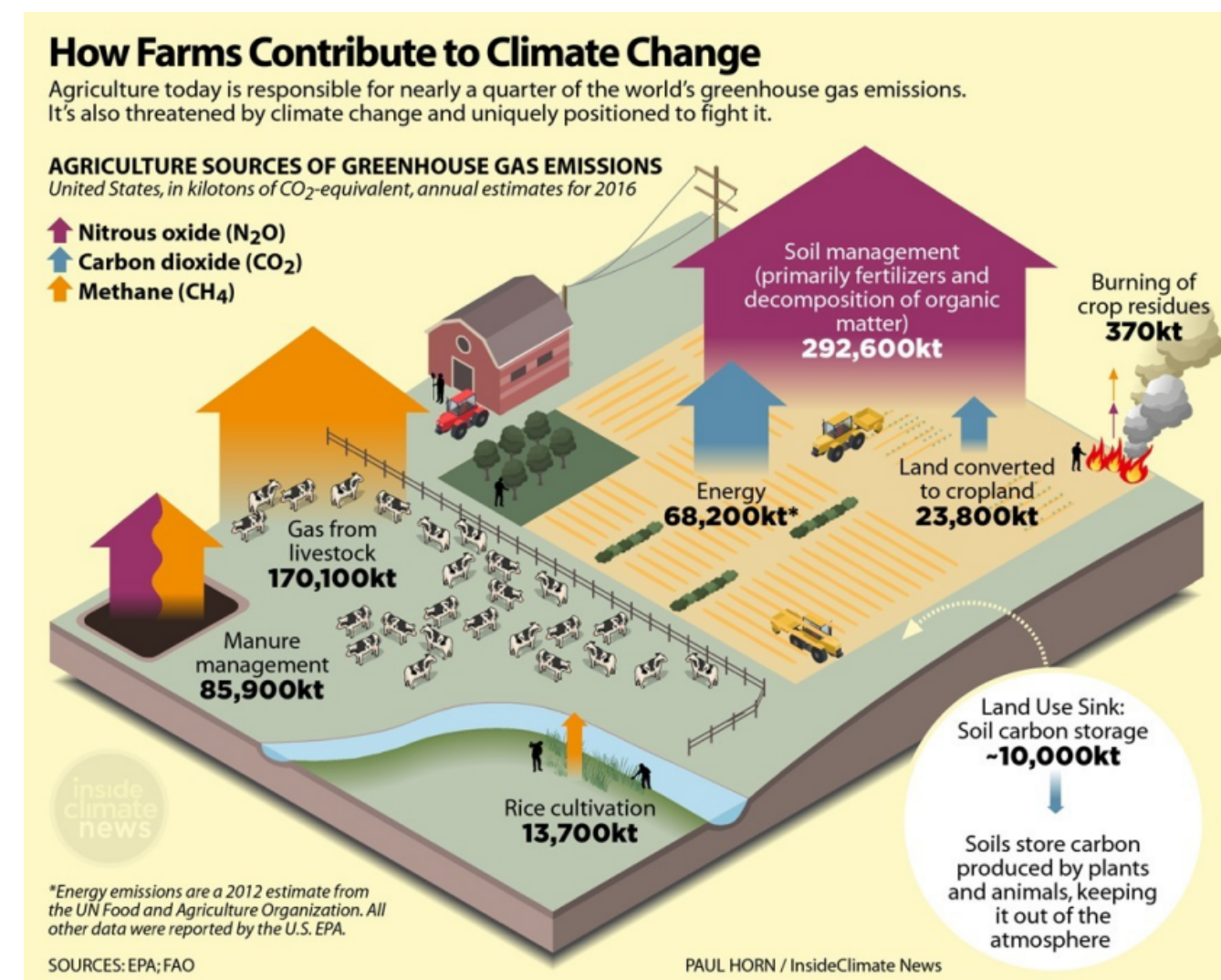


Figure 2: How different agricultural functions contribute to greenhouse gas emissions. Source: Paul Horn, InsideClimateNews

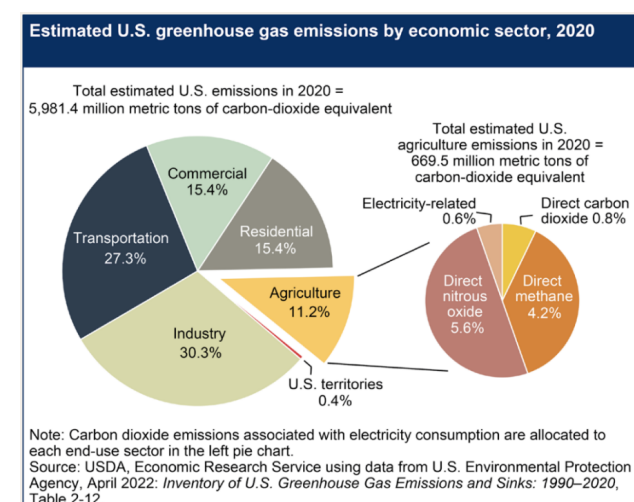


Figure 1: Estimated US Greenhouse gas emissions by economic sector, 2020. Source: USDA

Our initial research found that along with carbon dioxide, nitrous oxide and methane are especially harmful. Therefore, we spent our time understanding the science and policy implications of mitigation activities to reduce levels of both. Specifically, nitrous oxide has 300 times the warming potential of carbon dioxide, while methane has 25 times the warning potential (Stanford, 2020).

Agricultural soil management practices represent 73 percent of all current US nitrous oxide emissions, whereas 25 percent of all US methane emissions come directly from enteric fermentation, part of the digestive process of livestock (EPA 2023). A reduction in agricultural nitrous oxide and methane emissions

represents a massive opportunity for emissions reduction. Therefore, both the grant programs we focus on in our report will directly help contribute towards this reduction goal. Nitrous oxide and methane can result from synthetic fertilizers, poor manure management, enteric (digestive) fermentation, the burning of agricultural residues, irrigation, and the decomposition of organic matter (EPA, 2023). We then investigated the role of soil health as a driver and solution to US greenhouse gas emissions.

Similarly, our team examined the provisions proposed by the Act on manure management. The bill provides funding and technical assistance to implement covered manure management and pasture-based management. Both can reduce methane emissions by 15 percent and 30 percent respectively (Dairy Farmers of Canada, 2020). One example of a successful pasture management method is rotational grazing. When pastures are continuously grazed by animals throughout the season, the land doesn't get time to recuperate between grazing, leading to low pasture yields, uneven fertility, and erosion problems. With rotational grazing, a pasture is divided into smaller pastures, and only one small section is grazed at any given time, while the remainder of the pasture rests. This rest period improves root systems, vegetation growth, and overall health of the soils (North Carolina State University, 2021).

To address these issues, the Act offers diverse solutions that propose better soil health and pasture-based grazing practices, such as increasing the use of no-till farming, cover cropping, agroforests, and improved manure and grazing management.

To foresee how these proposed solutions could be implemented if the bill passes, our report will outline a comprehensive implementation plan. Our plan simulates the operations for two grant programs, one primarily focuses on on-farm conservation activities and the second focuses on food waste management. The areas of focus fall under the Act's Section 3, Soil Health, and the Act's Section 7, Food Loss and Waste, respectively.

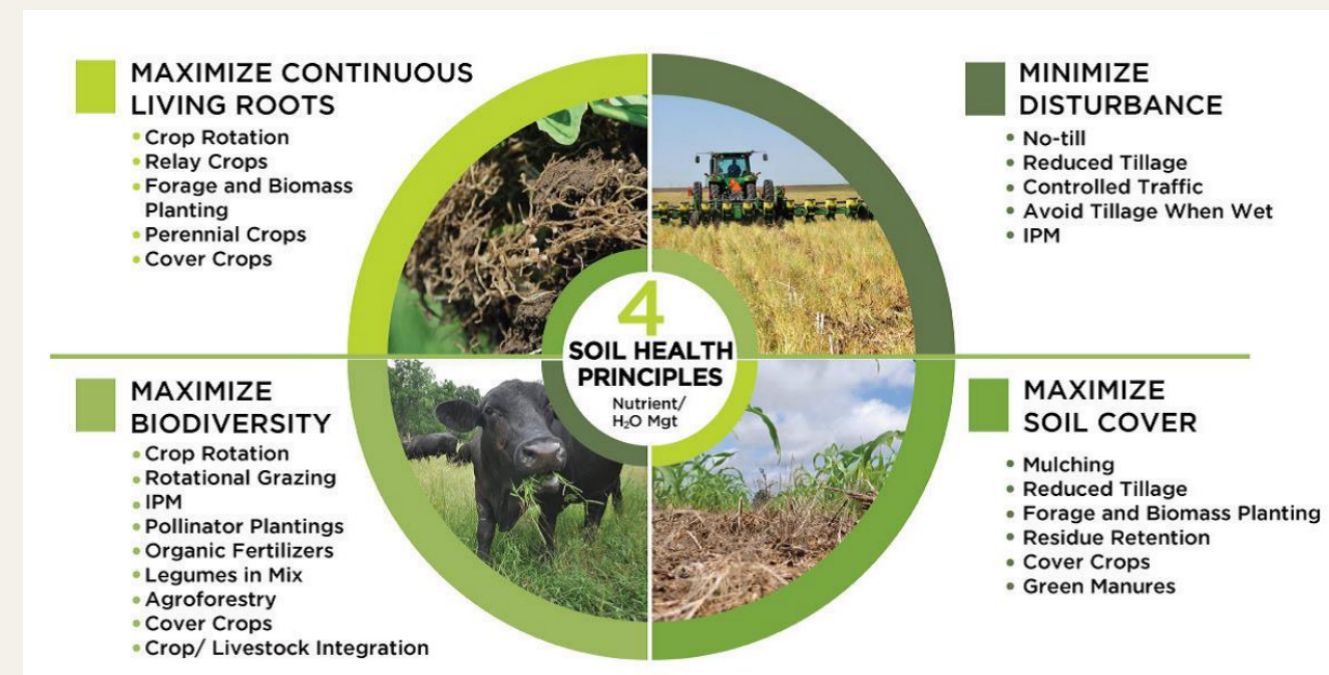
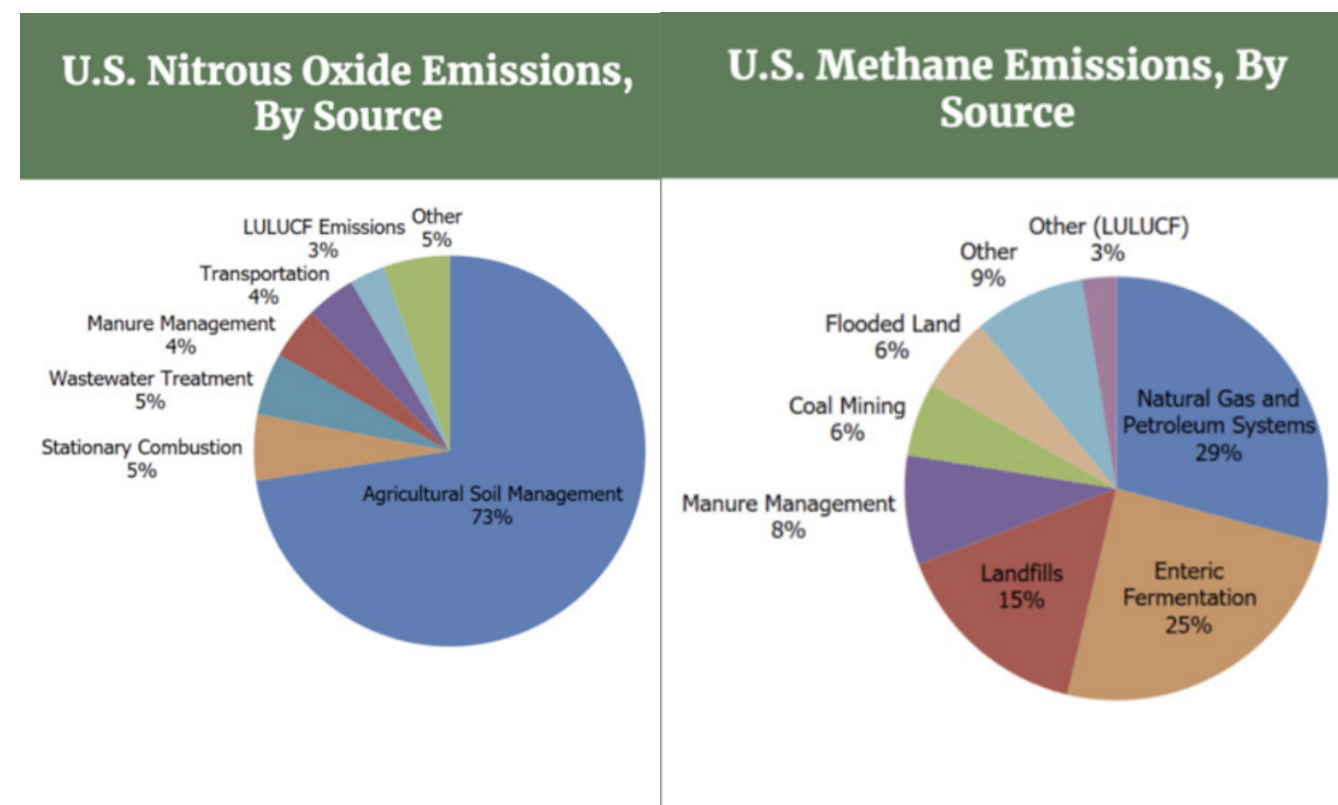


Figure 5: USDA's Soil Health Principles & Supporting Strategies.
Source: USDA



Figures 3 and 4: Inventory of US greenhouse gas emissions and sinks 1990-2021.
Source: US Environmental Protection Agency, 2023.

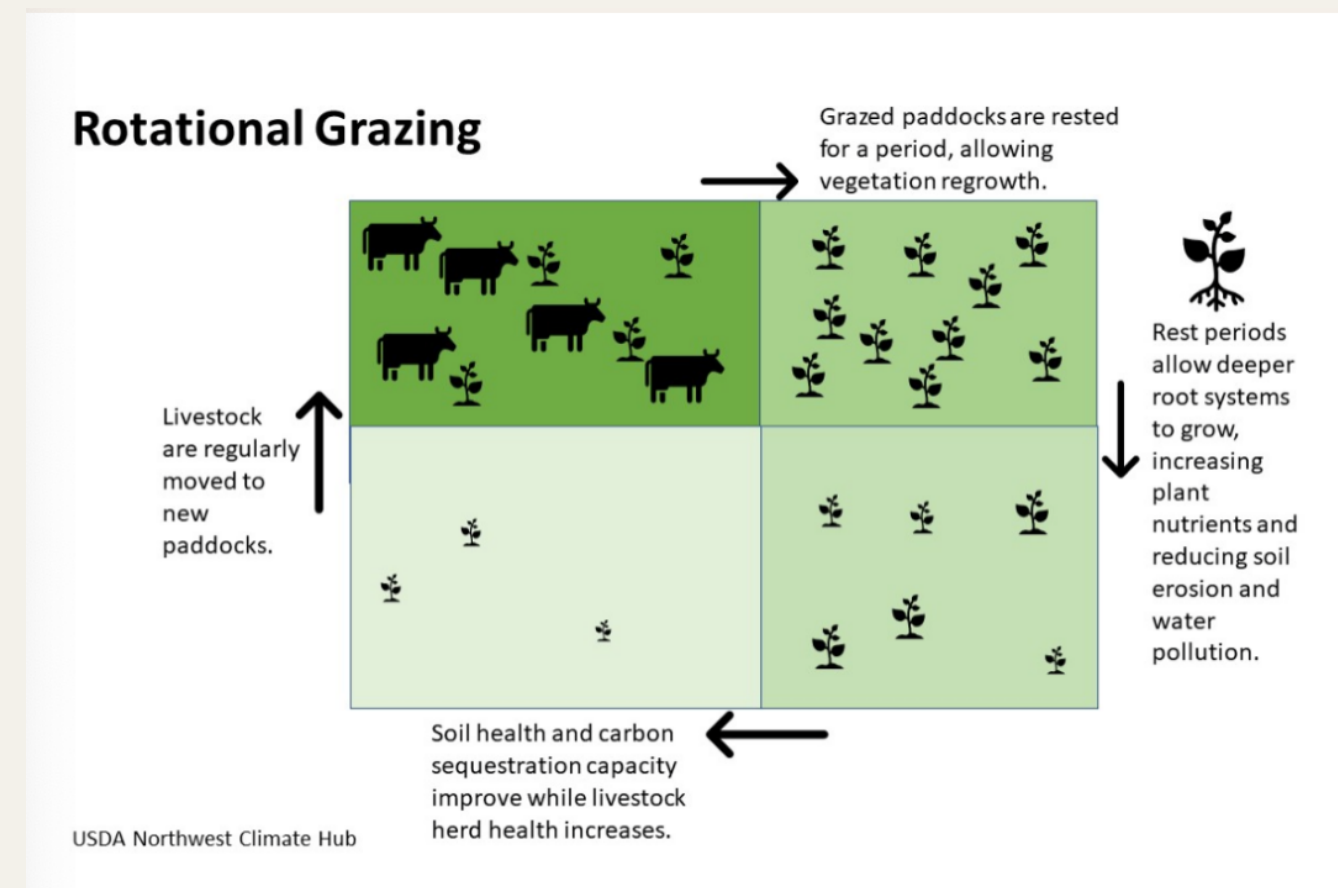


Figure 6: How rotational grazing works.
Source: USDA Northwest Climate Hub

Under Soil Health, we chose to evaluate the grant program known as the On-Farm Conservation Stewardship Innovation Grants Program, which we will refer to from here on as the Innovation Grants Program t. Under Food Loss and Waste, we chose to evaluate the Grants for Composting and Anaerobic Digestion Food Waste-to-Energy Projects, which we will refer to as the Energy Grants moving forward.

The Innovation Grants Program builds upon the Conservation Stewardship Program which is already in place under Natural Resources Conservation Service (NRCS) within the United States Department of Agriculture (USDA). The Conservation Stewardship Program aims to provide technical assistance to farmers to improve land health and encourages new ways to farm sustainably. Five-year grants for both crop and livestock will be allocated by the NRCS and managed by existing USDA regional offices.

The Energy Grants Program is operated under the National Institute of Food and Agriculture (NIFA), and the grants will be managed by existing regional NIFA offices. The program provides financial support for composter and anaerobic digester construction projects that would use organic waste such as food and manure.

The Innovation Grants Program has a total budget of \$200 million per year, while the Energy Grants Program has a total budget of \$100 million per year. Our staffing plans and organization structure for both programs focus on senior administration, with Program Directors overseeing each work with each regional office and reporting to the Deputy Chief of Programs at either NRCS or NIFA. Both programs have four regional offices (West, Central, Northeast, and Southeast) and corresponding Program Associates for each office, ranging from six to eight staff members for the Innovation Grant Program and one to four staff members for the Energy Grants Program.

POLITICAL ANALYSIS AND HISTORY OF THE BILL

Agriculture Resilience Act

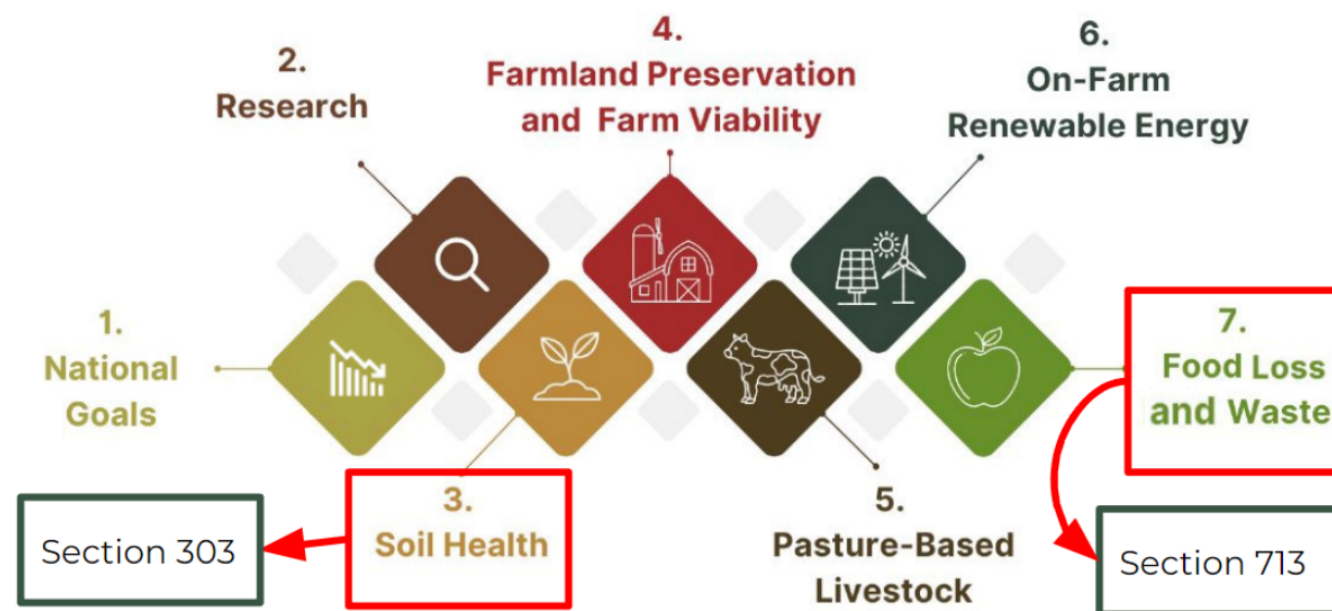


Figure 7: The Six Core Policy Recommendations, with areas of focus highlighted

The challenges to passing the Agriculture Resilience Act are numerous. The current political landscape marked by a Republican-led House of Representatives poses significant obstacles to creating new government programs. The absence of a clear analysis of the budget impacts as well as the controversies around funding levels for agricultural programs add to the complexity.

Nonetheless, there is potential for integrating elements of the Agriculture Resilience Act into the upcoming US Farm Bill, set to renew in 2024. The Farm Bill, historically a bipartisan endeavor reviewed every five years, plays a pivotal role in shaping agricultural policy with significant implications for sustainability and conservation. The most recent Farm Bill passed in 2018 contained provisions aligned with the Act's goals; it is therefore hopeful that the 2024 Farm Bill will incorporate additional programs that are included in the Agriculture Resilience Act. Today, the US

Farm Bill authorizes the United States Department of Agriculture (USDA) and National Institute of Food and Agriculture (NIFA) to administer grants furthering scientific research in six priority areas under the Agriculture and Food Research Initiative. One area of particular emphasis that the Farm Bill has historically covered is nutritional programs. The Supplemental Nutrition Assistance Program (SNAP), typically accounts for three-quarters of the Farm Bill's total funding. SNAP has consistently addressed food insecurity across America since the bill's inception.

Additionally, the Inflation Reduction Act of 2022 (IRA) allocates substantial funding for emissions reduction in agriculture, making progress toward one of the goals of the Act. However, some climate advocates argue that more substantial and sustained efforts are needed beyond the IRA's 10-year funding window, and that the Act would provide that lasting investment.



Figure 8: Representative Chellie Pingree, on 4th anniversary of Green New Deal
Source: Pingree House. Gov 2023



The Innovation Grants Program creates a grant program to carry out on-farm conservation innovation projects on eligible land of program participants. It stimulates innovative approaches on farms and ranches to leverage federal investment in conservation stewardship, in conjunction with agricultural production or forest resource management. This program is created within the existing Conservation Stewardship Program (CSP), a program funded at \$1 billion for FY2023, which provides payments to farmers for implementing conservation strategies on their lands (Conservation Stewardship Program, 2023). Grants can fund agricultural operations or partnerships between agricultural professionals and small groups of agricultural operations participating

in the program. Grants can also be used for on-farm conservation projects that facilitate research and development or pilot testing of new technologies or innovative conservation systems and practices that reduce greenhouse gas emissions and decarbonize agriculture. Program participants will receive payments for the direct costs of the research and/or development projects and compensation for foregone income, to address the increased economic risk or lower economic return potentially associated with the innovative conservation approach. The program has already proven successful in helping small-scale farmers obtain contracts to enhance their land and crops through sustainable farming techniques and supporting farmers financially.

PROGRAM DESIGN

The goal of this program is to provide technical assistance to farmers to improve the health of the land and encourage new ways to farm sustainably to advance the broader goals of the Conservation Stewardship Program (CSP). The program will be run by the Natural Resources Conservation Service (NRCS) under the U.S. Department of Agriculture and will be managed through the existing regional offices in USDA. The Act specifies that the CSP budget will increase from \$1 billion per year to \$4

billion per year, but does not specify what proportion of the Conservation Stewardship Program funding should be allocated to the grant program versus to payments to producers. Our team decided to allocate 5 percent of the \$4 billion, \$200 million per year, to the Innovation Grant Program. The time period of the grants is designed to be 5-year periods with the consideration of both execution speed and the need for efficacy. Grants would be distributed into two categories: grants related to crop systems and grants related to livestock systems.

Table 1. Innovation Grants Program Design Overview

Program Goal	Work with farmers to advance the broader goals of the Conservation Stewardship Program - improving the health of the land
Budget	\$4B authorized for Conservation Stewardship Program 5% allocation for Innovation Grants with \$200M each fiscal year and \$50K/ grant
Project Types	Portfolio split into two categories: 1. Crop systems 2. Livestock systems
Program Oversight	Program run by the Natural Resources Conservation Service under the U.S. Department of Agriculture
Grant Disbursement Strategy	Grant competitions managed through regional offices
Grant Period	5 years

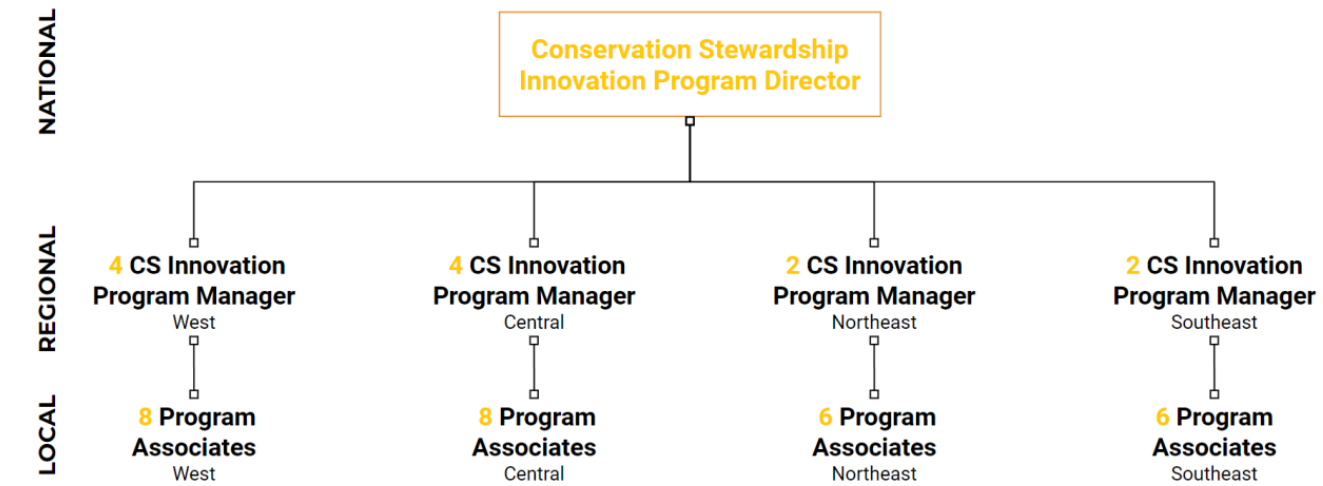
ORGANIZATION,
CONTRACTING, AND
STAFFING PLAN

The existing Conservation Stewardship Program (CSP) is managed by the Natural Resources Conservation Service (NRCS). Within the NRCS, the CSP is managed by the Regional Programs division (NRCS Leadership, 2023). The Regional Programs division works with the Regional Conservationists, who manage the State Conservationists that deploy the CSP on the ground. For example, farmers apply for the CSP via their town or county NRCS representative, who is supervised by the State and Regional Conservationists. This division of labor means that in order for the innovation grants program to succeed, it must be integrated with the existing Regional Programs division of the NRCS. We propose the creation of a new program office within the NRCS for the innovation grants program. The Program Director of the innovation grants program would report to the office of the Regional Programs division. A major part of the Innovation Grants Program Director's role is communication and outreach to the Regional and State Conservationists. The Program Director will supervise Regional Program Managers – one for each NRCS region: Western, Central, Southeastern, and Northeastern. Finally, relevant to the discussion of organizational staffing is the federal government's General Schedule (GS) structure, which is the pay scale and experience requirements for positions within the federal government. The GS level for each position is based on the job description and responsibilities.

Because different regions of the US have different amounts of agricultural activity, there are four regional Program Managers for each of the Central and Western NRCS regions and two regional Program Managers for each of the Southeastern and Northeastern regions. Each Program Manager in turn supervises a team of Program Associates , who support the Regional Program Managers in running the request for proposals (RFP) process, recruiting panels of experts to evaluate grant applications, and managing the evaluation and reporting processes for the grants in their region. The Innovation Grants Program Director is responsible for supervising the entire \$200M grant program. As part of this, this role will liaison with the Regional and State Conservationists. This person will need extensive

experience in program management in the crop and livestock conservation sector. Because this Program Director will be responsible for a \$200M total budget, this role will be a federal level GS-13. Regional Program Managers will be responsible for administering a subset of the \$200M grant funding. A potential division could be 1000 grants for each of the West and Central regions and 600 grants each for the Northeastern and Southeastern regions, to account for variation in agricultural activity of each region, although the exact distribution would ultimately be determined by the Innovation Grants Program Director. Regional Program Managers will also oversee the process of reviewing and selecting grant applications from regional and local offices, liaise with the relevant Regional and State Conservationists, manage grant Program Associates, and develop a monitoring and evaluation strategy for the grant program in partnership with the Program Director. Regional Program Managers will be GS-10s on the federal pay scale. Regional Program Associates will be responsible for the administration of grants, as well as coordinating the evaluation committees. Program Associates will use grant reporting software, to be determined by the Program Director, to track each grant once approved by the approval committee. Program Associates will also manage a calendar of grant reporting requirements as determined by the Regional Program Managers. Regional Program Associates will be GS-7.





50/50 split designation on crop and livestock grants with academic and/or professional experience on each focus area

Figure 9: Conservation Stewardship Innovation Grant Program organizational structure

BUDGET

The budget for this program covers three different categories of costs: administrative costs (3 percent), technical support costs (57 percent), and direct financial payments to grantees (40 percent). Given the total budget of the innovation grants programs is \$200M, \$6M will be used for administrative costs, \$114M will be used as technical support costs, and \$80M will be used for direct financial assistance. Following the staffing plan presented above, the administrative costs include personnel budget (salaries and fringe benefits) and non-personnel costs such as travel and office supplies. The salary for the newly hired senior staff is estimated to be \$3,610,000 per year for the Program Director, 12 Regional Program Managers, and 28 Regional Program Associates positions described earlier, with an additional 40 percent of the salaries allocated for fringe benefits, amounting to \$1400,000 (Table 2). Fringe benefits align with USDA policy and include health insurance, retirement plans, paid time off, life insurance, and relocation assistance. In addition to the senior staff described earlier, about 300 to 500 technical support staff will be hired to support both the innovation grants program and other existing or expanded Conservation Stewardship Programs. These technical staff provide direct outreach to farmers. Expenses for these new staff will be within the state and local offices of the NRCS and not part of the scope of the budget presented here, but will

be covered by the expanded \$4B budget for the CSP. The travel budget for senior staff is divided into two parts, one is under the Program Director and the other is under each Regional Manager. The Program Director and 12 Regional Managers are budgeted for total travel expenses of \$214,000 (Table 3). After deducting salary, fringe benefits, and travel expenses, the remaining \$776,000 in administrative costs will be used for office expenses, technology, and reserve funds.

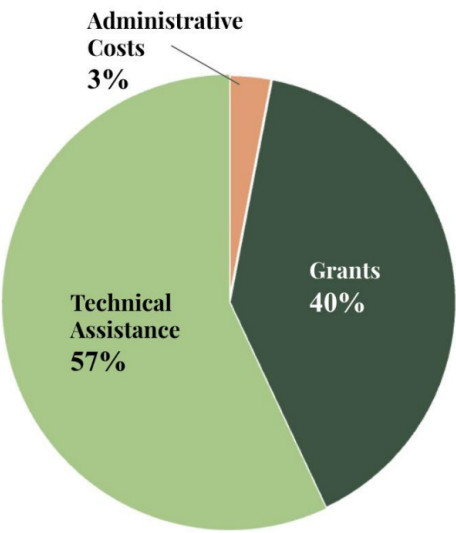


Figure 10: Budget Allocation Plan for the Conservation Innovation Grants Program.

Table 2. Personnel Budget Summary of Conservation Innovation Grants Program.

Position	Program Level Staffing	GS Level	Salary Per Individual	Salary
Program Director	1	GS 13	\$170,000	\$170,000
Regional Managers	12	GS 10	\$100,000	\$1,200,000
Regional Program Associates	28	GS 7	\$80,000	\$2,240,000
Salaries Total	41			\$3,610,000
Fringe Benefits	N/A	N/A	N/A	\$1400,000
Total	41			\$5,010,000

Table 3. Travel Budget Summary of Conservation Innovation Grants Program.

Expense Category	Unit Cost/ Year	Unit	Total Cost/Year
Director Travel	\$6,320	1	\$6,320
Regional Manager Travel	\$17,320	12	\$207,840
Total			~\$214,000

*Travel Budget for Program Director and Regional Managers is determined by the estimation of travel costs (flights, car rental) and accommodation costs (hotel, meals).

Table 4. Total Budget Summary of Conservation Innovation Grants Program.

Expense	Section 303: Innovation Grants Program Cost Estimate
Salary	\$3,610,000
Fringe benefits	\$1400,000
Travel	\$214,000
Office expenses, technology & reserve funds	\$776,000
Total	\$6,000,000

PERFORMANCE MANAGEMENT

The performance management system sets project goals and establishes metrics to determine if these goals have been achieved. Foundational metrics such as the number of applicants, the approval rate, and the duration of the application process will be used to measure the effectiveness of the program.

For the Innovation Grants Program, the primary objectives include ensuring equitable and timely distribution of funds and furnishing essential technical support. To meet these objectives, several

measures can be adopted, first evaluating the diversity of participant groups (based on farm size, type, and demographic attributes) to assess the breadth of participation and by measuring the distribution of funds across different regions. Additionally, counting the service hours rendered by technical agents is a key metric of program performance. From the second year onward, the outcomes and expected sustainability of the Innovation Grants Program will be assessed. This will involve monitoring quantitative conservation outcomes, such as reductions in soil erosion and greenhouse gas emissions, and tracking the number of re-applications to the program. Such measures will offer a comprehensive evaluation of the program’s value and effectiveness.

Table 5. Conservation Stewardship Innovation grant goals and metrics

Goals (Year 1)	Metrics
Sufficient grant distribution	- Number of applications - Percent of grants approved
Efficient Application and Enrollment Process	- Duration of the application review process - Percent of applications processed within a set timeframe.
Equity of grant distribution	- Diversity of participants reached - Percent of involvement across the four regions
Effective support of grant recipients	- Hours of technical assistance provided
Goals (Year 2+)	
Project sustainability	- Percent of participants reapplying for the grant - Number of program updates or changes made based on feedback.
Effectiveness of grants	- Quantitative conservation outcomes achieved - Percent of participants in compliance with the contracts.

The reporting structure for both innovation grants follows a bottom-up approach, with reports drafted by Program Associates, reviewed by the Regional Managers, and approved by the Program Director. The Regional Directors, Associate Chief, and Operational Directors from NRCS would be in charge of overall management and monitoring of the programs. For the innovation grants program, the reports include administrative reports, program implementation reports, and summary reports (Figure 11). The summary report would be more in-depth than the other two, so it would be drafted by the Regional Manager and approved by the Program Director. The other two reports will be supported by Program Associates to include detailed operating information for a specific portfolio of grants.

Reporting Type	Content	Frequency	Reporting Line
Administrative Report	Operational measures to evaluate the management team	Semi-annually	Approve: Program Director
			Review: Regional Manager
			Draft: Program Associate
Program Implementation Report	Innovation and application status to evaluate the program impact	Quarterly	Approve: Program Director
			Review: Regional Manager
			Draft: Program Associate
Summary Report	Evaluating if the program is achieving the main goals	Annually	Approve: Program Director
			Draft: Regional Manager

Figure 11: Reporting Structure of the On-farm Conservation Stewardship Innovation Program.

As for the feedback process, both innovation grants follow a top-down approach. The senior officers provide regular feedback to the staff they supervise. In the innovation grants program, feedback is frequent to reflect the large number of grants and the expected complexities of such a large program. In general, Regional Program Managers would give feedback to the Regional Program Associates through regular in-person meetings. Decisions on operational process, resource coordination, technical, and administrative issues will be discussed. The Program Director will conduct monthly meetings with the Regional Program Managers to give feedback on decisions on grant distribution, regional reporting, auditing, monitoring, reviewing, or cross-regional collaboration if needed. For more formal feedback, there will be a semi-annual report for the NRCS officer to give strategic feedback to the Program Director on program goals, results, reporting, and management in order to assess overall administrative performance (Figure 12).

Frequency	Members	Responsibilities
Weekly (Meeting)	Regional program managers	Decisions on operational process, resource coordination, technical, and administrative issues
	Regional program associates	
Monthly (Meeting)	Program director	Decisions on grant distribution, cross-regional collaboration, regional reporting, auditing, and monitoring
	Regional program managers	
Semi-annually (Report)	NRCS associate chief of programs	Decisions on program goals, results, reporting, and management
	Program director	

Figure 12: Feedback process of the On-farm Conservation Stewardship Innovation Program.

MASTER CALENDAR

Year 1

The first year's activities are systematically organized into five distinct phases (Table 6). The process commences with the recruitment for new positions, spanning the first through the eighth month. This stage is succeeded by the development of program priorities and grant criteria, which is concentrated within the third to the sixth month. The next phase is initiating the application process and evaluating grant proposals during months four to nine. The following phase involves committing to the first year's grants and facilitating technical assistance, occupying the ninth to the eleventh month. The year concludes with the task of reviewing annual performance and strategizing for the upcoming year's grants, allocated to the twelfth month. The calendar employs a color-coded system to visually represent the duration of each task within the timeline.

Table 6. Calendar for Year 1

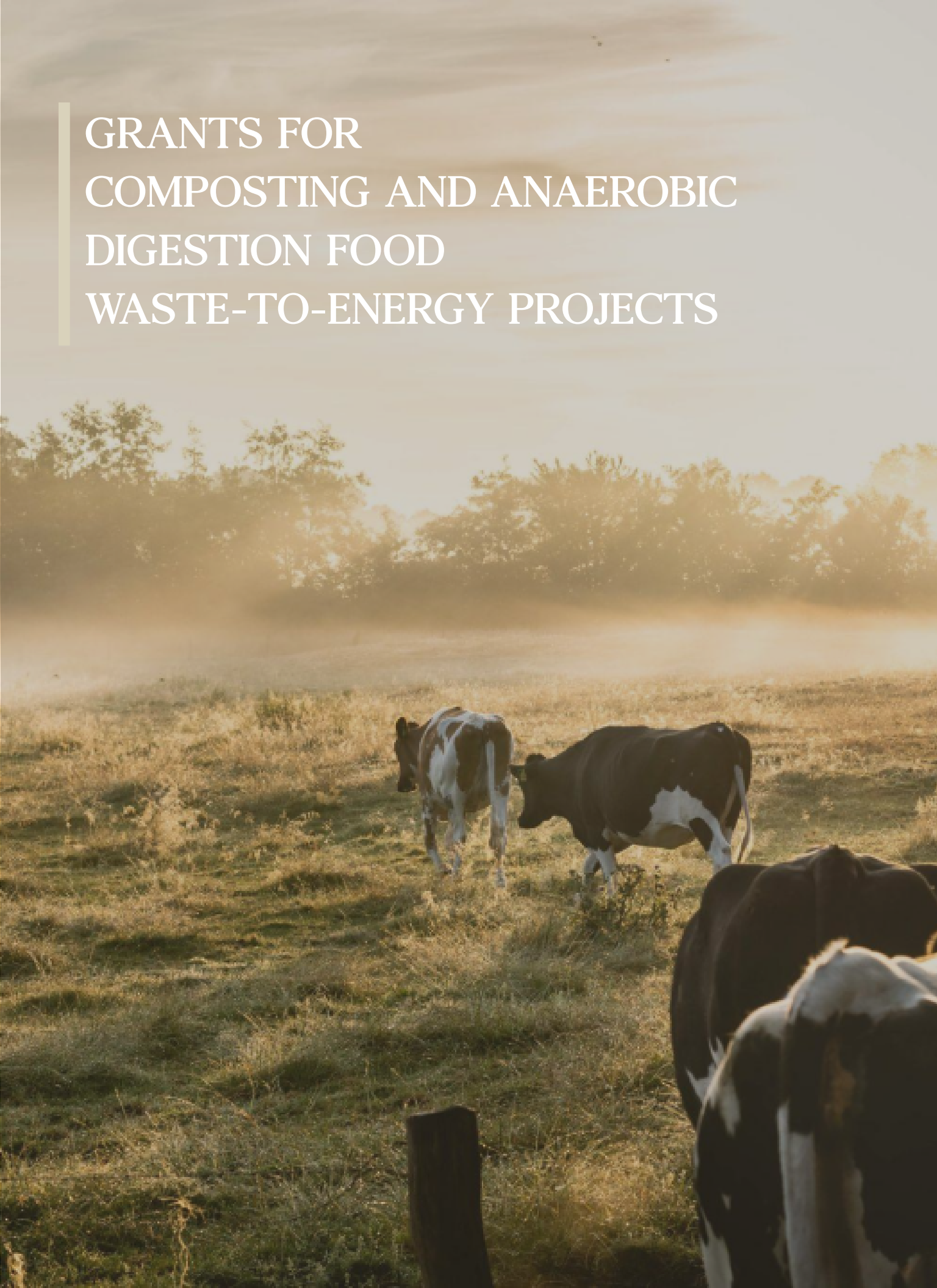
Task #	Task	Q1			Q2			Q3			Q4		
		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
1	Recruit for new positions												
2	Establish program priorities and grant criteria												
3	Initiate application process and evaluate grant proposals												
4	Commit the first year grants, provide technical assistance												
5	Review yearly performance and plan the following years' grants												

Year 2 and Beyond

In the subsequent years, the schedule outlines five phases (Table 7). The first phase begins with the solicitation of grant applications managed by Program Associates in the initial months. Selection of grant recipients, led by Regional Managers, occurs between months two and three. The distribution of grants, also overseen by Regional Managers, is mapped out from months three to four. Following this, Regional Managers carry out post-award monitoring from months four through nine. The cycle concludes with a yearly review by the Program Director in the final quarter.

Table 7. Calendar for Year 2 and beyond

Task #	Task	Task Manager	Q1			Q2			Q3			Q4		
			M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
1	Solicit grant applications	Program Associates												
2	Select grant recipients	Regional Managers												
3	Disburse grants	Regional Managers												
4	Post-award monitoring	Regional Managers												
5	Yearly review	Program Director												



GRANTS FOR COMPOSTING AND ANAEROBIC DIGESTION FOOD WASTE-TO-ENERGY PROJECTS

Grants for Composting and Anaerobic Digestion Food Waste-to-Energy Projects (described in Section 713; hereinafter referred as Waste-to-Energy Grants) focus on converting food waste into energy, allocating \$100 million annually to farmers to develop large-scale composting or anaerobic digestion projects. The key objective is to support initiatives that harness food waste for energy generation while promoting environmental sustainability. The program prioritizes

projects that use primarily nonedible food and crop waste; grant funds are not eligible for projects that use only manure. The program's flexible structure allows for a variety of funding allocations, timelines, regional priorities and project sizes to meet the varying needs of states, territories and federally recognized Indian tribes that will serve as conduits for these grants.

PROGRAM DESIGN

The overarching objective of the Waste-to-Energy Grants program is to spearhead the development of composters and anaerobic digesters specifically aimed at converting food waste into usable energy sources. By allocating an annual budget of \$100 million, this program, administered by the National Institute of Food and Agriculture (NIFA) within the U.S. Department of Agriculture (USDA), strives to foster innovation and sustainability within the agricultural

sector. The initiative will focus on funding projects that prioritize the efficient utilization of food waste, excluding manure, for energy production. Oversight and management of the program will be facilitated through regional offices, acknowledging the diverse landscape and distribution of farming communities across the nation. This approach ensures a flexible and adaptable disbursement strategy tailored to the varying scales and operational capacities of different regions, aligning with the overarching aim of enhancing energy sustainability in agriculture.

Table 8. Waste-to-Energy Grants Program Design Overview

Program Goal	Increase composter and anaerobic digester construction projects that are using food waste (not solely manure)
Budget	\$100M each fiscal year
Project Types	Portfolio mix of a few large & small projects - 4 grants of \$10M - 8 grants of \$5M - 18 grants of \$1M
Program Oversight	Program run by the National Institute of Food and Agriculture under the U.S. Department of Agriculture
Grant Disbursement Strategy	Grants managed through regional offices

ORGANIZATION, CONTRACTING, AND STAFFING PLAN

In the structure for the Waste-to-Energy Grants program, a Program Director will serve as the head, responsible for overseeing the overall implementation, management, and strategic direction of the initiative. Working closely with the Program Director, five Regional Managers will be appointed to manage the operations and activities within designated regions. Each of the four regions will have one of more Regional Managers responsible for coordinating and supervising the grant-related endeavors within their respective areas. Specifically, the Central, Northeast, and Southeast regions would each be under the direction of one manager, whereas the West

region would have two managers, due to its larger geographical coverage.

Responsibilities of the Program Director include defining program goals, establishing operational policies, and ensuring alignment with the USDA's broader objectives for sustainability and innovation in agriculture. They also oversee budget allocation, report on program progress, and facilitate collaboration between regional offices. Regional Managers would be tasked with managing the day-to-day operations within their assigned regions. Their responsibilities encompass evaluating grant proposals, providing technical guidance to applicants, monitoring project implementation, ensuring compliance with program guidelines, and fostering relationships with stakeholders within their regions. Additionally, they could collaborate with the Program Director to disseminate best practices and ensure the program's effectiveness and impact across different regions.

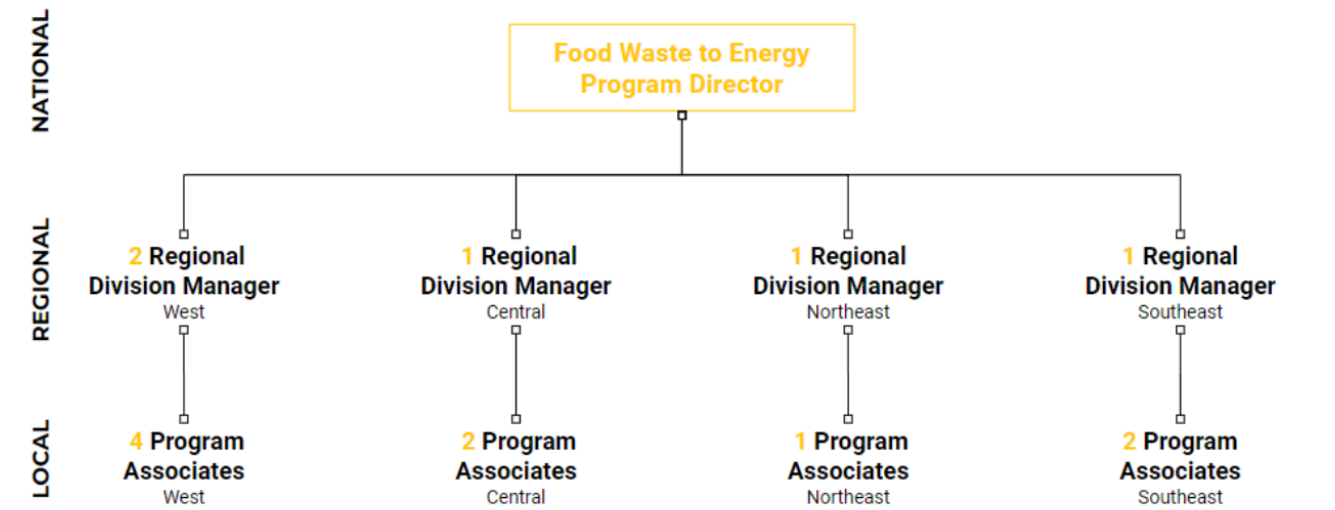


Figure 13: Energy Grants Program Organizational Structure

BUDGET PLAN

The allocation strategy for this program encompasses a diverse range of projects, catering to various scales of operation and spanning across different geographic regions. Specifically, four projects will be awarded grants amounting to \$10 million each, eight projects will receive grants of \$5 million each, and eighteen projects with grants of \$1 million each. This totals \$98 million in direct grant support, leaving \$2 million for the administration of the program.

From the \$2 million for the administration of the

program, the salary for the staff is estimated to be \$1,110,000 per year, with an additional 24 percent of salaries, totaling \$265,000, as the fringe benefits budget (Table 8). Since there are only 30 grants in the program, the staff described here are sufficient to handle the administrative work. The remaining budget will be utilized for travel and office supplies. The Program Director and five Regional Managers are budgeted for total travel expenses of \$92,920 (Table 9). After deducting salary, fringe benefits, and travel expenses, the remaining \$532,080 in administrative costs will be used for office expenses, technology, and reserve funds.

Table 9. Personnel Budget Summary for Waste-to-Energy program

Position	Program Level Staffing	GS Level	Salary Per Individual	Salary
Food Waste to Energy program Director	1	GS 15	\$110,000	\$110,000
Regional Managers	5	GS 13	\$80,000	\$400,000
Program Associates	10	GS 11	\$60,000	\$600,000
Total	16			\$1,110,000
Fringe Benefits	N/A	N/A	N/A	\$265,000
Total	16			\$1,375,000

Table 10. Travel Budget for Waste-to-Energy Program

Expense Category	Unit Cost/ Year	Unit	Total Cost/Year
Under each Director	\$6,320	1	\$6,320
Under each Regional Manager	\$17,320	5	\$86,600
Total			\$92,920

Table 11. Total Budget Summary of Waste-to-Energy Program

Expense	Section 303: Innovation Grants Program Cost Estimate
Salary	\$1,110,000
Fringe benefits	\$265,000
Travel	\$92,920
Office expenses, technology & reserve funds	\$532,080
Total	\$2,000,000

PERFORMANCE MANAGEMENT

The Waste-to-Energy Grants program objective is to allocate funds to support and catalyze innovative projects that convert food waste into usable energy resources, facilitating the development

of infrastructure and technology dedicated to composting and anaerobic digestion. Metrics include number of grants distributed, tons of food waste processed, reduction of GHG emissions, and KWh of energy produced (Table 12). Grant recipients will be responsible for providing an annual grant utilization and progress report, and the director and Regional Managers will be in charge of overall management and monitoring of the programs.

Table 12. Waste-to-Energy program goals and metrics

Goals (Year 1)	Metrics
Sufficient grant distribution	- Number of applications - Percent of grants approved
Efficient Application and Enrollment Process	- Duration of the application review process - Percent of applications processed within a set timeframe.
Appropriate allocation of grants	- Number of grants across size categories (\$10M,\$5M, \$1M) - Number of grant applications and number of grants awarded for each region
Effectiveness of grants	- Percent of food waste processed, reduction of GHG emission. - Amount of energy produced and utilization

Reporting Type	Content	Frequency	Reporting Line
Year 1			
Administrative Report	Operational measures to evaluate the management team	Annually	Approve: Program Director
			Review: Regional Manager
			Draft: Program Associate
Year 2+			
Program Implementation Report	Social measures and energy production effectiveness to evaluate the program impact	Annually	Approve: Program Director
			Review: Regional Manager
			Draft: Program Associate

Figure 14: Reporting Structure of the Grant for Composting & Anaerobic Digestion Food Waste to Energy Program.

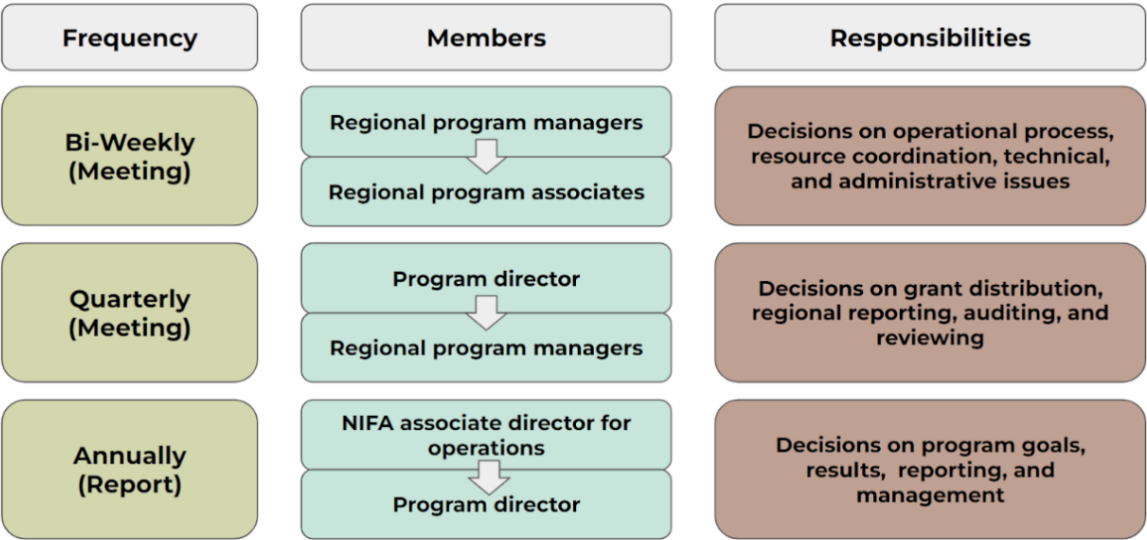


Figure 15: Feedback process of the Grant for Composting & Anaerobic Digestion Food Waste to Energy Program

MASTER CALENDAR

Year 1

The first year activities will be divided into three phases (Table 13). The calendar starts with recruiting for new positions in the first five months. The Chief of NIFA will focus efforts on hiring a Program Director for the first month. Once the Program Director is hired, they will hire the five Regional Managers. Finally, the team will hire the remaining nine Program Associates. The whole team should be hired by the end of month five. The second phase is establishing program priorities and grant criteria phase in months three to five. The Associates will begin conducting outreach to community organizations and local offices to advertise the grant program. Simultaneously, the Program Director will work with the communications team within NIFA to publish the new program website, so the Associates can reference the website in their outreach. The third phase is initiating the application process and evaluating grant proposals during months five to ten. Along with the program website launch at the beginning of month five, the Program Director will publish the office funding opportunity announcement. Between months five and seven, the Program Associates will market the program and conduct outreach to solicit applications. Each regional office will have a marketing plan managed by the Program Associates. The grant applications are due at the end of month seven, at which time the Program Associates will review the grant applications for completion. Once the Program Associates have done an initial review for eligibility, the Regional Managers will assess the applications in further detail and rank the applications in each category (small, medium, and large projects). This process will happen in month eight and month nine. Then, the Program Director will review the Regional Managers' selections for the grants. Once the Program Director approves the grantees, the Regional Managers will notify grantees of their decision by the end of month ten. In the remainder of the year, months eleven and twelve, the Program Associates will work with the grantees to complete paperwork, distribute the grant money, and set up the progress monitoring plan for each project. Construction of composting facilities is not expected to begin right away - the first year focuses on identifying and funding projects to be built in future years.

Table 13. Calendar for Year 1

Task #	Task	Q1			Q2			Q3			Q4		
		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
1	Recruit for new positions												
2	Establish program priorities and grant criteria												
3	Initiate application process and evaluate grant proposals												

Year 2 and beyond

After the grants are distributed and projects begin construction in year 2 , reporting will begin in the fourth quarter of the second year. Program Associates and Regional Managers will collaborate to complete reporting requirements in month ten and eleven. The Program Director will work with the Government Accountability Office to complete audits at the end of the second year, and the first round of grants will be completed. Each year this process will repeat for the food waste-to-energy grant program, so there are an additional 30 new anaerobic digester projects annually. After the first year, which is mostly spent on building program capacity, the yearly timeline will have a consistent structure (Table 14).

Table 14. Calendar for Year 2+

Task #	Task	Task Manager	Q1			Q2			Q3			Q4		
			M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12
1	Solicit grant applications	Program Associates												
2	Select grant recipients	Regional Managers												
3	Disburse grants	Regional Managers												
4	Post-award monitoring	Regional Managers												
5	Yearly review	Program Director												

CONCLUSION

The Agriculture Resilience Act of 2023 ambitiously aims to cut the agricultural sector’s net greenhouse gas emissions by 50% by 2030 and achieve net zero emissions by 2040. To do so, a number of grant programs for farmers have been proposed. We evaluated two of these programs in detail to better understand the resources, planning, and management needed for their implementation. Based on our findings, we outlined a comprehensive first year strategy for the management and implementation of the Conservation Stewardship program under Section 303, and the Food Waste-to-Energy program under Section 713.

Throughout the Act, emphasis is given to cohesive, scientifically-informed, farmer-centric strategies; the legislation aspires to enhance the resilience and adaptability of the agricultural system amidst shifting environmental conditions.

Based on our analysis, we outlined a one year management and implementation plan for both the Innovation Grants Program and the Food Waste-to-Energy Program. While these two grant programs only represent a small portion of the programs created or modified by the ARA, they both significantly aim to reduce greenhouse gas emissions from different agricultural sources, while incorporating strategies to mitigate economic setbacks. This comprehensive approach intends to provide mutual benefits for farmers, small enterprises, consumers, and communities particularly vulnerable to the ripple effects of climate change. Through these initiatives, the Act not only sets sights on decreasing greenhouse gas emissions and carbon capture but also focuses on broader agro-environmental challenges.

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APPENDICES

Expense Category	Unit Cost	Units/Year	Total Cost/Year
Program Director			
Travel			
- Flights	\$400	8 times	\$3,200
- Car Rental	\$200	4 times	\$800
Accommodation			
- Hotel	\$210/night	8 (2 nights/trip)	\$1,680
- Meals (Per Diem)	\$80/day	8	\$640
Total			\$6,320
Program Regional Manager			
Travel			
- Flights	\$400	8 times/person	\$9600
- Car Rental	\$200	4 times	\$800
Accommodation			
- Hotel	\$210/night	8 (2 nights/trip)	\$5000
- Meals (Per Diem)	\$80/day	8	\$1920
Total			\$17,320

