



**NOTICE OF GRANT AND AGREEMENT AWARD**

1. Award Identifying Number NR233A750004G055	2. Amendment Number	3. Award /Project Period Date of final signature - 05/20/2028	4. Type of award instrument: Grant Agreement
5. Agency (Name and Address) USDA Partnerships for Climate-Smart Commodities c/o FPAC-BC Grants and Agreements Division 1400 Independence Ave SW, Room 3236 Washington, DC 20250 Direct all correspondence to FPAC.BC.GAD@usda.gov		6. Recipient Organization (Name and Address) PENNSYLVANIA STATE UNIVERSITY, THE 110 TECHNOLOGY CENTER UNIVERSITY PARK PA 16802  UEI Number / DUNS Number: NPM2J7MSCF61 / 003403953 EIN:	
7. NRCS Program Contact Name: TANYA CULBERT	8. NRCS Administrative Contact Name: ADAM CARL	9. Recipient Program Contact Name: Christina Wagner	10. Recipient Administrative Contact Name: Armen Kemanian
(b)(6)			
11. CFDA 10.937	12. Authority 15 USC 714 et seq	13. Type of Action New Agreement	14. Program Director Name: Armen Kemanian <div style="background-color: yellow; width: 150px; height: 20px; margin-top: 5px;">(b)(6)</div>
15. Project Title/ Description: Expands markets for climate-smart dairy in PA and supports farmer implementation and monitoring of climate-smart practices that reduce greenhouse-gas emissions or sequester carbon.			
16. Entity Type: H = Public/State Controlled Institution of Higher Education			
17. Select Funding Type			
Select funding type:	<input checked="" type="checkbox"/> Federal	<input checked="" type="checkbox"/> Non-Federal	
Original funds total	24,999,997.00	\$2,154,290.00	
Additional funds total	\$0.00	\$0.00	
Grand total	24,999,997.00	\$2,154,290.00	
18. Approved Budget			

Personnel	\$6,590,655.00	Fringe Benefits	\$1,695,667.00
Travel	\$187,658.00	Equipment	\$2,305,000.00
Supplies	\$265,558.00	Contractual	\$85,333.00
Construction	\$0.00	Other	13,870,126.00
Total Direct Cost	21,568,960.00	Total Indirect Cost	\$3,431,037.00
		Total Non-Federal Funds	\$2,154,290.00
		Total Federal Funds Awarded	24,999,997.00
		Total Approved Budget	27,154,287.00

This agreement is subject to applicable USDA NRCS statutory provisions and Financial Assistance Regulations. In accepting this award or amendment and any payments made pursuant thereto, the undersigned represents that he or she is duly authorized to act on behalf of the awardee organization, agrees that the award is subject to the applicable provisions of this agreement (and all attachments), and agrees that acceptance of any payments constitutes an agreement by the payee that the amounts, if any, found by NRCS to have been overpaid, will be refunded or credited in full to NRCS.

Name and Title of Authorized Government Representative KATINA HANSON Acting Senior Advisor for Climate-Smart Commodities	Signature <b>KATINA HANSON</b>  Digitally signed by KATINA HANSON Date: 2023.07.03 09:32:14 -05'00'	Date 07/03/2023
Name and Title of Authorized Recipient Representative Michelle M. Spangler Assistant Treasurer	Signature <b>Michele M Spangler</b>  Digitally signed by Michele M Spangler Date: 2023.06.30 09:18:31 -04'00'	Date 6/30/2023

**NONDISCRIMINATION STATEMENT**

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, SW., Washington, DC 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

**PRIVACY ACT STATEMENT**

The above statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. Section 522a).

## Statement of Work

### Purpose

The purpose of this agreement, between the U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS) and Pennsylvania State University-Univ Park (Recipient), is to build markets for climate-smart commodities and invest in America's climate-smart producers to strengthen U.S. rural and agricultural communities.

### Objectives

The objectives of this project are to support the production and marketing of climate-smart commodities by providing voluntary incentives to producers and landowners, including early adopters, to implement climate-smart agricultural production practices, activities, and systems on working lands; measure/quantify, monitor and verify the carbon and greenhouse gas (GHG) benefits associated with those practices; and develop markets and promote the resulting climate-smart commodities.

### Budget Narrative

The official budget summarized below and described in the attached Budget Narrative will be considered the total budget as last approved by the Federal awarding agency for this award.

Amounts included in this budget narrative are estimates. Reimbursement or advance liquidations will be based on actual expenditures, not to exceed the amount obligated.

TOTAL BUDGET \$ 27,154,287

TOTAL FEDERAL FUNDS \$24,999,997

PERSONNEL \$4,108,887

FRINGE BENEFITS \$1,057,149

TRAVEL \$116,994

EQUIPMENT \$2,305,000

SUPPLIES \$165,560

CONTRACTUAL \$53,200

CONSTRUCTION \$0

OTHER \$13,762,170 (includes PRODUCER INCENTIVES \$10,649,000)

TOTAL DIRECT COSTS \$21,568,960

INDIRECT COSTS \$3,431,037

TOTAL NON-FEDERAL FUNDS \$2,154,290

PERSONNEL \$819,557

FRINGE BENEFITS \$295,034

TRAVEL \$0

EQUIPMENT \$95,000

SUPPLIES \$5,000

CONTRACTUAL \$0

CONSTRUCTION \$0

OTHER \$263,466 (includes PRODUCER INCENTIVES \$0)

TOTAL DIRECT COSTS \$1,478,057

INDIRECT COSTS \$676,233

Recipient has an approved Negotiated Indirect Cost Rate Agreement (NICRA) with a rate of 60.4 percent and a base of all direct salaries and wages, applicable fringe benefits, materials and supplies, services, travel, and up to the first \$25,000 of each subaward (regardless of the period of performance of the subawards under the award). MTDC excludes equipment, capital expenditures, charges for patient care, rental costs, tuition remission, scholarships and fellowships, participant support costs, and the portion of each subaward in excess of \$25,000.

When equipment is purchased with Federal funds it must be used until no longer needed as described in the General Terms and Conditions and 2 CFR 200. If the residual value of the equipment is \$5,000 or more at the time it is no longer needed, the recipient must request disposition instructions. The disposition instructions may direct the recipient to: 1) sell the equipment and return a proportionate share of the proceeds to the Federal agency; 2) transfer title to another eligible entity identified by the Federal agency; or 3) keep the equipment if desired and compensate the Federal agency for its proportionate share of the value.

**Responsibilities of the Parties:**

If inconsistencies arise between the language in this Statement of Work (SOW) and the General Terms and Conditions attached to the agreement, the language in this SOW takes precedence.

**RECIPIENT RESPONSIBILITIES**

Perform the work and produce the deliverables as outlined in this Statement of Work and attachments.

Ensure Paperwork Reduction Act (PRA) clearance is obtained prior to conducting data collection from producers or other project participants, including data collection performed by subrecipients.

Comply with the applicable version of the General Terms and Conditions.

Submit reports and payment requests to the ezFedGrants system as outlined in the applicable version of the General Terms and Conditions. Reporting frequency is as follows:

Performance Reports: Quarterly

SF425 Financial Reports: Quarterly

Detailed Progress Report: Quarterly

(The detailed progress report is in addition to the performance and financial reports referenced above and described in the general terms and conditions)

**Expected Accomplishments and Deliverables**

See attached Benchmarks Table and associated Project Narrative.

**Resources Required**

See the Responsibilities of the Parties section for required resources, if applicable.

**Milestones**

See attached Benchmarks Table and associated Project Narrative.



## **GENERAL TERMS AND CONDITIONS**

Please reference the below link(s) for the General Terms and Conditions pertaining to this award:  
<https://www.fpacbc.usda.gov/about/grants-and-agreements/award-terms-and-conditions/index.html>

### Attachments:

Budget Narrative

Project Narrative

Benchmarks Table

Climate-Smart Practices List and Limitations

Data Dictionary

Climate-Smart Specific Terms and Conditions

Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act

Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act

Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act



Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act

Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act

Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act

Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act



Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act

Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act

Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act

Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act



Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act

Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act

Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act

Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act



Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act

Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act

Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act

Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act

Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act

Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act

Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act

Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act



Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act

Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act

Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act

Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act

Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act

Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act

Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act

Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act



Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act

Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act

Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act

Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act

Withheld pursuant to exemption

(b)(4)

of the Freedom of Information and Privacy Act

## Climate-smart Agriculture that is profitable, Regenerative, Actionable, and Trustworthy (CARAT)

### I. Executive Summary

#### A. Contact Information

Armen R. Kemanian (Project Lead). Professor, Department of Plant Science, The Pennsylvania State University, 116 ASI Building, University Park 16802-3504, PA. email: [kxa15@psu.edu](mailto:kxa15@psu.edu)

#### B. List of Project Partners

**Center for Dairy Excellence (CDE)** nucleates the dairy producers and industry of Pennsylvania. With broad statewide and national recognition, the CDE provides the sector a common voice, is alert to emerging opportunities, and develops and distributes grants. The CDE will lead CARAT's **implementation plan** with participating producers, administer financial assistance, and coordinate recruitment, planning, and technical assistance (TA).

**Penn State Institute for Sustainable Agricultural, Food, and Environmental Science (SAFES)** is housed in the College of Agricultural Sciences. SAFES operates at the interface of research and stakeholder engagement to tackle the complex and interconnected challenges of feeding a growing population while increasing environmental and economic sustainability. SAFES will lead the coordination of CARAT through PD Kemanian, and will integrate experts and technologies from economics, social, and natural sciences. SAFES associates will be integral

to the **measurement, monitoring, reporting, and verification (MMRV)** and the **market development plans**.

**Penn State Agriculture and Environment Center (AEC)** facilitates partnerships and engagement in SAFES. The center fosters community-driven partnerships with stakeholders to address land and water issues. The AEC will lead the integration of CARAT partnerships for recruiting, training, and TA in the **implementation plan**.

**Penn State Extension** is Pennsylvania's centralized agricultural cooperative extension program since 1921. It serves Pennsylvania's ag community through a network of specialists (campus-based) and educators (county-based). Penn State Extension specialists work closely with producers and other entities in the region. Three extension teams (Agronomy,

Dairy, and Business), totaling 18 specialists and 53 educators, will be directly involved in this

project in the **implementation** and **market development plans**.

**Proagrica** is a global provider of independent connectivity and data-driven support solutions for the agriculture and animal health industries. Proagrica will advance the **market development**



Figure 1. Partnership structure and function diagram.

**plan**, by scoping the mechanics of climate-smart practices documentation and climate commodity tracing in their data stream. Proagrica is uniquely suited to fulfill this task for this project now, and for the nation in the future, through the extension of products and services tailored to tracing climate-smart commodities through the food supply chain.

**Professional Dairy Managers of Pennsylvania (PDMP)** is farmer-driven and focused on advancing Pennsylvania's dairy industry through improved productivity and economic viability with continued stewardship of our animals, environment, and community. PDMP is a collaborative organization partnering with dairy producers, industry experts and representatives, and organizations who share our commitment and passion for Pennsylvania's dairy industry. The PDMP will be integral to the **implementation** and **market development plans**.

**Red Barn Consulting (RBC)** has provided agricultural engineering, permitting, nutrient management, and conservation planning in the Mid-Atlantic region for more than twenty years, servicing over 1,500 family farms. RBC will provide key TA in the **implementation plan** from assessment of farms to monitoring the implementation of climate-smart practices.

### **C. List of underserved/minority-focused project partners**

Both CDE and PDMP, as well as Penn State AEC and Extension, reach and engage underserved producers across the dairy sector of Pennsylvania. Because of the diversity of underserved producers across gender, business scale, and culture, engagement will require customized strategies that can be readily adapted. CARAT partners are well-versed in the concerns and motivations of producers and the agricultural workforce in Pennsylvania. Collectively, CARAT partners have a comprehensive and nuanced understanding of the mechanisms needed to engage diverse stakeholders in the region and across the supply chain.

### **D. Compelling need for the project**

Agriculture is at the crossroads between societies' deepening concern about climate change and rising demands for action to reduce greenhouse gases (GHGs) from the atmosphere. Agriculture is the dominant source of the second and third most important GHGs – methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O).<sup>16,31</sup> Yet, climate-smart agriculture can be a vehicle to turn the tide and make agriculture economically robust while improving the environment globally and locally. Research continues to identify the specific means to reduce agriculture's GHG emissions and enhance carbon storage, while also providing the foundation for developing actionable climate-smart practices. Dairy production systems are important sources of CH<sub>4</sub> and N<sub>2</sub>O and therefore offer an excellent opportunity to reduce GHGs and enhance carbon storage and to develop successful climate partnerships. Furthermore, CARAT partners state that "... *nobody in this space is paying attention to small dairy farms that are predominantly what makes up Pennsylvania's dairy industry.*" Now we are. **We propose that Pennsylvania dairy systems offer the ideal testbed to develop successful pilot climate-smart partnerships for small and medium size farms** that can be expanded to the rest of the nation.

A key ingredient needed to realize the promise of climate-smart agriculture in Pennsylvania and nationwide is **trust**. Our vision is that the establishment of partnerships that support climate-smart commodity markets requires **building trust among partners along the supply chain through a shared understanding that reconciles what is produced on the ground with what is sold in markets**. Producers do not want to sell perceptions. Accordingly, climate-smart partnerships require transparent documentation and tracing of climate commodities along the



supply chain. Trust requires that practices implemented on the ground reduce GHGs, and that these emissions reductions and other environmental benefits are documented. That is, trust requires that producers' efforts to improve the environmental performance of their lands be recognized through objective indicators. These indicators need to be built atop a stratum of measurements and robust models trusted along the supply chain, from producers to buyers of a commodity. In this way, GHGs emissions reductions and other benefits can be valued by consumers. To realize this vision, we propose to establish CARAT.

**CARAT core values, goals, and basic structure:** CARAT has been conceived as a pilot project to implement, measure, model, and enable the establishment of trustworthy partnerships to develop markets for climate-commodities, attending to all the requirements of the NFO. The acronym CARAT reflects the **core values** of this endeavor: climate-smart agriculture that is renerative, actionable, and trustworthy, and as suggested by the noun carat, an endeavor that brings economic value to producers along the supply chain (profitable). **The goal of CARAT** is to establish successful climate partnerships to tackle in a straightforward fashion the concerns of climate commodity producers and consumers. We **focus on dairy production in Pennsylvania**, a sector with tremendous potential to reduce GHGs by suppressing CH<sub>4</sub> and N<sub>2</sub>O emissions and by storing C, and a region with a diversity of underserved constituencies including farmers. The long-term goal is for CARAT to serve as a testbed for further expansion of this program throughout the nation under a common framework.

CARAT establishes a framework for a synergistic partnership that recognizes producer associations' leadership; the private sector as a service provider and vehicle for market development; and the land-grant system as an honest broker that brings expertise in climate-smart agriculture and market development, as well as experience engaging producers. We seek to turn skepticism into trust and hesitation into action by drawing on the success of established programs developed by the project partners, including federal agencies like NRCS and regional entities like the Chesapeake Bay Program, and supporting them to develop stable and reliable markets for agricultural climate commodities. The practices proposed and incentives for implementation are straightforward, the methods to quantify climate commodities explicit, the verification transparent, and the overall system set up for perpetual improvement.

Insight Box #1. **Why are N<sub>2</sub>O and CH<sub>4</sub>** more relevant as climate commodities than soil C storage in PA's environment? They are simply more manageable and quantifiable. Suppressed N<sub>2</sub>O or CH<sub>4</sub> emissions directly reduce GHGs in the atmosphere and mitigation can recur in perpetuity. Conversely, soil C storage, when quantifiable, has a limit that will eventually be reached and is vulnerable to future losses. Furthermore, PA soils may have little room for further C storage, as systems are already predominantly no-till, frequently manured, cover cropped, and with perennials. However, increasing soil C brings benefits that should be valued through other soil health indicators. Focusing on N<sub>2</sub>O and CH<sub>4</sub> bypasses the soil C quantification and persistence conundrum (biochar, with qualification, can be an exception). Moreover, if CH<sub>4</sub> emissions from dairy are large and relatively well known, emissions of N<sub>2</sub>O are episodic and likely underestimated. We have measured high emissions when soil tillage mixes manure and cover crops (> 10 kg N<sub>2</sub>O-N /ha/yr)<sup>23</sup>, and extremely high emissions in sandy soils (> 25 kg N<sub>2</sub>O-N /ha in just 3 weeks). These N<sub>2</sub>O emission rates dwarf optimistic soil C gains and are a great opportunity to monetize climate commodities.



Several economic, geographical, production, and environmental factors point to the significance of Pennsylvania for this project. Pennsylvania's dairy industry occupies a unique position in the region and the nation. While Pennsylvania does not escape the relentless consolidation of the industry, the state retains many small- and medium-size producers compared with Midwestern or Western states, and their impact is felt throughout the Commonwealth, the Chesapeake Bay Watershed and beyond. Dairy farming, pivotal for Pennsylvania's economy, ranks 7<sup>th</sup> in the nation for milk production and in the top 5 for multiple dairy products.<sup>33</sup> Farms and industry are close to large urban centers. Moreover, dairy farms are often located on sloping terrain, and farmers are habituated to implementing soil conservation practices, many of them already climate-smart. Perennial forages, no-till, and winter annual cover or double-cropped silage crops are components of farmers' climate-smart practices menu.<sup>34</sup> Between the two periods from 2003-06 to 2013-16, conservation tillage and no-till have increased from 39 to 64% of the cropland in the broader Northeast region.<sup>34</sup> Feeding operations rely on grain imports to feed the almost half million milk cows; when applying manure, only 48% of the fields used manure testing.<sup>34</sup> In sum, the intensive management and flow of nutrients due to both fertilizers and grain imports, the metabolism of ruminants, manure management, and opportunities for precision agriculture and precision conservation make the region a prime testbed to produce climate-smart dairy products.

The project has four main thrusts. First, since CH<sub>4</sub> and N<sub>2</sub>O are dairies' largest GHG sources<sup>35</sup>, we will implement and monitor approaches on pilot-farms to reduce emissions of: i) CH<sub>4</sub> from enteric emissions, ii) CH<sub>4</sub> from manure storage and cropland application, and iii) N<sub>2</sub>O from manure and N fertilizer application during crop production. We will do so by engaging dairy producers, industry, and the private sector to plan and implement practices that are straightforward and whose outcome in terms of climate-smart commodities can be measured or modeled. The CDE, PDMP and RBC are not only experienced organizations, but a core component of CARAT that will mediate producer and industry engagement. Second, while we focus on CH<sub>4</sub> and N<sub>2</sub>O emission reductions, we will implement and measure the effects of practices for soil and other forms of C storage or emission reduction on participating farms. We will also assign a monetary incentive to producers that already operate in a climate-smart fashion. Third, we will engage underserved populations, from the producer and worker sectors to the incoming professionals that will shape this market. Fourth, we will scope a market structure that can mediate transactions of climate commodities. For this purpose, we engage Penn State experts and Proagrica, a large enterprise dedicated to data collection and tracing in agriculture.

**Insight box #2. Simple accounting of climate commodities.** Many practices affect CH<sub>4</sub>, N<sub>2</sub>O, and CO<sub>2</sub> emissions. Our approach favors simple, conservative and easy to use estimations of emission reductions through the CARAT-CALCULATOR (CARAT-C). The layout resembles COMET-PLANNER but will use site- and farm-specific information. Each practice will have a positive and a negative effect on emissions associated to a baseline and farm-specific inputs. Practices that reduce net GHG emissions generate climate commodities. Any practice that reduces GHGs applies. For example, if the application of 150 lb/ac of (available) N in manure would emit 5 lb/ac of N<sub>2</sub>O-N and adding a nitrification inhibitor can reduce emissions by 50%, then after unit conversion, the climate commodity is about 1150 lb/ac of CO<sub>2</sub>eq. If the nitrification-inhibitor cost is \$10/ac, the climate payments should exceed \$10/ac. In this way, any agricultural commodity can consider adding a climate-smart premium transparently.

Penn State, a public land-grant institution, will operate as the lead institution—an **honest broker** in the emerging value chain—preserving data integrity and documenting the value of climate-

smart commodities. Penn State will contribute to CARAT by: 1) helping recruit a diverse set of producers, including underserved dairy farming populations, and connecting them to a team of expert consultants for practice implementation; 2) providing science-based assistance to identify and prioritize which practices to implement on each farm; 3) measuring and verifying the benefits of deploying climate-smart practices with advanced landscape-scale, continuous GHG monitoring technologies, and 4) determining market prospects for climate-smart commodities. The role of scientists will be to ensure that measurement and standardization protocols meet rigorous standards. As practices are implemented, results in terms of GHGs will be tested and verified through close-knit relationships with producers and partner organizations.

Dairy farm size, technology, and physical setting vary across Pennsylvania due to climate, soils, and landscape features as well as cultural heritage and proximity to markets. All these factors render inadequate a “one size fits all” approach to implementing climate-smart technologies. To accommodate this variation, CARAT partners have identified three “dairy core pockets” that represent dairy farm typologies<sup>19</sup> where we will initiate this project:

- i. **Lancaster**, Lebanon and Berks Counties, with many Amish and Mennonite tie-stall dairy farms with less than 65 milking cattle per farm;
- ii. **Franklin** and Cumberland Counties, with 350-500 milking cattle per farm in free-stall barns ; and
- iii. **Blair**, Huntingdon, Bedford, and Somerset Counties, with 1000+ milking cattle per farm with total mixed rations in free-stall barns.

We propose to work on pilot farms in these areas. As requested in the NFO, the project contains the following plans: climate-smart practices implementation, MMRV of GHGs impact, and market development. Dairy producers, a total of 75 in the core production regions, will participate in the project in three capacities: determination of the baseline emission of GHGs, implementation of practices, and in-depth monitoring. **Through CDE, PDMP, and Penn Extension, these activities will reach a much broader audience.** Surveys will secure a full description of each farm for information systems used to calculate the climate commodities’ value. Surveys are modeled after the National Resource Inventory surveys and will collect structural and operational information about each farm, with additional questions pertaining to market development. Information pertaining to each farm will be confidential to avoid tracing individual fields or farms, but available for quantifying the benefits of GHG reductions, evaluate models, and develop CARAT-C. Through the combination of surveying, measurement, and modeling, we seek to develop a system of perpetual learning that improves as it adds new data.

#### **E. Approach to minimize transaction costs associated with project activities**

Strategically, the goal is to develop a low-cost calculator, CARAT-C, that can aid stakeholders in estimating the benefits of climate-smart practices, for no current methodology to measure GHGs emission is low-cost or simple. This calculator must fit in existing data collection and streaming services, such as those developed by Proagrica. Core algorithms can be shared for incorporation in COMET-PLANNER, COMET-FARM, or other tools. Thus, through our work with Proagrica, we will take concrete steps towards using objective indicators and traceable commodities, previewing market growth. Tactically, we will minimize transaction costs by avoiding duplication of equipment and recognizing efforts from early adopters of climate-smart practices. As models continuously improve, as is the case with new versions of COMET-FARM or CARAT-C, uncertainty and transaction costs will decrease.



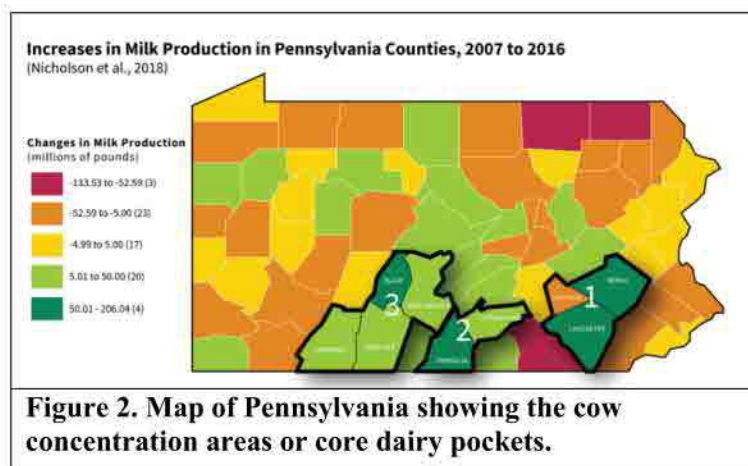
Knowing whether their practices generate climate commodities is a real concern among producers. To assuage producers' concerns, CARAT will cost-effectively deploy equipment to measure GHGs in the three farm typologies, reducing future transaction costs. Deployment across two-year blocks will allow CARAT to use the same equipment in different fields or farms. Measurements can begin immediately by working with early adopters who have practices in place and setting up comparisons between baseline observational units (those who do not implement climate-smart practices or where those practices were undone through an intervention, for example, uncovering a lagoon) and units employing such practice. This will secure the collection of actionable data early in the project and reward early adopters for participation.

#### **F. Reducing barriers to implementing climate-smart practices and marketing**

Producer barriers to implementing climate-smart practices have several dimensions. First, we mentioned a generic wariness that translates into lack of trust. Second, neither the cost of implementing these practices nor their benefits are clear, which breeds skepticism. Many underserved communities are underserved because skepticism keeps them on the fence. Third, climate markets are not well developed, although a few voluntary and regional programs are in place. Fourth, concerns that emissions reporting may result in regulations contributes to an ambiguous engagement from stakeholders. We propose to address these concerns through an organizational structure that enables transparent sharing of information and confidentiality, engages a wide spectrum of stakeholders, and seeks to develop markets. The project is led on the ground by the CDE, PDMP, RBC, Penn State's AEC, and Penn State Extension. All these entities have close ties to the dairy community and industry, experience finding ways to communicate with the diverse stakeholders, and a reputation that secures the transmission of information. To resolve the existing confusion around climate markets, Penn State experts will assess economic and other factors that affect the willingness of farmers to produce and consumers to pay for climate commodities. Funding requested for CARAT will allow us to circumvent the ambiguity of markets by paying producers upfront for the estimated cost plus an incentive to implement climate-smart practices. This will generate a supply of climate commodities to be absorbed later in open markets.

#### **G. Geographic Focus**

To engage a credible and complete representation of the numerous types, sizes and management practices of Pennsylvania's diverse dairy farms, the partnership will focus on three regions where the dairy industry is prominent and milk production has increased in recent years.<sup>19</sup> They are located around Lancaster (southeastern PA), Franklin County (south central PA), and Blair County (including the Alleghenies).





Insight box #3. Within a **core dairy pocket** area, dairy production systems have multiple commonalities. For expediency, we use counties to identify PA’s core dairy pockets. The concept allows us to: focus on the particulars of each region; quickly evaluate the impact of any practices, as the success of one practice can be expanded to the acreage of each broader area; and have an agile organizational structure. The idea draws from CDE’s experience and is analogous to the use of climate and soil clusters to represent production areas nationwide to develop the Conservation Effect Assessment Project (CEAP).<sup>35</sup> The core dairy pockets also account for cultural and technological factors intrinsic to each cluster.

**H. Partners’ project management capacity**

**Penn State SAFES** will be the lead organization, administering subawards to CDE and PDMP and other services. The SAFES-AEC has over a decade of experience developing implementation partnerships to provide technical and financial assistance to farmers in adopting conservation practices for soil and water quality improvements, primarily funded by National Fish and Wildlife Foundation’s Chesapeake Bay Stewardship Fund. This public/private partnership will be the model for implementation of this program. CDE, PDMP, and RBC will work with AEC and Penn State Extension to collaboratively establish criteria for producers to participate in CARAT, to ensure representation of Pennsylvania’s dairy industry as well as identify climate-smart practices that should be considered for implementation. RBC has invaluable experience in monetizing ecosystem services for farmers, specifically trading nutrient credits. Proagricra brings experience in big data traceability and operation in global markets.



**Figure 3. Schematics of the flow of the project, from left to right, highlighting the implementation plan on the ground, the MMRV plan, and the market development plan.**

The **CDE** will use their current dairy team template to administer implementation funds for each participating farm by issuing payments directly to farms and/or vendors for climate-smart



practices. CDE will work with partners to recruit and coordinate Climate-Smart Dairy Teams for producers and help develop business connections for market development. CDE is an experienced administrator of funds for these purposes. For example, in 2020-21 alone, CDE grants reached 33 counties in the state. Additionally, the center has a far-reaching email list, and its podcasts are popular among producers. **PDMP** has established professional development programs to improve members' skills and increase knowledge. PDMP's track record of promoting the future of the dairy industry through responsible public policy carries important clout with producers and will secure success in coordinating an industry "think tank" consisting of early implementers and state and national industry leaders to work with core partners. **RBC** has provided TA for over twenty years as an NRCS-certified TSP in Pennsylvania and will advise in establishing climate-smart action plans, recruiting participants, and providing technical expertise on the ground. **Penn State Extension** specialists provide a unifying backbone through an organizational structure that encompasses all counties and facilitates coordination.

## II. A plan to pilot climate-smart agriculture practices on a large scale

CARAT will adopt a two-pronged and producer-driven strategy to implementing climate-smart agricultural practices on the 75 participating farms. 1) "Pilot farms" will be enrolled for intensive monitoring and measurement, either implementing a single climate-smart practice or serving as a baseline plot; 2) "Survey farms" will be enrolled to adopt a single or a suite of practices.

### A. Description of climate-smart agricultural and forestry (CSAF) practices to be deployed

The practices proposed for implementation are not limited to the list in Table 1 but fall within the approaches of suppressing CH<sub>4</sub> and N<sub>2</sub>O emissions, storing C, reducing fuel consumption, or reducing any input with an associated C footprint. **Reductions in CH<sub>4</sub> emission** will be based on feeding strategies that include supplements (some receiving regulatory approval soon), management of manure storage (capture and flaring CH<sub>4</sub>), and manure addition to soil. Dairy cattle diets will be reformulated to increase CH<sub>4</sub> suppressors (starch and lipids), decrease methanogenic nutrients (neutral-detergent fiber), and include proven CH<sub>4</sub> inhibitors, (for example 3-nitrooxypropanol, Bovaer) and seaweed (e.g. *Asparagopsis* spp.). These interventions can decrease enteric CH<sub>4</sub> emissions by up to 60%.<sup>29</sup> A patented manure processing technology to extract phosphorus that reduces CH<sub>4</sub> from manure (MAPHEX)<sup>6</sup> will be explored for selected pilot farms. **Reductions in N<sub>2</sub>O emission** (of up to 75%) will occur through N management that will reduce N additions and improve application timing, increase N use efficiency, and reduce N losses to prevent the accumulation of nitrate in soil that invites N<sub>2</sub>O emissions (or leaching); improved cover crop management (harvest for hay or silage to remove residues that stimulate N<sub>2</sub>O emissions); and precision agriculture. Attention will be paid to avoid double counting or undercounting climate benefits.

Other techniques involve storing C in soil or wood, with storage in transient pools under scrutiny.<sup>1,2,27</sup> The C storage alternative that is costly today, but feasible, is production and addition of biochar to soils.<sup>3,8</sup> Producing biochar from manure solids, heat recovery, and biochar storage in soil can be considered in the future, as the operation requires investments in pyrolysis reactors and heat recovery structures. Similarly, developing buffer strips with trees or perennialization can be considered. While all approaches have risks, most practices in Table 1 mesh well with current dairy operations.

**Table 1. Summary of the main climate-smart practices to be primarily considered in this project.**

<b>Climate-Smart Practice Examples</b>	<b>Benefit</b>	<b>Cost</b>	<b>Interaction</b>
<b><i>CH<sub>4</sub> suppression</i></b>			
Feed supplements (CH <sub>4</sub> inhibitors, seaweed) NRCS Code 592	reduce enteric CH <sub>4</sub>	nutritionist, supplement	monitoring of feeding operation
Prescriptive feed management NRCS Code 592	reduce enteric CH <sub>4</sub>	nutritionist, cost of grain vs. forage	modification of on-farm crop production
Lagoon cover and methane flaring, NRCS Code 313, 367, 371, 372	reduce lagoon CH <sub>4</sub>	supplies, installation, engineering	added control, system maintenance, drainage
Aerobic composting of bedded-pack manure NRCS Code 317	reduce CH <sub>4</sub> from solids	labor, equipment	added control, system maintenance
Manure storage and runoff controls NRCS Code 313, 318	reduce CH <sub>4</sub>	supplies, installation, engineering	added control, system maintenance, drainage
<b><i>N<sub>2</sub>O suppression</i></b>			
Precision / Split N management NRCS Code 590	-N fertilizer; -N <sub>2</sub> O	equipment, planning	+labor, +yield
Addition of nitrification inhibitor NRCS code 590	-N fertilizer, -N <sub>2</sub> O	nitrification inhibitor	none known
Manure analysis pre application NRCS Code 590	-N fertilizer, -N <sub>2</sub> O	analysis cost, planning	none known
Redistribution of manure (app. rate) NRCS Code 590	-N fertilizer; -N <sub>2</sub> O	transportation	-N <sub>2</sub> O > + fuel cost
Synchronize N supply and demand via manure side-dressing / injection NRCS Code 590	- N fertilizer: -N <sub>2</sub> O	equipment, planning	potential higher yield, +N retention
Interseeding / other cover crop	-N <sub>2</sub> O due to N capture	equipment, operation	-erosion, -N fertilizer, +N retention
<b><i>Interventions with multiple benefits</i></b>			
From till to reduced till / strip till NRCS code 329	+SOC, -fuel	equipment	-erosion
From till to no-till NRCS code 329	+SOC, -fuel	equipment	pest management
Add perennial pastures NRCS code 328	+SOC	Seed, planting costs, fencing, water system	Land use change (LUC), +feed imports, -erosion
Legume interseeding in pastures NRCS code 512	+SOC	seed, planting costs	increased N fixation, +productivity, -ration
Prescribed grazing NRCS code 528	+SOC	fencing, planning and management	+pasture productivity, +soil structure, -erosion
Expand buffer strips NRCS code 332, 393	+SOC, +C in wood, -N <sub>2</sub> O	-production area	LUC, +grain or +hay imports, -erosion
Tree planting/afforestation NRCS Code 379	+SOC, +C in wood, -N <sub>2</sub> O	-production area, establishing trees	Same as above

In each core dairy pocket, a pilot farm will adopt a single GHG reduction strategy explained above, totaling three farms for each pocket and nine total for the entire implementation plan. Additionally, two pilot farms in each pocket, totaling six, will be identified as a baseline or controls on which no climate-smart practices will be implemented, but the same measurements



will be gathered as on the implementation pilot farms. **That renders a total of 15 management units that will be intensely measured. Practices in these cases will be selected to protect experimental integrity and comparison.** Climate-smart practices, including but not limited to the three practices implemented at the pilot farms, will be implemented at up to 60 survey farms. Through CARAT, producers will adjust management practices to reduce GHGs and to realize other environmental benefits and maintain or increase crop productivity, a virtuous environmental and economic cycle. The GHGs benefits and other variables will be measured or computed with CARAT-C. This tool will be based on work by scientists at Penn State and elsewhere and available through models like C-Farm,<sup>13</sup> Cycles and CropSyst,<sup>30,39</sup> and IFSM.<sup>5</sup> Critically, all actions will map to a “climate-smart practice” that is suitable for accounting and tracing.

### **B. Plan to recruit producers and landowners, including estimated scale of the project**

We will work directly with 75 dairy producers, 15 of which will be involved as pilot farms for intensive measuring of GHG emissions, and 60 for implementation and surveying. Pilot farms and survey farms will represent the diversity of Pennsylvania dairies, from 60-cow Plain-Sect tie-stall operations to large, 1000-plus cow free-stall dairies. The estimated area directly involved in the project is > 10,000 ac. The project will indirectly reach all Pennsylvania dairy producers that together manage a half million milking cows and > 6,500 farms. The project scale and the partners’ community connections secure maximum visibility and projection in the state.

### **C. Plan to provide technical assistance, outreach, training, and timeline**

Planning and implementation will include regional coordination (AEC) and farm-specific activities (CDE and RBC). At a regional level, Penn State’s AEC will assign one AEC outreach staff to each core dairy pocket to develop regional muddy boots teams responsible for **local outreach and recruitment strategies**. These teams will be coordinated by AEC director M. Royer and include county extension educators and TSPs, and industry representatives. **Outreach and technical assistance will be coordinated** by CDE through their successful model of a ‘Dairy Teams’ approach that, for CARAT, will be identified as Climate-Smart Dairy Teams (CSDT). Each producer under the program will work with one CSDT. These teams will include the producer’s trusted advisors relevant to implementing climate-smart management and operations, including nutritionists, agronomists, consulting TSPs, and Penn State AEC/Extension Educators as appropriate. The team will work with the producer to design a climate-smart action plan. The CARAT partnership will develop streamlined and producer-friendly guidance for the implementation program. This guidance will collect feedback from a PDMP-convened think tank consisting of early implementers and industry leaders from Pennsylvania and beyond.

**Technical assistance necessary to implement climate-smart practices will primarily be provided by RCB**, an NRCS-certified TSP in Pennsylvania. Necessary TA may include planning, design, engineering, permitting and project management for successful implementation of practices (and offer training opportunities for students). If a producer already works with another NRCS-certified TSP, that TSP will provide these same services. Complementary TA will be provided by Penn State scientists and Extension team through the CSDT, leveraging a large group of researchers, extension specialists, and educators from the Field and Forage Crops, Dairy Production, and Business Teams. The TA teams will ensure that implementation conforms to protocols and inform farmers about developing markets. Planning will include developing a climate-smart comprehensive dairy feeding strategy and nutrient management plan (CSCMPs).

The CSDT format will allow an open dialogue about data collection, as producers and farm advisors might be already experienced in using record-keeping systems that are efficient and unintrusive. Modeling using COMET-PLANNER and COMET-FARM, as well as Cycles and other inhouse tools, will be used to develop CARAT-C. The data collection structure will be part of the scoping work with Proagrica. Further, sampling protocols for the pilot farms agreeing to deploying measuring equipment will be discussed and agreed upon. Survey farms will serve a dual purpose. First, they will be role models for farmer-to-farmer transfer of knowledge. Second, survey data will be used for modeling to estimate the benefits of climate-smart practices. Co-investigator D. Carrijo will lead the development of data collection/survey template. Extension Educators and AEC will lead data collection on behalf of participating producers. Survey questions will be designed to collect all the input information required by CARAT-C and other tools and gather information on economic incentives received through conservation plans. Proper selection of the survey farms is critical for the success of the project, as these farms need to encompass the three core dairy pockets, be willing and habituated to innovate, and be influential locally and statewide. To leverage this effort, the Penn State extension team will hold an annual meeting, open to the public and named “PA Climate-Smart Commodities Working Group Conference”, where participating farmers will be invited to share their experiences.

This process will apply to both the pilot and survey farms in Year 1 and repeated through Year 4 as additional survey farms are recruited. We will recruit *ca.* 20 farms/year but favor an accelerated timeline that completes recruitment in Year 3. Planning will take 3 months. Implementation will start within 6 months of recruitment. Measurement equipment will be deployed at practice deployment or before to allow for troubleshooting. Surveying will be completed in line with recruitment. Documentation using COMET-PLANNER will be done at Planning and will be part of the CSCMP. The tool CARAT-C will be fully deployed in Year 2. Each farm will be fully modeled with Cycles / other tools to aid technical team decision making.

#### **D. Plan to provide financial assistance for producers to implement CSAF practices**

Financial assistance will be based on farm-specific CSCMPs, which will include Inventory and Evaluation Reports and cost estimates to guide implementation and financial assistance. CSCMPs will be developed by RBC or the producer’s NRCS-certified TSP. Funds will be administered by CDE and overseen by AEC. A total of \$12.15 million is allocated for CSAF practice implementation on 75 dairies across the three dairy regions, of which \$900,000 is allocated for Climate-Smart Dairy Team expenses and development of CSCMPs for each participating farm. Implementation funds are estimated at no more than \$150,000 per farm, with 10% of allowable for design, engineering and project management costs and other implementation costs. Higher per-farm amounts may be necessary to fund one of the three priority practices for which monitoring will be installed, or if implementation of additional practices results in comprehensive, whole farm implementation of all feasible climate-smart practices on the operation. Pilot farms will be a priority. An additional incentive payment to farmers will also be provided to incentivize participation, and to recognize early adoption that enables immediate deployment of equipment. If funds permit it, we will expand the project footprint and increase the # of participating farms, a proposition to be assessed in Year 2.

#### **E. Plan to enroll underserved and small producers**

About 81% of the state’s 6,914 dairy farms are small and have herds < 100 milking cows<sup>33</sup> compared with the national average herd size of 232.<sup>10</sup> Under-served groups in the state’s dairy



sector are: Small farmers, women, new and beginning farmers, and the Latino dairy workforce. **(1) Among small farmers**, Amish represent *ca.* 25% of the state's dairy farms.<sup>38</sup> The average herd size and farm area on Amish farms is about half of the state's average.<sup>10</sup> Our partnership approach will customize strategies to reach these producers. We estimate that 25 out of the 75 farms enrolled will be small (<100 cows), with at least 12 of them Plain-Sect. **(2) Women-owned farms**: Nearly 19% (1,317) of PA dairy farms have a female principal operator, and that demographic will be proportionally represented in the participating farms. **(3) New and beginning farmers**: About 20% of dairy farmers (1,365) are classified as New and Beginning Farmers; again, that demographic will be proportionally represented in the participating farms. **(4) Fewer than 50 of PA's dairy farms have Latino, Black, American Indian, or Asian managers.** However, **the project will engage the large Latino workforces employed on dairy farms.** These employees are functional pillars of the operations and often the ones who perform tasks related to climate-smart technology. A 2015 report sponsored by the National Milk Producers Federation found that around half of the nation's dairy farm workforce are immigrants, and this number is known to be rising. Co-investigator Barragan will lead a team of bilingual educators to establish Extension educational programs regarding adoption and implementation of climate-smart practices. The training provided to Latino workers would have a broad impact because of the mobility and entrepreneurialism of employees in managerial positions. Our goal is that funds devoted to small producers and underserved populations exceed 50% of funds allocated to TA and incentives.

### III. A measurement/quantification, monitoring, reporting, and verification plan

#### A. Approach to greenhouse gas benefit quantification: Hybrid modeling/measurements

Unlike other agricultural commodities, CO<sub>2</sub>e are not measured on a scale or transported in containers. Our approach will account for existing challenges that include: (1) accounting for farm-specific GHG reductions can be quantitatively difficult and (2) interactions and "leakage", which means that an action to reduce emissions locally may trigger emissions elsewhere, a proposition that will erode consumer confidence in climate-smart commodities. That is why we focus on reducing existing GHGs leaks.

**Modeling.** COMET-PLANNER, COMET-FARM, and CARAT-C. These tools will be deployed as standards with reproducible outputs. CARAT-C will be continuously improved by incorporating on-farm work and measurements, survey info, and insight from our work with Proagrica. CARAT-C will provide not only numbers by toggling yes/no to a given climate-smart practice but plug to a data platform that will allow tracing and trading. Penn State hosts state-of-the-art modeling platforms (Cycles) that can simulate ag systems in every field in the state.

Despite their limitations, look-up-table tools like COMET-PLANNER provide a useful initial step to engage producers, but capabilities are limiting for trading. Eve et al.<sup>9</sup> provides a clear conceptual framework underlying COMET-FARM, but these tools need improvement to become market-ready and be relied upon by the public. As requested by partners, deploying measurement equipment on pilot farms will help overcome some of these concerns.

**Monitoring.** Evidence suggests that for N<sub>2</sub>O, for example, emissions are underestimated and the potential for mitigation grossly undervalued (mostly in the eastern USA). This fact feeds farm operators' wariness about models. Simply stating that results are peer-reviewed and models validated does not overcome this wariness; no table of citations replaces measurements that farm operators witnessed. **The CDE and PDMP stated their preference for measurements that**



**reflect the impact of implementing climate-smart practices in unambiguous terms.** Project participants will be able to see how GHGs are measured, what are the challenges, and most importantly, they will be able to track the result of implementing management practices with unprecedented detail. This project will build trust through joint efforts between partners.

**Methane and Nitrous oxide measurements using eddy covariance.** Leveraging Penn State's expertise, we will deploy continuous CH<sub>4</sub> and N<sub>2</sub>O monitoring systems based on eddy covariance. They are costly and require specialized personnel for installation but operate almost unattended. We propose to use Licor closed path fitted to measure CO<sub>2</sub> and CH<sub>4</sub> simultaneously, with an added Aerodyne (TILDAS) instrument for N<sub>2</sub>O measurement. Team members K. Davis, S. Richardson (Meteorology) and F. Montes (Plant Science) have ample experience deploying these systems. **Measuring systems will be deployed in the pilot farms that allow comparing cases with and without climate-smart practices,** generating a unique dataset to value climate commodities, to compare, calibrate, or improve models, and on the ground demonstration.

**Methane and nitrous oxide with traditional static chambers.** Due to our expertise measuring GHGs fluxes using the static chamber, we will compare emissions obtained with eddy covariance with those obtained with cheaper, but more labor-intensive, equipment. Only a few researchers have done such critical comparison and on a limited temporal scope,<sup>18</sup> a glaring knowledge gap that hinders market development. Since we can simultaneously estimate CH<sub>4</sub> and N<sub>2</sub>O fluxes with static chambers, these measurements will be critical when, for example, dairy manure is either broadcasted or injected. The goals are to obtain independent estimates of GHGs fluxes from soils on certain days, and to have dairy producers and students participate in the process. The sample collection is intuitive (Figure 4).

Insight box #4. **Measuring GHGs.** In locations with side-by-side with and without climate-smart practice implementation, we will collect GHGs using static chambers, as shown in the picture. The chambers were designed by Montes. Eddy covariance systems, also deployed on pilot farms, bypass this laborious step and improve temporal resolution, but add analytical complexity.



**Monitoring: Soil carbon, satellite imagery, and other variables.** For completeness we will measure soil C concentration and bulk density in the monitored field down to 1.2 meters if the bedrock allows it. The eddy covariance towers will also be fitted with soil moisture sensors which will provide important information to model GHGs emissions. Surveys will provide operational information to estimate lime, fertilizer, and fuel usage.

#### **B. Approach to monitoring of practice implementation, anticipated # farms and acres**

The program is built to ensure verification of practice implementation. Participants must sign an agreement with CDE as the funding partner which will include implementation verification. Producers must work with an NRCS-certified TSP to implement selected practices funded by the program. TSPs must provide an as-built certification upon implementation completion. Finally, CDE will reserve 10% final payment until a verification visit is conducted by AEC staff or Extension Educators. The AEC will develop a form/checklist for verification visits and before and after photos when applicable. As set forth above, we anticipate CSAF practice



implementation on 75 dairies across the three core cow concentration areas, an estimated 15 farms per year over the period of the grant, and a minimum of 10,000 ac of direct impact.

### **C. Reporting and tracking of greenhouse gas benefits**

Reduced emissions or stored carbon will be recorded once with a unique identifier for each practice, field, farm and time frame in units of CO<sub>2</sub>eq. These C credits or agnostic “climate commodity” can be traded as a standalone credit, or assigned to another commodity to capture a premium price (e.g., climate-smart milk). Operations that apply to fields can be normalized on a per acre basis, but also on a per unit of product (grain, milk) depending on premiums. Operations like feeding are better expressed in absolute terms (tons of CO<sub>2</sub>eq) for zero-area operation (barn emissions) or on per milking cow basis. Similarly, GHGs emissions reductions from manure lagoons are assigned on a per lagoon basis but traded on the most convenient farm product.

Overall, we aim at reducing emissions of CH<sub>4</sub> and N<sub>2</sub>O between 50 and 75% from a baseline. The GHG credit cost will depend on the practice and the longevity of the investment. Clearly, producers should favor low-cost options first, and then move to costly investments enabled by this program. The high emission of CH<sub>4</sub> and N<sub>2</sub>O from dairy farms ensures a substantial reduction in GHGs emissions per dollar spent on dietary and N management changes, and likely high long-term return on investment (GHGs reduction / dollar) for operations that recover P and reduce CH<sub>4</sub>, or from lagoon cover and CH<sub>4</sub> flaring. Additionally, most of the proposed climate-smart practices carry additional benefits to the producer and the environment (See IV.B).

### **D. Verification of greenhouse gas benefits**

Modeling will play a primary role through CARAT-C, and COMET products, but measurements and model documentation will continuously be updated. Penn State’s SAFES will host and update a transparent database to document GHGs benefits unambiguously.

### **E. Agreement to participate in the Partnerships Network**

Armen Kemanian, Project Director, will serve as the CARAT representative in the “USDA Partnerships for Climate-Smart Commodities Learning Network.”

## **IV. A plan to develop and expand markets for climate-smart commodities**

### **A. Any partnerships designed to market resulting climate-smart commodities**

The CARAT advisory board and PDMP-led think tank will offer ample opportunities to connect with companies interested in purchasing GHG credits or climate-smart milk. Additionally, and considering a national and global market, the work with Proagrica will enable a generic approach for commercialization. As a Proagrica-enabled data stream provides other companies access to information about accrued dairy GHGs, the scenario will be set not only for trading commodities generated in this project, but in other regions and sectors. This concept will require substantial polishing, but clearly all ingredients are in place through CARAT. Investigations on market development by Penn State researchers will help shape climate-smart commodity trading.

### **B. A plan to track climate-smart commodities through the supply chain**

The process is addressed explicitly through Proagrica engagement and market scoping. Successful markets for climate-smart dairy commodities, like markets for environmentally friendly food products, depend on realizing value at each link of the supply chain. Market concentration in U.S. food processing and retail industries is high and growing, and this raises

questions about the extent to which value created by consumer willingness to pay for climate-smart food will filter back to farmers.<sup>37</sup> To explore the market operation, Abler and Zipp will develop economic simulation models of value allocation among different stages of dairy supply chains in the Mid-Atlantic, drawing on earlier work on farm-retail price transmission in agricultural markets<sup>37,41</sup> and cost and revenue sharing in green supply chains.<sup>28,40</sup> This will enable us to identify the conditions for production and sale of climate-smart dairy commodities that give farmers sufficient incentives to adopt.

### **C. Estimated economic benefits for participating producers including market returns**

In theory, supply curves for climate-smart practices provide estimates of the number of operators adopting them given the economic incentives (commodity price, subsidy). In practice, information is not perfect, risk difficult to assess, and cultural habits influence decisions. Abler and Zipp, in coordination with AEC, will complement theoretical work with analysis of focus groups and a choice experiment survey of farmers to identify factors that hinder climate-smart practice adoption. Focus groups will have 20 to 25 farmers and surveys will encompass 1000 additional farmers. Since few independent factors have a consistent relationship with adoption decisions,<sup>21</sup> we will use results from focus groups, consumer analysis, and supply chain analysis to design a hypothetical market scenario where farmers would be offered financial incentives to implement climate-smart practices. Then, we will elicit farmers' willingness to participate in this hypothetical market scenario with a contingent valuation survey. The outcome will be estimates the minimum output price at which farmers are willing to adopt climate-smart practices, and supply curves for each practice, both by farm typology.

Partner and Producer Engagement in Market Development is challenging for immature markets. As market analyses proceed on this project and climate-smart practices are implemented, PDMP, with its dairy industry "think tank" and expanded resources and networks beyond the dairy industry, will be broadening the scope of participation to corporations and industry interested in developing and participating in climate-smart ag commodities markets from the buyer end of the market.

Partner and Producer Engagement to Share Lessons Learned will occur continuously through the lifetime of the project. The PDMP convened think thank will provide the space to collect and share feedback through a closing workshop. The workshop will explore challenges and successes, lessons learned, and develop actionable items for scaling up the project for Pennsylvania dairies and industry and beyond.

### **D. Post-project potential**

CARAT is conceived as a pilot project that will morph through private partners into a self-sustained enterprise where different players in the supply chain will collect value by developing climate-smart commodities that consumers, i.e., the general public, corporations, or governments, will purchase. CDE, PDMP, and RBC, and Proagrica will be uniquely suited to capitalize on this early engagement locally and nationally. Penn State will remain involved as the honest broker that brings transparency and rigorous protocols to value climate-smart agricultural commodities.



## References

1. Amundson, R. and Biardeau, L., 2018. Opinion: Soil carbon sequestration is an elusive climate mitigation tool. *Proceedings of the National Academy of Sciences*, 115(46), pp.11652-11656.
2. Baker, J.M., Ochsner, T.E., Venterea, R.T. and Griffis, T.J., 2007. Tillage and soil carbon sequestration—What do we really know? *Agriculture, Ecosystems & Environment*, 118(1-4), pp.1-5.
3. Biederman, L.A. and Harpole, W.S., 2013. Biochar and its effects on plant productivity and nutrient cycling: a meta-analysis. *GCB Bioenergy*, 5(2), pp.202-214.
4. Butterbach-Bahl, Klaus, Elizabeth M. Baggs, Michael Dannenmann, Ralf Kiese, and Sophie Zechmeister-Boltenstern. 2013. Nitrous oxide emissions from soils: How well do we understand the processes and their Controls? *Philosophical Transactions of the Royal Society B: Biological Sciences* 368 (1621): 20130122.
5. Chianese, D.S., Rotz, C.A. and Richard, T.L., 2009. Simulation of methane emissions from dairy farms to assess greenhouse gas reduction strategies. *Transactions of the ASABE*, 52(4), pp.1313-1323.
6. Church, C., A. N. Hristov, R. B. Ray, and P. Kleinman. Process and treatment systems for treating high phosphorus containing fluids. USDA Docket No. 0165.17, PSU 2014-4193. United States Patent # 10,737958: Issued 08/11/2020.
7. Church, C. A. N. Hristov, R. B. Ray, and P. Kleinman, Process and treatment systems for treating high phosphorus containing fluids. USDA Docket No. 0045.14 United States Patent # 9,790,110.
8. del-Campo, B.G., Morris, M.D., Laird, D.A., Kieffer, M.M. and Brown, R.C., 2015. Optimizing the production of activated carbon from fast pyrolysis char. *Technology*, 3(02n03), pp.104-113.
9. Eve, M., D. Pape, M. Flugge, R. Steele, D. Man, M. Riley-Gilbert, and S. Biggar, (Eds), 2014. *Quantifying Greenhouse Gas Fluxes in Agriculture and Forestry: Methods for Entity-Scale Inventory*. Technical Bulletin Number 1939. Office of the Chief Economist, U.S. Department of Agriculture, Washington, DC. 606 pages. July 2014.
10. Holly, M. A., Gunn, K. M., Rotz, C. A., & Kleinman, P. J. (2019). Management characteristics of Pennsylvania dairy farms. *Applied Animal Science*, 35(3), 325-338.
11. Huang, H., Wang, J., Hui, D., Miller, D.R., Bhattarai, S., Dennis, S., Smart, D., Sammis, T. and Reddy, K.C., 2014. Nitrous oxide emissions from a commercial cornfield (*Zea mays*) measured using the eddy covariance technique. *Atmospheric Chemistry and Physics*, 14(23), pp.12839-12854.
12. Kammann, C., L. Grünhage, and H.-J. Jäger. 2001. A New Sampling Technique to Monitor Concentrations of CH<sub>4</sub>, N<sub>2</sub>O and CO<sub>2</sub> in Air at Well-Defined Depths in Soils with Varied Water Potential. *European Journal of Soil Science* 52 (2): 297–303.
13. Kemanian, A.R. and Stöckle, C.O., 2010. C-Farm: A simple model to evaluate the carbon balance of soil profiles. *European Journal of Agronomy*, 32(1), pp.22-29.

14. Lawrence, Nathaniel C., Carlos G. Tenesaca, Andy VanLooche, and Steven J. Hall. 2021. Nitrous oxide emissions from agricultural soils challenge climate sustainability in the US Corn Belt. *Proceedings of the National Academy of Sciences* 118 (46). <https://doi.org/10.1073/pnas.2112108118>.
15. Li, X., K.Y. Zipp, F. Jiang, T.L. Veith, H.E. Gall, and J.S. Shortle, 2019. Integrated Assessment Modeling for Design of Riparian Buffer Systems and Incentives for Adoption. *Social Cost of Water Pollution Workshop Selected Paper*. <https://cpb-us-e1.wpmucdn.com/blogs.cornell.edu/dist/1/8608/files/2019/03/Li-et-al-2lpdbnu.pdf>
16. Mbow, C., C. Rosenzweig, L.G. Barioni, T.G. Benton, M. Herrero, M. Krishnapillai, E. Liwenga, P. Pradhan, M.G. Rivera-Ferre, T. Sapkota, F.N. Tubiello, Y. Xu, 2019: Food Security. In: *Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems* [P.R. Shukla, J. Skea, E. Calvo Buendia, V. Masson-Delmotte, H.-O. Pörtner, D.C. Roberts, P. Zhai, R. Slade, S. Connors, R. van Diemen, M. Ferrat, E. Haughey, S. Luz, S. Neogi, M. Pathak, J. Petzold, J. Portugal Pereira, P. Vyas, E. Huntley, K. Kissick, M. Belkacemi, J. Malley, (eds.)]. In press.
17. Minkoff-Zern, L.-A. (2019). *The New American Farmer: Immigration, Race, and the Struggle for Sustainability*. The MIT Press.
18. Molodovskaya, M., Warland, J., Richards, B.K., Öberg, G. and Steenhuis, T.S., 2011. Nitrous oxide from heterogeneous agricultural landscapes: source contribution analysis by eddy covariance and chambers. *Soil Science Society of America Journal*, 75(5), pp.1829-1838.
19. Nicholson, C., M. Stephenson, and A.M. Novakovic. 2018. Study to support growth and competitiveness of the Pennsylvania dairy industry. 186p. Last accessed 5/5/2022. <https://www.centerfordairyexcellence.org/markets-management/pa-dairy-study/>
20. Ponce de León, M.A., C. J. Dell, H.D. Karsten. 2021. Nitrous oxide emission from manured, no-till corn system. *Nutrient Cycling in Agroecosystems*. 119 (3): 405-421.
21. Prokopy, L.S., Floress, K., Arbuckle, J.G., Church, S.P., Eanes, F.R., Gao, Y., Gramig, B.M., Ranjan, P. and Singh, A.S., 2019. Adoption of agricultural conservation practices in the United States: Evidence from 35 years of quantitative literature. *Journal of Soil and Water Conservation*, 74(5), pp.520-534.
22. Rau, Benjamin M., Paul R. Adler, Curtis J. Dell, Debasish Saha, and Armen R. Kemanian. 2019. Herbaceous perennial biomass production on frequently saturated marginal soils: Influence on N<sub>2</sub>O emissions and shallow groundwater. *Biomass and Bioenergy* 122: 90–98.
23. Sachs, Carolyn, Mary Barbercheck, Kathryn Brasier, Nancy Ellen Kiernan, and Anna Rachel Terman. 2016. *The Rise of women farmers and sustainable Agriculture*. Iowa City: Iowa University Press.
24. Saha, D., Kaye, J.P., Bhowmik, A., Bruns, M.A., Wallace, J.M. and Kemanian, A.R., 2021. Organic fertility inputs synergistically increase denitrification-derived nitrous oxide emissions in agroecosystems. *Ecological Applications*, 31(7), p.e02403.

25. Saha, Debasish, Armen R. Kemanian, Benjamin M. Rau, Paul R. Adler, and Felipe Montes. 2017. Designing efficient nitrous oxide sampling strategies in agroecosystems using simulation models. *Atmospheric Environment* 155: 189–98.
26. Saha, Debasish, Benjamin M. Rau, Jason P. Kaye, Felipe Montes, Paul R. Adler, and Armen R. Kemanian. 2017. Landscape control of nitrous oxide emissions during the transition from conservation reserve program to perennial grasses for bioenergy. *GCB Bioenergy* 9 (4): 783–95.
27. Schlesinger, W.H. and Amundson, R., 2019. Managing for soil carbon sequestration: Let's get realistic. *Global Change Biology*, 25(2), pp.386-389.
28. Song, Huihui, and Xuexian Gao. Green supply chain game model and analysis under revenue-sharing contract. *Journal of Cleaner Production*, vol. 170, Jan. 2018, pp. 183–192,
29. Stefenoni, H.A., Räisänen, S.E., Cueva, S.F., Wasson, D.E., Lage, C.F.A., Melgar, A., Fetter, M.E., Smith, P., Hennessy, M., Vecchiarelli, B. and Bender, J., 2021. Effects of the macroalga *Asparagopsis taxiformis* and oregano leaves on methane emission, rumen fermentation, and lactational performance of dairy cows. *Journal of Dairy Science*, 104(4), pp.4157-4173.
30. Stöckle, C.O., Kemanian, A.R., Nelson, R.L., Adam, J.C., Sommer, R. and Carlson, B., 2014. CropSyst model evolution: From field to regional to global scales and from research to decision support systems. *Environmental Modelling & Software*, 62, pp.361-369.
31. Taghizadeh-Toosi, Arezoo, Baldur Janz, Rodrigo Labouriau, Jørgen E. Olesen, Klaus Butterbach-Bahl, and Søren O. Petersen. 2021. Nitrous oxide emissions from red clover and winter wheat residues depend on interacting effects of distribution, soil nitrogen availability and moisture level. *Plant and Soil* 466 (1): 121–38.
32. Tian, Hanqin, Rongting Xu, Josep G. Canadell, Rona L. Thompson, Wilfried Winiwarter, Parvatha Suntharalingam, Eric A. Davidson, et al. 2020. A Comprehensive Quantification of Global Nitrous Oxide Sources and Sinks. *Nature* 586 (7828): 248–56.
33. Tian, Hanqin, Jia Yang, Rongting Xu, Chaoqun Lu, Josep G. Canadell, Eric A. Davidson, Robert B. Jackson, et al. 2019. Global soil nitrous oxide emissions since the preindustrial era estimated by an ensemble of terrestrial biosphere models: Magnitude, attribution, and uncertainty. *Global Change Biology* 25 (2): 640–59.
34. USDA-NASS, 2019. The 2017 Census of Agriculture. Data Release April 11, 2019. Accessed at [https://www.nass.usda.gov/Publications/AgCensus/2017/index.php#full\\_report](https://www.nass.usda.gov/Publications/AgCensus/2017/index.php#full_report)
35. USDA-NRCS, 2022. Conservation Practices on Cultivated Cropland: A Comparison of CEAP I and CEAP II Survey Data and Modeling. 165p.
36. Veltman, K., Rotz, C.A., Chase, L., Cooper, J., Ingraham, P., Izaurralde, R.C., Jones, C.D., Gaillard, R., Larson, R.A., Ruark, M., Salas, W., Thoma, G., Jolliet, O., 2018. A quantitative assessment of Beneficial Management Practices to reduce carbon and reactive nitrogen footprints and phosphorus losses on dairy farms in the US Great Lakes region. *Agric. Syst.* 166, 10–25.

37. von Cramon-Taubadel, Stephan, and Barry K. Goodwin. 2021. Price transmission in agricultural markets. *Annual Review of Resource Economics*, vol. 13, no. 1, 5 Oct. 2021, pp. 65–84.
38. Welk-Joerger, Noel. (2021). Performing Amish Agrarianism: Negotiating Tradition in the Performing Amish Agrarianism: Negotiating Tradition in the Maintenance of Pennsylvania Dairy Farms Maintenance of Pennsylvania Dairy Farms.” *Journal of Amish and Plain Anabaptist Studies* Vol. 9, No. 2: 125-140.
39. White, C.M., Kemanian, A.R. and Kaye, J.P., 2014. Implications of carbon saturation model structures for simulated nitrogen mineralization dynamics. *Biogeosciences*, 11(23), pp.6725-6738.
40. Yu, Baoqin, et al. 2020. Collaboration in a low-carbon supply chain with reference emission and cost learning effects: Cost sharing versus revenue sharing strategies. *Journal of Cleaner Production*, vol. 250, Mar. 2020, p. 119460
41. Yu, Charng-Jiun, and Brian W. Gould. 2019. Market power and farm-retail price transmission: The case of US fluid milk markets. *Agribusiness*, vol. 35, no. 4, 8 Apr. 2019, pp. 537–555.
42. Zhu, Yuhao, Klaus Butterbach-Bahl, Lutz Merbold, Sonja Leitner, and David E. Pelster. 2021. Nitrous oxide emission factors for cattle dung and urine deposited onto tropical pastures: A review of field-based studies. *Agriculture, Ecosystems & Environment* 322:107637.



## Benchmarks/Milestones

All applicants are expected to provide quarterly benchmarks. Benchmarks will be considered interchangeably with milestones for the purposes of these discussions and the progress reports expected of grantees. We do want each project to have unique benchmarks that help track their progress in executing the innovative projects under their specific grant. We also want to make sure that all grants have the following elements covered in their benchmarks at minimum.

### **Required Quantitative Targets by Quarter (Cumulative) – some initial quarters may be zero:**

Please see the attached spreadsheet, graphs, and text.

Narrative: Calculations were based on the average area per farm (100, 500, and 800 ac per farm for the categories small, medium, and large farms for Pennsylvania dairies), the average area per cow (1.15 acres per cow), and the estimated funds allocated per producer (\$75k, \$141k, and \$259k for small, medium and large farms, respectively). Producers, area, and corresponding number of heads were added through the timeline of the project. Recruitments starts in year one, and proceed through year 3, as producers enter the project in 3 separate cohorts in Q4 of Y1, Y2, and Y3. Area, number of head, and funds are incrementally added every quarter at a rate of 1/8 per quarter, so that in two years, or funds allocated to a farm are spent.

The GHG benefits were estimated using the SIMAP methodology using a conservative approach. We assumed that emissions of methane will be reduced by 50% through feeding and use of supplements, and by 50% through manure management. We assumed that emission of nitrous oxide from the soil will be reduced by 50% through improved nutrient management. The SIMAP emission factors for methane are 209.79 kg CH<sub>4</sub>/head/year (or 5.87 mtCO<sub>2</sub>e/head) and 1.45 kg N<sub>2</sub>O/head/year (or 0.38 mtCO<sub>2</sub>eq/head/year).

Clearly, as producers that are not receiving technical assistance or funding adopt these practices, the benefits will increase proportionally.

Here is the summary of the results in table format, per year:

### **Cumulative – Y1 to Y5**

Year	Y1	Y2	Y3	Y4	Y5
Quarter	Q4	Q4	Q4	Q4	Q4
Number of producers involved	22	46	69	69	69
Number of underserved producers involved	6	13	20	20	20

Number of acres involved	2600	13225	24400	32500	32500
Number of heads involved (if applicable)	2260	11496	21211	28252	28252
Dollars provided to producers	\$440,000	\$2,600,625	\$6,166,125	\$9,320,000	\$10,649,000
GHG Benefits (Metric Tons of CO2e Reduced or Sequestered)	7,072	106,693	327,099	658,691	1,012,315

**Per quarter – Year 1**

Year	Y1	Y1	Y1	Y1
Quarter	Q1	Q2	Q3	Q4
Number of producers involved	0	0	0	22
Number of underserved producers involved	0	0	0	6
Number of acres involved	0	0	0	2750
Number of heads involved (if applicable)	0	0	0	2391
Dollars provided to producers	\$0	\$0	\$0	\$447,250
GHG Benefits (Metric Tons of CO2e Reduced or Sequestered)	0	0	0	7,481

**Per quarter – Year 2**

Year	Y2	Y2	Y2	Y2
Quarter	Q1	Q2	Q3	Q4
Number of producers involved	22	22	22	45
Number of underserved producers involved	6	6	6	13
Number of acres involved	5500	8250	11000	13775
Number of heads involved (if applicable)	4782	7173	9564	11977
Dollars provided to producers	\$894,500	\$1,341,750	\$1,789,000	\$2,692,875
GHG Benefits (Metric Tons of CO2e Reduced or Sequestered)	22,444	44,889	74,816	112,294

**Per quarter – Year 3**

Year	Y3	Y3	Y3	Y3
Quarter	Q1	Q2	Q3	Q4
Number of producers involved	45	45	45	70
Number of underserved producers involved	13	13	13	20
Number of acres involved	16550	19325	22100	25200
Number of heads involved (if applicable)	14390	16803	19216	21911

Dollars provided to producers	\$3,596,750	\$4,500,625	\$5,404,500	\$6,366,625
GHG Benefits (Metric Tons of CO2e Reduced or Sequestered)	157,323	209,903	270,034	338,598

#### Per quarter – Year 4

Year	Y4	Y4	Y4	Y4
Quarter	Q1	Q2	Q3	Q4
Number of producers involved	70	70	70	70
Number of underserved producers involved	20	20	20	20
Number of acres involved	28300	31400	34500	34500
Number of heads involved (if applicable)	24606	27301	29996	29996
Dollars provided to producers	\$7,328,750	\$8,290,875	\$9,253,000	\$9,758,500
GHG Benefits (Metric Tons of CO2e Reduced or Sequestered)	415,595	501,026	594,890	688,754

#### Per quarter – Year 5

Year	Y5	Y5	Y5	Y5
Quarter	Q1	Q2	Q3	Q4
Number of producers involved	70	70	70	70
Number of underserved producers involved	20	20	20	20
Number of acres involved	34500	34500	34500	34500
Number of heads involved (if applicable)	29996	29996	29996	29996
Dollars provided to producers	\$10,264,000	\$10,769,500	\$11,275,000	\$11,275,000
GHG Benefits (Metric Tons of CO2e Reduced or Sequestered)	782,618	876,482	970,346	1,064,210

#### Marketing Channels

Number of new marketing channels\*

Number of marketing channels\*

\*Note: Marketing channels can be a wide range e.g. selling to food processors, distributors, direct to consumer.

The project is set up to let interested parties “purchase” documented emissions. All industries that use milk in their products become, by definition, market channels given the need to address Scope 3 emissions. Consumers interested in purchasing milk products with a low carbon intensity becomes potential indirect purchasers via retailers. Aggregator interested

in trading carbon credits become potential market channels. Two of our partners have participated in carbon markets. Corporations in general become potential purchasers of carbon credits, for example airlines that attempt to reduce fuel carbon intensity (the procedure is regulated through an international framework). Countries like Norway that have a carbon credit procurement system become potential marketing channels. In fact, the proposition is to document emissions so that producer gain the ability to trade climate commodities in the most convenient market. We are offering to scope a tracing system that is reliable, which is the bottleneck of many carbon trading enterprises.

We specifically propose to expand and explore establishing (but are not limited to) the following marketing channels. This is a conservative and preliminary proposition.

**Food Processors:** Hershey, Turkey Hill, Kraft, and numerous regional milk, cheese, yoghurt, and ice cream producers such as Turner's, Schreiber Foods, Clover Farms, Galliker's Dairy, Harrisburg Dairies and other processors.

**Distributors:** Land O'Lakes and other (smaller) milk cooperatives from Pennsylvania such as Middlebury Cooperative Milk Producers Association, Inc., Farmers Union Milk Producers Association, Cumberland Valley Milk Producers, Keystone Family Farms LLC, Mount Joy Farmers Co-operative Association, Lancaster Organic Farmers Co-op.

**Retailers:** Ahold (Giant) and Whole Foods

**Direct to restaurants:** Restaurant chains like McDonalds, Wendy's, Burger King, and other outlets are attractive due their capacity to secure a market for commodities. They will be explored but not explicitly counted due to their large scale, a scale that exceeds the volume of credits managed by this pilot project. However, exploring these options it will be part of the market development activities.

**Commodity Brokers:** Red Barn Trading (associated to our partner Red Barn), Proagrica (associated to our partner but in a separate division other than tool development), and other brokers that we tentatively limit to one but the number will be likely much larger.

**Other – Corporate offsets:** Corporations procure now (airlines) or will in the future procure carbon credits (agricultural climate commodities) to offset their Scope 1 to 3 emissions. These include large retailers, financial institutions, and large tech companies. We commit to explore selling climate commodities to airlines and to explore selling credits to a new corporate partner to be established and that will not be food company.

**Other – Governments:** The government of Norway has a carbon credit procurement system. We will explore the possibility of selling carbon credits to this entity. Norway is but one example of a potentially growing market. Several governments are establishing e-systems to trace carbon credits, prominently Chile and Jordan. We will explore these new marketing channels in the second half of the project.

Integrated market strategies seek to obtain a premium price for milk based on the product climate intensity. Split market strategies will seek to obtain value from the climate commodity. Food processor, distributor, and retailer channels will be pursued for both integrated and split marketing strategies. Commodity broker, corporate offset channels, and government offset channels will be pursued for climate benefits (offsets) separately from milk to the extent it provides a better return to farmers.

Year	Y1	Y1	Y1	Y1	Y2	Y2	Y2	Y2	Y3	Y3	Y3	Y3	Y4	Y4	Y4	Y4	Y5	Y5	Y5	Y5
Quarter	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
<b>Number of new marketing channels* established</b>																				
Food Processors	0	2	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Distributors	0	0	1	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Retailers	0	0	0	0	0	0	1	1	1	1	2	2	2	2	2	2	2	2	2	2
Commodity Broker	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Other (Corporate Offsets)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Other (Governments)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>3</b>	<b>5</b>	<b>7</b>	<b>9</b>	<b>10</b>	<b>10</b>	<b>11</b>	<b>11</b>	<b>11</b>	<b>11</b>	<b>12</b>	<b>12</b>	<b>12</b>	<b>12</b>	<b>12</b>	<b>12</b>	<b>12</b>	<b>12</b>	<b>12</b>	<b>12</b>
<b>Number of marketing channels* expanded</b>																				
Food Processors	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Distributors	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Retailers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commodity Broker	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Other (Corporate Offsets)	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Other (Governments)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
<b>Total</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>

### Number of measurement tools utilized (by category):

Measurement tools that are equipment based: 4 methods that include: (start in Y1Q4)

Direct, continuous meas. on farms, eddy covariance method, CO<sub>2</sub> – 8 units (one method)

Direct, continuous meas. on farms, eddy covariance method, N<sub>2</sub>O – 8 units (one method)

Direct, continuous meas. on farms, eddy covariance method, CH<sub>4</sub> – 8 units (one method)

Direct, discrete measurements on farms, semi-automatic static chamber method, CO<sub>2</sub>, N<sub>2</sub>O, CH<sub>4</sub> – 24 units (minimum number) (one method)

*Note on measuring tools: measurements are always in pairs that compare intervention vs. no intervention, and include peripheral monitoring of environmental and management variable, to merge measurements with modeling and expand the data application domain.*

Measurement tools that are equipment based: 1 method

Experimental systems: modeling + remote sensing; CH<sub>4</sub> (one method) Starts in Y2Q4

*Note: This method combines monitoring using terrestrial and satellite-based measurements of wind profiles and other atmospheric properties; exploratory. Target is methane; all information is publicly available.*

Modeling (the tools below include multiple models): 5 methods

COMET-PLANNER (1 tool, all farms) starts in Y1Q4

IPCC protocol (when applicable) starts in Y1Q4

SIMAP protocol (when applicable) starts in Y1Q4

COMET-FARM (1 tool, all farms) starts in Y2Q4

CARAT-C (1 tool, all farms) This is a dynamic system that will continually learn through monitoring. Starts in Y2Q4

	Y1	Y1	Y1	Y1	Y2	Y2	Y2	Y2	Y3	Y3	Y3	Y3	Y4	Y4	Y4	Y4	Y5	Y5	Y5	Y5
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
#Tools	0	0	0	7	7	7	7	10	10	10	10	10	10	10	10	10	10	10	10	10

**Other Required Benchmarks that may be quantitative or qualitative:**

**Outreach, training and other technical assistance**

Row 1 in table below. The initial Extension, education, and outreach activity will be to develop and deliver an outreach strategy to reach dairy farmers for participation in the program. This outreach strategy will be coordinated by the Penn State AEC and involve partners CDE, PDMP, Red Barn Consulting, and the Penn State Extension Dairy Team. The team will develop and disseminate outreach and marketing materials to Pennsylvania dairy farmers about program opportunities, relying upon partners CDE, PDMP, and Extension to achieve broad reach in core dairy pockets and throughout the Commonwealth. Additional, targeted outreach will be conducted through partner contacts with industry so that program diversity goals of small, medium, and large farms participants can be met. The AEC will



develop, coordinate, and maintain an internal list of candidate producers, with partners assigned to initial farm visits based on existing relationships and geographies. Farmers interested in the program after initial farm visits will be referred to CDE for enrollment in the program.

Row 2 in table below. The core activity to be undertaken with the producers recruited for the program is the establishment of the Climate Smart Dairy Teams which will develop the Climate Smart Plan (short for Climate-Smart Comprehensive Dairy Feeding Strategy and Nutrient Management Plan or CSCMP). Outreach and technical assistance will be coordinated by CDE through their successful model of a 'Dairy Teams' approach that, for CARAT, will be identified as Climate-Smart Dairy Teams (CSDT). Each producer under the program will work with one CSDT. These teams will include the producer's trusted advisors relevant to implementing climate-smart management and operations, including nutritionists, agronomists, consulting TSPs, and Penn State AEC/Extension Educators as appropriate. The team will work with the producer to design a climate-smart action plan. The CARAT partnership will develop streamlined and producer-friendly guidance for the implementation program. (Part of this paragraph was extracted from the original proposal.)

Rows 3 and 4 in table below. The Penn State Dairy Team from Penn State Extension, will develop Climate Smart Educational material to maintain a stream of activity, a record of learning, and a presence through the life time of the project.

Row 5 in table below. The climate smart educational activities will be conducted once a year (last row of the table below). The Penn State extension team will hold this meeting taking advantage of the concentration of producers and convenient time of the year during the August Ag Progress Days. Participating farmers will be invited to share their experiences.

X = milestone in progress or activity in the timeline

M = reach milestone

Year	1				2				3				4				5			
Quarter	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>Extension, Education, and Outreach</b>																				
Climate Smart Management Plans	X	X	X	M	X	X	X	M	X	X	X	M								
Climate Smart Educational Materials - Technologies	X	X	X	M	X	X	X	M	X	X	X	M	X	X	X	M	X	X	X	M
Climate Smart Education Materials - Markets	X	X	X	M	X	X	X	M	X	X	X	M	X	X	X	M	X	X	X	M
Climate Smart Educational Activities and Annual Mtg	X	X	M	X	X	X	M	X	X	X	M	X	X	X	X	M	X	X	X	M

**Other MMRV and supply chain traceability attributes**

The traceability of the climate commodities generated will be scoped in the first two years of the project by working with Proagrica. Their current farmer-oriented tool Farm Rite works on the basis of a field that needs to be associated with geographic coordinates. All emissions and emission reductions will be tailored to a land unique through a unique ID. The starting point of the project will be nitrous oxide due and nutrient management (as the current tool structure has all components in place for calculations and tracing. Methane will be developed in parallel. Another data tracing structure will be developed by Penn State and the banner of CARAT-C, a tool meant to store information and improve in perpetuity.

Proagrica = PA

	Y1	Y1	Y1	Y1	Y2	Y2	Y2	Y2	Y3	Y3	Y3	Y3	Y4	Y4	Y4	Y4	Y5	Y5	Y5	Y5
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
PA	x	X	x	x	x	x	x	x												
Carat-C	x	X	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

**Other measurements of work related to marketing of commodities**

Lead by Penn State, CARAT partners will study the conditions that will facilitate the production and sale of climate-smart dairy commodities. This work will be directly related to the establishment and development of marketing channels and will provide a theoretical and practical underpinning to the establishment of these markets.

	Year 1				Year 2				Year 3				Year 4				Year 5			
	Quarter 1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<b>Market development</b>																				
Identify market conditions for production and sale of climate-smart dairy commodities, i.e, those that give farmers and other dairy supply chain participants sufficient financial incentives to adopt.	X	X	X	X	X	X	X	X	M	X	X	X	M							
Identify non-financial barriers to farm adoption of climate-smart practices and strategies for overcoming those barriers.	X	X	X	X	X	X	X	X	M	X	X	X	M							
Develop a generic marketing plan for climate-smart dairy products, including target market segments, marketing and promotion strategies, and pricing, positioning, and branding.					X	X	X	X	X	X	X	X	M							
Pilot test and refine the generic marketing plan with selected Pennsylvania dairy processors.																X	X	X	X	M

**Demonstrated engagement of major partners**

PSU: Penn State

CDE: Center for Dairy Excellence

PDMP: Professional Dairy Managers of Pennsylvania

RBC: Red Barn Consulting

PA: Proagrica

All partners are committed to the project for five years except Proagrica whose work will be completed in the first two years of the project.

	Y1	Y1	Y1	Y1	Y2	Y2	Y2	Y2	Y3	Y3	Y3	Y3	Y4	Y4	Y4	Y4	Y5	Y5	Y5	Y5
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
PSU	x	X	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
CDE	x	X	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
PDMP	x	X	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
RBC	x	X	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
PA	x	X	x	x	x	x	x	x												



**Climate smart technologies employed (if applicable)**

Key climate smart technologies are encapsulated in feed and manure management and nutrient management. They are applicable through the lifetime of the project and follow the allocation of funds and technical assistance to producers. The specific combination of climate smart practices is tailored to each farm but given methane's dominance, it is expected that more than 80% of the expenditures will attend reducing methane emissions. A complete list of practices and practice codes are explicitly presented below, with the clarification that new technologies will be actively scrutinized and incorporated if valuable and authorized for use (e.g. ruminal methane inhibitors).

**Climate-Smart Practices and Limitations**

Climate-Smart practices under this grant shall be limited to the following practices:

<b>NRCS Practice Code</b>	<b>Practice Name</b>
590	Nutrient Management
592	Feed Management
379	Forest Farming
393	Filter Strip
313	Waste Storage Facility
367	Roof and Covers
371	Air Filtration and Scrubbing*
372	Combustion System Improvement
317	Composting Facility
318	Short-Term Storage of Animal Waste and By-Products
340	Cover Crop
329	Residue Tillage Management, No-Till
345	Residue Tillage Management, Reduced Till
328	Conservation Crop Rotation
512	Pasture and Hay Planting
528	Prescribed Grazing
332	Contour Buffer Strips

\*Only in combination with other climate smart practices listed above

All practices applied under this grant will follow NRCS practice standards unless noted below:

N/A



Partnerships for  
Climate-Smart  
Commodities  
Data Dictionary  
for Recipients  
February 2023  
Version 1.0

---

## Table of Contents

Overview of Reporting Requirements .....	2
Project Summary .....	3
Partner Activities .....	4
Marketing Activities .....	5
Producer Enrollment .....	6
Field Enrollment .....	7
Farm Summary .....	8
Field Summary .....	9
GHG Benefits - Alternate Modeled .....	10
GHG Benefits - Measured .....	11
Additional Environmental Benefits .....	12
Supplemental Data Submission .....	13
Data Descriptions .....	14
Unique IDs .....	14
Project Summary .....	15
Partner Activities .....	20
Marketing Activities .....	25
Producer Enrollment .....	30
Field Enrollment .....	38
CSAF Practice Sub-questions .....	44
Farm Summary .....	45
Field Summary .....	49
GHG Benefits - Alternate Modeled .....	57
GHG Benefits - Measured .....	61
Additional Environmental Benefits .....	65
CSAF Practice Sub-questions .....	75
Appendix A: Climate-smart Agriculture and Forestry Practices .....	83
All NRCS Practice Standards (not limited to climate-smart practices) .....	83
Other CSAF Practices .....	85
Appendix B: Commodity List .....	86



## Overview of Reporting Requirements

Grant recipients are required to submit reports to document their performance under the *Partnerships for Climate-Smart Commodity* funding opportunity. These submissions will be required to use the Microsoft Excel workbook templates provided by USDA. The workbooks contain a series of worksheets that collect data in a standardized format to ensure data quality and allow for aggregation and summary of this information. The entire workbook must be submitted quarterly, with updates to all applicable worksheets. This guide is divided into three sections. The *Overview of Reporting Requirements* section summarizes the layout of the reporting workbook and presents the data elements included in each worksheet. It also describes additional documents that must be submitted to supplement the performance reports. The *Data Definitions* section provides descriptions and allowable response options for each data element. The guide also indicates whether each data element is required, applicable at times, or optional; as well as how frequently each data element must be updated. Finally, the *Appendices* contain practice and commodity lists that will be used for these reports. Reporting is necessary for USDA oversight of this effort. The data elements required for inclusion in the quarterly performance reports allow USDA to conduct selected audits to review whether producers are receiving federal funds from multiple sources for the same purpose; to determine whether GHG benefits from implementation of climate-smart agriculture and forestry (CSAF) practices are being estimated accurately; and for other purposes deemed appropriate by USDA.

The reporting worksheets collect information at four levels: project, partner, producer, and field. Descriptions of each level:

**Project level:** Information about activities and impacts at a whole project/aggregate level (i.e., reflecting all activities under the grant agreement). Some project-level reporting is further subdivided by commodity type or a combination of commodity and CSAF practice(s) (commodity x practice).

**Partner level:** Information about activities related to a single organization (recipient, subrecipient, contractor, or other partner) within a project.

**Producer level:** Information about individual producers who have one or more farms enrolled in a project.

**Field level:** Information about individual fields enrolled in a project.

Certain data elements are required to be reported for each producer and field enrolled in a project. In order to minimize the burden associated with data collection and to enable USDA to match data to existing records, these producer- and field-specific records must use the producer's established FSA Farm, Tract and Field IDs, and report the State and County associated with the Farm ID. Associated data entered in conjunction with these data elements, such as Producer Name, must match the data contained in the customer's Business Partner record, and the Farm Operating Plan in Business File for that Farm ID. Disclosure of this information is protected under Section 1619 of the Food, Conservation, and Energy Act of 2008 (PL 110- 246), 7 U.S.C. 8791. Additionally, Departmental Regulation 4370-001 provides USDA's policies for collecting demographic data, including race, ethnicity and gender. Providing demographic information is voluntary and at the discretion of the customer. Demographic information is used by USDA for statistical purposes only and will not be used to determine an applicant's eligibility for programs or services for which they apply.

**Note:** For purposes of this guide, "farm" refers to the operation from which climate-smart commodities are produced and may represent farms, ranches, forests or other operations. Similarly, "field" refers to the individual land units at which climate-smart practices are being implemented to produce climate-smart commodities and may represent lots, farmsteads or other units, depending on the type of operation and commodity. The use of "Farm", "Tract" and "Field" align with the FSA definitions; for example, "A field is a part of a farm that is separated from the balance of the farm by a permanent boundary, such as; fences, permanent waterways, woodlands, croplines in cases where farming practices make it probable that this cropline is not subject to change, and other similar features."

The following tables list the data elements included in each reporting worksheet, along with a brief description of each item.

### Project Summary

These data will be collected about each project. Cumulative results are reported each quarter. Report last quarter's entry if there has been no change in this quarter.

Table 1. Project Summary elements

<b>Data element name</b>	<b>Description</b>	<b>Frequency</b>
Commodity type	Type of commodity(ies) incentivized by the project	Quarterly
Commodity sales	Indicates sales of the commodity(ies) related to the project occurred this quarter	Quarterly
Farms enrolled	Indicates enrollment activities occurred this quarter	Quarterly
GHG calculation methods	Methods used to calculate greenhouse gas (GHG) benefits	Quarterly
GHG cumulative calculation	Method used to calculate cumulative GHG benefits	Quarterly
Cumulative GHG benefits	Whole project estimate of total GHG (CO <sub>2</sub> e) emission reductions	Quarterly
Cumulative carbon stock	Whole project estimate of total carbon sequestration	Quarterly
Cumulative CO <sub>2</sub> benefit	Whole project estimate of total CO <sub>2</sub> emission reductions	Quarterly
Cumulative CH <sub>4</sub> benefit	Whole project estimate of total CH <sub>4</sub> emission reductions	Quarterly
Cumulative N <sub>2</sub> O benefit	Whole project estimate of total N <sub>2</sub> O emission reductions	Quarterly
Offsets produced	Amount of carbon offsets produced by project	Quarterly
Offsets sale	Name of marketplace where carbon offsets were sold	Quarterly
Offsets price	Price of carbon in offset sales	Quarterly
Insets produced	Amount of carbon insets produced by project	Quarterly
Cost of on-farm TA	Cost of on-farm technical assistance (TA) provided to producers	Quarterly
MMRV cost	Cost of measurement, monitoring, reporting, and verification (MMRV) activities	Quarterly
GHG monitoring method	Methods used by project to monitor GHG benefits (up to 5)	Quarterly
GHG reporting method	Methods used by project to report on GHG benefits (up to 5)	Quarterly
GHG verification method	Methods used to verify GHG benefits (up to 5)	Quarterly




**Partnerships for Climate-Smart Commodities Data Dictionary for Recipients**  
 February 2023

### Partner Activities

These data will be collected at the project level. Each row in this worksheet will represent one organization involved in the project, including the recipient and all contributing partners. A partner is any organization that is receiving project funds or providing matching contributions (funds or in-kind contributions) to the project. While the recipient must complete one row for their own organization, not all data elements apply to the recipient. These exceptions are noted in the detailed descriptions of the specific elements in the *Data Definitions* section of this guide. Data are reported cumulatively each quarter. Report last quarter's entry if there has been no change in this quarter.

Table 2. Partner Activities elements

<b>Data element name</b>	<b>Description</b>	<b>Frequency</b>
Partner ID	Unique ID for each partner	One-time
Partner name	Name of partner organization	One-time
Partner type	Type of organization	One-time
Partner POC	Partner point of contact name	As applicable
Partner POC email	Partner point of contact email	As applicable
Partnership start date	Start of partnership on project	One-time
Partnership end date	End of partnership on project	As applicable
New partnership	Indicator for partner organizations that have no prior work with the recipient	As applicable
Partner total requested	Total amount requested to date by partner from recipient	Quarterly
Total match contribution	Total amount of match contribution by partner to date	Quarterly
Total match incentives	Total amount of match contribution by partner for incentives	Quarterly
Match type	Top 3 types of match contribution by partner, other than incentives	Quarterly
Match amount	Value of match contributions by type	Quarterly
Training provided	Top 3 types of training provided to the partner through project	Quarterly
Activity by partner	Top 3 types of activities provided by this partner to producers or other partners	Quarterly
Activity cost	Approximate cost per activity type provided by partner to producers or other partners	Quarterly
Products supplied	Names of products supplied to producers as part of project activities or incentives	Quarterly
Product source	Supplier or source of products supplied to producers as part of project activities or incentives	Quarterly

### Marketing Activities

These data will be collected at the project level. Each row in this worksheet will correspond to one commodity for which the project enrolls fields and one marketing channel used to sell that commodity by the project or producers enrolled in the project. Data are reported for the current quarter and are not cumulative. If no sales of the commodity were reported during a quarter, do not complete this worksheet for that quarter.

Table 3. Marketing Activities elements

<b>Data element name</b>	<b>Description</b>	<b>Frequency</b>
Commodity type	Type of commodity incentivized by the project	Quarterly
Marketing channel type	Type of marketing channels used	Quarterly
Number of buyers	Number of buyers per marketing channel	Quarterly
Names of buyers	Names of buyers in the marketing channel	Quarterly
Marketing channel geography	Geography of marketing channel	Quarterly
Value sold	Value of commodity sold by marketing channel	Quarterly
Volume sold	Volume of commodity sold by marketing channel	Quarterly
Price premium	Price premium of commodity by marketing channel	Quarterly
Price premium to producer	Percent of price premium that goes to the producer	Quarterly
Product differentiation method	Top 3 types of product differentiation methods used	Quarterly
Marketing method	Top 3 types of marketing methods used	Quarterly
Marketing channel identification method	Top 3 ways marketing channel was identified	Quarterly
Traceability method	Top 3 types of supply chain traceability methods used	Quarterly



### Producer Enrollment

These data will be collected at the producer level about each farm enrolled in the project. In this worksheet, each row will correspond to one farm that has at least one field enrolled in the project. Data are reported when a producer first enrolls one or more fields in the project. If a producer is enrolled in the project for multiple years, review the farm characteristics each time a new contract is signed and provide any necessary updates. The quarterly submission should contain information about each farm initially enrolled in the project during that quarter and for updates to farms that have re-enrolled during that quarter, as applicable. If no farms are enrolled during that quarter, do not complete this worksheet for that quarter.

Table 4. Producer Enrollment elements

<b>Data element name</b>	<b>Description</b>	<b>Frequency</b>
Farm ID	Unique Farm ID assigned by FSA	
State or territory	State name (must match FSA farm enrollment data)	
County of residence	County name (must match FSA farm enrollment data)	
Producer data change	Indicator that producer data was updated at re-enrollment	As applicable
Producer start date	Contract start date	Enrollment
Producer name	Name of primary operator	Enrollment
Underserved status	Indicator the primary operator is considered underserved and/or a small producer	Enrollment
Total area	Total area of enrolled operation	Annual
Total crop area	Total crop area in enrolled operation enrolled	Annual
Total livestock area	Total livestock confinement, pasture and rangeland in enrolled operation	Annual
Total forest area	Total forest area in enrolled operation	Annual
Livestock type	Top 3 types of livestock on enrolled operation	Annual
Livestock head	Total livestock currently managed (by type)	Annual
Organic farm	Indicator that part of the farm is certified or transitioning organic	Annual
Organic fields	Indicator that any of the enrolled fields are certified or transitioning organic	Annual
Producer motivation	Motivation for participation	Annual
Producer outreach	Top 3 types of outreach provided to producer	Annual
CSAF experience	Indicator of prior implementation of CSAF practices at this farm	Annual
CSAF federal funds	Indicator of prior receipt of federal funds for CSAF practices	Annual
CSAF state or local funds	Indicator of prior receipt of state funds for CSAF practices	Annual
CSAF nonprofit funds	Indicator of prior receipt of nonprofit funds for CSAF practices	Annual
CSAF market incentives	Indicator of prior receipt of market incentives for CSAF practices	Annual

### Field Enrollment

These data will be collected about each field enrolled in the project. In this worksheet, each row corresponds to one field x commodity combination enrolled in the project. Generally, data are reported once for each field, at its initial enrollment. The quarterly submission should contain information about each field initially enrolled in the project during that quarter. If no fields are enrolled during that quarter, do not complete this worksheet for that quarter. If a field is enrolled for multiple years, any relevant changes, such as a new ID number or changes to the commodity or practice combinations should be entered in this worksheet during the quarter it is re-enrolled, or as applicable.

Table 5. Field Enrollment elements

<b>Data element name</b>	<b>Description</b>
Farm ID	Unique Farm ID assigned by FSA
Tract ID	Unique Tract ID assigned by FSA
Field ID	Unique Field ID assigned by FSA
State or territory of field	State name
Physical County of field	Physical county name must match FSA farm records
Prior Field ID	Previous Field ID when reconstitution of farm results in new Field IDs
Field data change	Indicator that field data has changed from initial enrollment
Contract start date	Start date of contract
Total field area	Size of enrolled field
Commodity category	Category of commodity(ies) produced
Commodity type	Type of commodity(ies) produced
Baseline yield	Average yield of commodity in 3 years prior to enrollment
Baseline yield location	Location for which baseline yield is provided
Field land use	Most common land use in field in past 3 years
Field irrigated	Most common irrigation type in field in past 3 years
Field tillage	Most common tillage in field in past 3 years
Practice past extent - farm	Extent of operation that implemented this practice prior to project enrollment
Field any CSAF practice	Indicator for prior CSAF practices in this field in past 3 years
Practice past use - this field	Indicator of prior use of this practice in this field in the past 3 years
Practice type	CSAF practice(s) that will be implemented in enrolled field (up to 7)
Practice standard	Organization that developed CSAF practice standard implemented in field
Planned practice implementation year	Year that practice is planned to be implemented
Practice extent	Area or number of animals for which practice is implemented
Follow-on questions	Follow-on questions by practice type (see Table 11)

### Farm Summary

These data will be collected about each farm enrolled in the project. In this worksheet, each row will correspond to one farm that has at least one field enrolled in the project. The quarterly submission should contain updates to any data elements that have changed for each farm enrolled in the project during that quarter. If there are no changes from the previous quarter, do not complete this worksheet for that quarter. Data are not cumulative.

Table 6. Farm Summary elements

<b>Data element name</b>	<b>Description</b>	<b>Frequency</b>
Farm ID	Unique Farm ID assigned by FSA	
State or territory	State name	
County of residence	County name	
Producer TA received	Type of technical assistance provided to producer	Quarterly
Producer incentive amount	Total financial incentive provided to the producer	Quarterly
Incentive reason	Top 4 reason(s) for financial incentives provided to producer	Quarterly
Incentive structure	Top 4 units on which financial incentives are structured	Quarterly
Incentive type	Top 4 type(s) of financial incentives provided to producer	Quarterly
Payment on enrollment	Extent of payment provided to producer upon enrollment	Quarterly
Payment on implementation	Extent of payment provided to producer upon implementation of CSAF practices	Quarterly
Payment on harvest	Extent of payment provided to producer upon harvest or slaughter	Quarterly
Payment on MMRV	Extent of payment provided to producer upon reporting or verification	Quarterly
Payment on sale	Extent of payment provided to producer upon sale of commodity	Quarterly



### Field Summary

These data will be collected about each field enrolled in the project for a commodity x practice(s) combination. In this worksheet, each row will correspond to one field x commodity x practice(s) combination enrolled in the project. Data for each field will be reported quarterly and are not cumulative. Report data for any elements that have an update in that quarter. Greenhouse gas benefit estimates must be entered upon practice completion or annually, as appropriate. If there are no changes from the previous quarter, do not complete this worksheet for that quarter. This worksheet includes a section to report the “official” estimate of GHG benefits – amounts of greenhouse gas emissions reduced and carbon sequestered – for the field. These quantities refer to the estimates that are used to calculate the project’s aggregate impact (reported in Table 1). Tables 8 and 9 are used to report alternate estimates of the field-level GHG benefits when additional methods are used to model (Table 8) or measure (Table 9) these impacts. Any field that can use COMET-Planner must submit those results, either as the official or alternate model.

Table 7. Field Summary elements

<b>Data element name</b>	<b>Description</b>	<b>Frequency</b>
Farm ID	Unique Farm ID assigned by FSA	
Tract ID	Unique Tract ID assigned by FSA	
Field ID	Unique Field ID assigned by FSA	
State or territory of field	State name	
County of field	County name	
Commodity type	Type of commodity produced from field	Quarterly
Practice type	Type of practice(s) incentivized in field (up to seven)	Quarterly
Date practice complete	Date that practice implementation is certified complete	Quarterly
Contract end date	End date of contract	Quarterly
MMRV assistance provided	Indicator that MMRV assistance is provided to field	Quarterly
Marketing assistance provided	Indicator that marketing assistance provided for commodity from field	Quarterly
Incentive per acre or head	Indicator that a per acre/head incentives is provided for the CSAF practice(s) on this field	Quarterly
Field commodity value	Value of commodity produced from field	Quarterly
Field commodity volume	Volume of commodity produced from field	Quarterly
Cost of implementation	Total cost of practice implementation in field	Quarterly
Cost coverage	Percent of total cost of implementation of practice covered by project incentives	Quarterly
Field GHG monitoring	Methods used to monitor GHG benefits in field (up to 3)	Quarterly
Field GHG reporting	Methods used to report on GHG benefits for field (up to 3)	Quarterly
Field GHG verification	Methods used to verify GHG benefits for field (up to 3)	Quarterly
Field GHG calculations	Methods used to calculate GHG benefits for field	Quarterly
Field official GHG calculation	Method used to calculate official GHG benefits for field	Quarterly
Field official GHG ER	Official estimate of total GHG emission reductions for field	Quarterly
Field official carbon stock	Official estimate of total carbon sequestration for field	Quarterly
Field official CO2 ER	Official estimate of total CO2 emission reductions for field	Quarterly
Field official CH4 ER	Official estimate of total CH4 emission reductions for field	Quarterly
Field official N2O ER	Official estimate of total N2O emission reductions for field	Quarterly
Field offsets produced	Amount of carbon offsets produced in field	Quarterly
Field insets produced	Amount of carbon insets produced in field	Quarterly
Other field measurements	Indicator that field data was collected for reasons other than GHG benefit estimation	Quarterly

### GHG Benefits - Alternate Modeled

If greenhouse gas benefits are modeled for the same field using multiple methods, the results for the alternate models are reported in this worksheet. The “alternate” models refer to those model results that were not used in the calculation of the project’s aggregate impact (as reported in Table 1). Any field that can use COMET-Planner must submit those results, either as the official or alternate model. These data will be collected about the modeled GHG benefits for each field x commodity x practice(s) combination. In this worksheet, each row will correspond to one field enrolled in the project. Data are not cumulative. Each quarterly submission should include information for all fields that have new modeled data. Greenhouse gas benefit estimates must be entered upon practice completion or annually, as appropriate.

Table 8. GHG Benefits – Alternate Modeled elements

<b>Data element name</b>	<b>Description</b>	<b>Frequency</b>
Farm ID	Unique Farm ID assigned by FSA	
Tract ID	Unique Tract ID assigned by FSA	
Field ID	Unique Field ID assigned by FSA	
State or territory of field	State name	
County of field	County name	
Commodity type	Type of commodity(ies) produced from the field (up to 6)	Annual
Practice type	Type of practice(s) incentivized in field (up to 7)	Annual
GHG model	Model used to calculate GHG benefits	Annual
Model start date	Start date of model run	Annual
Model end date	End date of model run	Annual
Total GHG benefits estimated	Estimate of total GHG benefits for field	Annual
Total carbon stock estimated	Estimate of total change in carbon stock for field	Annual
Total CO2 estimated	Estimate of total CO2 emission reductions for field	Annual
Total CH4 estimated	Estimate of total CH4 emission reductions for field	Annual
Total N2O estimated	Estimate of total N2O emission reductions for field	Annual

### GHG Benefits - Measured

Projects must report the results of any carbon stock or greenhouse gas emission measurements in this worksheet. These data will be collected at the field level. Each row will represent a separate measurement method used to calculate GHG benefits for a given field. Data are reported once per year of measurement and are not cumulative. Each quarterly submission should include information for any field for which there are new soil samples or new calculations of annual GHG benefits based on actual measurements.

Table 9. GHG Benefits - Measured data elements

<b>Data element name</b>	<b>Description</b>	<b>Frequency</b>
Farm ID	Unique Farm ID assigned by FSA	
Tract ID	Unique Tract ID assigned by FSA	
Field ID	Unique Field ID assigned by FSA	
State	State name	
County	County name	
GHG measurement method	Method of measurement	Annual
Lab name	Entity that conducted analysis	Annual
Measurement start date	Start date of measurements	Annual
Measurement end date	End date of measurements	Annual
Total CO <sub>2</sub> reduction calculated	Calculation of total CO <sub>2</sub> reduction	Annual
Total carbon stock change calculated	Calculation of change in carbon stock	Annual
Total CH <sub>4</sub> reduction calculated	Calculation of total CH <sub>4</sub> reduction	Annual
Total N <sub>2</sub> O reduction calculated	Calculation of total N <sub>2</sub> O reduction	Annual
Soil sample result	Numeric result from soil sample	Annual
Measurement type	Type of analysis conducted	Annual



### Additional Environmental Benefits

Projects that track additional environmental benefits (e.g., water quality improvements) from enrolled fields report results in this worksheet. These data will be collected about each field. Each row in this worksheet will correspond to an enrolled field. Data are not cumulative. Estimates of environmental benefits must be entered upon practice completion or annually, as appropriate.

Table 10. Additional Environmental Benefits elements

<b>Data element name</b>	<b>Description</b>	<b>Frequency</b>
Farm ID	Unique Farm ID assigned by FSA	
Tract ID	Unique Tract ID assigned by FSA	
Field ID	Unique Field ID assigned by FSA	
State	State name	
County	County name	
Environmental benefits	Indicator that project tracks other environmental benefits	Annual
Reduction in nitrogen loss	Indicator that project tracks reductions in nitrogen loss	Annual
Amount	Amount	Annual
Purpose	Purpose of tracking those co-benefits	Annual
Reduction in phosphorus loss	Indicator that project tracks reductions in phosphorus loss	Annual
Amount	Amount	Annual
Purpose	Purpose of tracking those co-benefits	Annual
Other water quality	Indicator that project tracks other water quality improvements	Annual
Type	Type of water quality metric being tracked	Annual
Amount	Amount	Annual
Purpose	Purpose of tracking those co-benefits	Annual
Water quantity	Indicator that project tracks reduced water use	Annual
Amount	Amount	Annual
Purpose	Purpose of tracking those co-benefits	Annual
Reduced erosion	Indicator that project tracks reductions in soil erosion	Annual
Amount	Amount	Annual
Purpose	Purpose of tracking those co-benefits	Annual
Reduced energy use	Indicator that project tracks reductions in energy use	Annual
Amount	Amount	Annual
Purpose	Purpose of tracking those co-benefits	Annual
Avoided land conversion	Indicator that project tracks reductions in land conversion	Annual
Amount	Amount	Annual
Purpose	Purpose of tracking those co-benefits	Annual
Improved wildlife habitat	Indicator that project tracks improvements in wildlife habitat	Annual
Amount	Amount	Annual
Purpose	Purpose of tracking those co-benefits	Annual

### Supplemental Data Submission

#### Project MMRV Plan

##### *Definition of MMRV elements:*

**Measurement:** Quantification of the greenhouse gas benefits (reduction or capture) using mathematical models and/or direct physical measurements in the field

**Monitoring:** Ongoing review and confirmation that the climate-smart practice has been implemented according to the agreed upon standard and documentation of any changes in the site, implementation, or GHG emissions impacts over time

**Reporting:** Documenting and sharing monitoring and measurement results with project partners, the recipient, and any third-party verification organization

**Verification:** Independent confirmation that measurement, monitoring and reporting information are complete, accurate and reliable.

Projects must submit an MMRV plan that includes details about how each of the following are addressed:

- Quantification approach, including:
  - GHG models used
  - GHG measurement plan (if applicable)
  - Approach to quantifying additional environmental benefits, if applicable (e.g., water quality, habitat)
- Verification approach:
  - Compliance criteria
  - Verification plan/methodology
- Approach to ensuring:
  - Additionality
  - Permanence
  - Leakage
  - Impacts of weather
- Plan for non-compliance

If the project is using a specific MMRV methodology or approach developed by the recipient, a project partner, or an outside organization, the project can submit documentation associated with the methodology as long as the documentation addresses each of the above categories.

If the project is tracking other environmental benefits (as reported in the *Additional Environmental Benefits* worksheet), include a description of the methodology and tools used to track and report on these benefits.

#### Field modeled GHG benefit reports

Results from any models besides COMET-Planner used to estimate GHG benefits must also be submitted as a separate report. This includes projects running COMET-Farm. The full results of any model can be submitted in the native/standard format generated by the modeling tool and must include the following Unique IDs in the report or in the file name: State, County, Farm ID, Tract ID, Field ID.

#### Field direct measurement results

For any direct physical measurements in the field, measurement results must be submitted as a separate report and must include the following Unique IDs in the report or in the file name: State, County, Farm ID, Tract ID, Field ID. Measurement results reports must include the name of the equipment used for sampling or data collection, the name of the lab that analyzed the data, and the analytical method used.

Sample report types include soil analysis reports, summarized results of portable emissions analyzers or flux towers, water quality analyses, and plant species counts. These could be collected for the purposes of determining GHG emission reductions or carbon sequestration amounts, for calibration of tools or models, for tracking other environmental benefits, or for other reasons.



### Data Descriptions

This section provides descriptions and allowable response options for each data element. The guide also indicates whether each data element is required, applicable at times, or optional; as well as how frequently each data element must be updated.

### Unique IDs

**Project ID:** Unique ID at the project level – “Award Identifying Number” shown on award documentation

**Partner ID:** Unique ID at the partner level – use EIN; if no EIN, a unique ID will be assigned for use in these reports

**State or territory of operation:** State or territory name

**County of operation:** Physical county name

**Farm ID:** Unique ID at the operation level assigned by Farm Service Agency (FSA)

**Tract ID:** Unique ID at the tract level assigned by FSA

**Field ID:** Unique ID at the field level assigned by FSA

### Project Summary

---

#### Commodity type

<b>Data element name:</b> Commodity type	<b>Reporting question:</b> What climate-smart commodity types are produced by this project?
<b>Description:</b> Type of commodity incentivized by the project. These commodities include those for whom farmers are directly receiving incentives or other types of marketing support. See full list of commodity options in Appendix B. List one commodity per row.	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b> FSA commodity list
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Project	<b>Data collection frequency:</b> Quarterly

---

#### Commodity sales

<b>Data element name:</b> Commodity sales	<b>Reporting question:</b> Did project activities result in sales this quarter of the commodity(ies) produced by this project?
<b>Description:</b> Indicator of sales of commodity(ies) related to project activities. If sales are reported, complete the <i>Marketing Activities</i> worksheet (Table 3) as part of the quarterly performance report.	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b> <ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Project	<b>Data collection frequency:</b> Quarterly

---

#### Farms enrolled

<b>Data element name:</b> Farms enrolled	<b>Reporting question:</b> Did the project enroll any producers or fields this quarter?
<b>Description:</b> Indicator that the project enrolled producers or fields. If enrollment activities occurred this quarter, complete the <i>Producer Enrollment</i> and <i>Field Enrollment</i> worksheets (Tables 4 and 5) as part of the quarterly performance report.	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b> <ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Project	<b>Data collection frequency:</b> Quarterly

---

#### GHG calculation methods

<b>Data element name:</b> GHG calculation methods	<b>Reporting question:</b> What methods is the project using to calculate GHG benefits?
<b>Description:</b> List the way(s) that GHG benefits are being measured and calculated by the project this quarter.	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b> <ul style="list-style-type: none"> <li>• Models</li> <li>• Direct field measurements</li> <li>• Both</li> </ul>
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Project	<b>Data collection frequency:</b> Quarterly

---

---

**GHG cumulative calculation**


---

<b>Data element name:</b> GHG cumulative calculation	<b>Reporting question:</b> What method(s) was used to calculate the total cumulative GHG benefits reported here?
<b>Description:</b> List the method(s) that was used to calculate the total cumulative GHG benefits reported by the project this quarter.	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b> <ul style="list-style-type: none"> <li>• Models</li> <li>• Direct field measurements</li> <li>• Both</li> </ul>
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Project	<b>Data collection frequency:</b> Quarterly

---

**Cumulative GHG benefits**


---

<b>Data element name:</b> Cumulative GHG benefits	<b>Reporting question:</b> What are the project's estimated total GHG emission reductions (CO <sub>2</sub> eq) to date?
<b>Description:</b> Total cumulative estimated greenhouse gas emission reductions from practice implementation. This is updated quarterly. If there are no changes, enter the same number as the previous quarter.	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Metric tons CO <sub>2</sub> eq	<b>Allowed values:</b> 0-10,000,000
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Project	<b>Data collection frequency:</b> Quarterly

---

**Cumulative carbon stock**


---

<b>Data element name:</b> Cumulative carbon stock	<b>Reporting question:</b> How much carbon has the project sequestered to date?
<b>Description:</b> Estimated total cumulative change in carbon stock based on practice implementation. This is updated quarterly. If there are no changes, enter the same numbers as the previous quarter. Conversion rate is one ton of carbon = 3.67 tons of CO <sub>2</sub> eq.	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Metric tons CO <sub>2</sub> eq	<b>Allowed values:</b> 0-10,000,000
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Project	<b>Data collection frequency:</b> Quarterly

---

**Cumulative CO<sub>2</sub> benefit**


---

<b>Data element name:</b> Cumulative CO <sub>2</sub> benefit	<b>Reporting question:</b> What are the project's estimated total cumulative CO <sub>2</sub> emission reductions to date?
<b>Description:</b> Estimated total cumulative carbon dioxide emission reductions based on practice implementation. This is updated quarterly. If there are no changes, enter the same number as the previous quarter.	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Metric tons CO <sub>2</sub>	<b>Allowed values:</b> 0-10,000,000
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Project	<b>Data collection frequency:</b> Quarterly

---

**Cumulative CH<sub>4</sub> benefit**


---

<b>Data element name:</b> Cumulative CH <sub>4</sub> benefit	<b>Reporting question:</b> What are the project's estimated total CH <sub>4</sub> emission reductions to date?
<b>Description:</b> Estimated total cumulative methane reduction based on practice implementation. This is updated quarterly. If there are no changes, enter the same numbers as the previous quarter. Conversion rate is one ton of CH <sub>4</sub> = 25 tons of CO <sub>2</sub> eq.	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Metric tons CH <sub>4</sub> reduced in CO <sub>2</sub> eq	<b>Allowed values:</b> 0-10,000,000
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Project	<b>Data collection frequency:</b> Quarterly

---



---

**Cumulative N2O benefit**


---

<b>Data element name:</b> Cumulative N2O benefit	<b>Reporting question:</b> What are the project's estimated total N2O emission reductions to date?
<b>Description:</b> Estimated total cumulative nitrous oxide reduction based on practice implementation. This is updated quarterly. If there are no updated numbers enter the same number as the previous quarter. Conversion rate is one ton of N <sub>2</sub> O = 298 tons of CO <sub>2</sub> eq.	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Metric tons N2O reduced in CO <sub>2</sub> eq	<b>Allowed values:</b> 0-10,000,000
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Project	<b>Data collection frequency:</b> Quarterly

---

**Offsets produced**


---

<b>Data element name:</b> Offsets produced	<b>Reporting question:</b> How many carbon offsets have been produced in the project?
<b>Description:</b> Total carbon offsets produced by enrolled project fields during the quarter. Offsets are defined as having been verified and certified using an accepted standard and sold into the carbon marketplace.	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Metric tons CO <sub>2</sub> eq	<b>Allowed values:</b> 0-10,000,000
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Project	<b>Data collection frequency:</b> Quarterly

---

**Offsets sale**


---

<b>Data element name:</b> Offsets sale	<b>Reporting question:</b> To what marketplace(s) were carbon offsets sold?
<b>Description:</b> Marketplaces to which carbon offsets produced by enrolled project fields were sold. Offsets are defined as having been verified and certified using an accepted standard and sold into the carbon marketplace. List each marketplace name. Separate names with commas.	
<b>Data type:</b> Text	<b>Select multiple values:</b> NA
<b>Measurement unit:</b> Name	<b>Allowed values:</b> Text
<b>Logic:</b> Respond if >0 to 'Offsets produced'	<b>Required:</b> Yes
<b>Data collection level:</b> Project	<b>Data collection frequency:</b> Quarterly

---

**Offsets price**


---

<b>Data element name:</b> Offsets price	<b>Reporting question:</b> What was the average price of carbon received for offsets?
<b>Description:</b> Average price per metric ton paid for carbon offsets produced by enrolled project fields. Offsets are defined as having been verified and certified using an accepted standard and sold into the carbon marketplace.	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Dollars per metric ton	<b>Allowed values:</b> 0-500
<b>Logic:</b> Respond if >0 to 'Offsets produced'	<b>Required:</b> Yes
<b>Data collection level:</b> Project	<b>Data collection frequency:</b> Quarterly

---

**Insets produced**


---

<b>Data element name:</b> Insets produced	<b>Reporting question:</b> How many carbon insets have been produced in the project?
<b>Description:</b> Total carbon insets produced by enrolled fields during the quarter. Insets are defined as having been verified and certified using an accepted standard and accounted for within Scope 3 emissions for a firm.	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Metric tons CO <sub>2</sub> eq	<b>Allowed values:</b> 0-10,000,000
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Project	<b>Data collection frequency:</b> Quarterly

---

---

**Cost of on-farm TA**


---

<b>Data element name:</b> Cost of on-farm TA	<b>Reporting question:</b> What is the total amount that has been spent to provide on-farm TA?
<b>Description:</b> Total cost of any field- or practice-specific technical assistance provided by the project (by recipient or partners) to any producers. This is updated quarterly. If there are no changes, enter the same number as the previous quarter.	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Dollars	<b>Allowed values:</b> \$0-\$50,000,000
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Project	<b>Data collection frequency:</b> Quarterly

---

**MMRV cost**


---

<b>Data element name:</b> MMRV cost	<b>Reporting question:</b> What is the total amount that has been spent on MMRV activities?
<b>Description:</b> Total cost of all MMRV activities paid for by the project (recipient or partners). MMRV components are defined as measurement (calculations or estimations of GHG emissions), monitoring (ongoing review and confirmation that the climate-smart practices have been implemented according to the agreed upon standard and documentation of any changes in the site, implementation, or GHG emissions impacts over time), reporting (documenting and sharing monitoring and measurement results with project partners, the recipient, and any third-party verification organization), and verification (independent confirmation that measurement, monitoring and reporting information are complete, accurate and reliable). This is updated quarterly. If there are no changes, enter the same number as the previous quarter.	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Dollars	<b>Allowed values:</b> \$0-\$50,000,000
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Project	<b>Data collection frequency:</b> Quarterly

---

**GHG monitoring method**


---

<b>Data element name:</b> GHG monitoring 1-5	<b>Reporting question:</b> How did the project monitor GHG benefits?
<b>Description:</b> Up to the five most common forms of monitoring GHG benefits used this quarter as part of MMRV requirements. Monitoring is defined as ongoing review and confirmation that the climate-smart practice has been implemented according to the agreed upon standard and documentation of any changes in the site, implementation, or GHG emissions impacts over time. Include up to 5 methods, based on which methods are most commonly used for this project. The worksheet provides five columns with a drop-down list of the allowed values. Choose one value for each column. If fewer than 5 GHG monitoring methods are used, leave unnecessary columns blank. If "other" is chosen, use the additional column to enter other GHG monitoring methods as free text.	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b> <ul style="list-style-type: none"> <li>• Drones</li> <li>• Ground-level photos and videos</li> <li>• On-farm visit</li> <li>• Plot-based sampling</li> <li>• Producer records or attestation</li> <li>• Satellite monitoring or remote sensing</li> <li>• Soil metagenomics</li> <li>• Soil sensors</li> <li>• Water sensors</li> <li>• Other (specify)</li> </ul>
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Project	<b>Data collection frequency:</b> Quarterly

---



---

**GHG reporting method**


---

**Data element name:** GHG reporting 1-5**Reporting question:** How did the project track and report implementation of practices to reduce GHG emissions?

**Description:** Up to the five most common forms of tracking and reporting on practice implementation used this year as part of MMRV requirements. Reporting is defined as documenting and sharing monitoring and measurement results with project partners, the recipient, and any third-party verification organization. Include up to 5 methods, based on which methods are most commonly used for this project. The worksheet provides five columns with a drop-down list of the allowed values. Choose one value for each column. If fewer than 5 GHG reporting methods are used, leave unnecessary columns blank. If "other" is chosen, use the additional column to enter other GHG reporting methods as free text.

**Data type:** List**Select multiple values:** No**Measurement unit:** Category**Allowed values:**

- Automated devices
- Email
- Mobile app
- Paper
- Third-party actors
- Website
- Other (specify)

**Logic:** None – all respond**Required:** Yes**Data collection level:** Project**Data collection frequency:** Quarterly

---

**GHG verification method**


---

**Data element name:** GHG verification method 1-5**Reporting question:** How did the project verify implementation of practices to reduce GHG emissions?

**Description:** Up to the five most common forms of verifying practice implementation used this year as part of MMRV requirements. Verification is defined as independent confirmation that measurement, monitoring and reporting information are complete, accurate and reliable. Include up to 5 methods, based on which methods are most commonly used for this project. The worksheet provides five columns with a drop-down list of the allowed values. Choose one value for each column. If fewer than 5 GHG verification methods are used, leave unnecessary columns blank. If "other" is chosen, use the additional column to enter other GHG verification methods as free text.

**Data type:** List**Select multiple values:** No**Measurement unit:** Category**Allowed values:**

- Artificial intelligence
- Audit by recipient
- Computer modeling
- Photos
- Record audit
- Satellite imagery
- Site or field visit
- Third-party audit
- Other (specify)

**Logic:** None – all respond**Required:** Yes**Data collection level:** Project**Data collection frequency:** Quarterly

**USDA** Partnerships for Climate-Smart Commodities Data Dictionary for Recipients  
February 2023

Partner Activities

**Unique IDs**

Partner ID	Unique Project ID for each partner
------------	------------------------------------

**Partner name**

<b>Data element name:</b> Name of partner organization	<b>Reporting question:</b> What is the official name of the recipient or partner organization?
<b>Description:</b> Legal name of recipient or partner organization	
<b>Data type:</b> Text	<b>Select multiple values:</b> NA
<b>Measurement unit:</b> NA	<b>Allowed values:</b> Text
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Partner	<b>Data collection frequency:</b> Partnership initiation

**Partner type**

<b>Data element name:</b> Type of partner organization	<b>Reporting question:</b> What type of organization is this?
<b>Description:</b> Legal/financial structure of recipient or partner organization	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b> <ul style="list-style-type: none"> <li>• Commodity groups (501c5)</li> <li>• For-profit</li> <li>• Individual</li> <li>• Nonprofit</li> <li>• State or local agency</li> <li>• Tribal agency</li> <li>• University</li> </ul>
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Partner	<b>Data collection frequency:</b> Partnership initiation

**Partner POC**

<b>Data element name:</b> Partner POC	<b>Reporting question:</b> Who is the point of contact for this project at the recipient or partner organization?
<b>Description:</b> Name of a point of contact for the recipient or partner organization	
<b>Data type:</b> Text	<b>Select multiple values:</b> NA
<b>Measurement unit:</b> NA	<b>Allowed values:</b> Text
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Partner	<b>Data collection frequency:</b> Partnership initiation; update as necessary

**Partner POC email**

<b>Data element name:</b> Partner POC email	<b>Reporting question:</b> What is the point of contact's email address?
<b>Description:</b> Email of the point of contact for the recipient or partner organization	
<b>Data type:</b> Text	<b>Select multiple values:</b> NA
<b>Measurement unit:</b> NA	<b>Allowed values:</b> Text
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Partner	<b>Data collection frequency:</b> Partnership initiation; update as necessary

**USDA** Partnerships for Climate-Smart Commodities Data Dictionary for Recipients  
February 2023

---

**Partnership start date**

<b>Data element name:</b> Partnership start date	<b>Reporting question:</b> When did the partnership start?
<b>Description:</b> Date that the partner organization and the recipient began formally partnering on the project	
<b>Data type:</b> Date	<b>Select multiple values:</b> NA
<b>Measurement unit:</b> MM/DD/YYYY	<b>Allowed values:</b> 01/01/2023 – 12/31/2030
<b>Logic:</b> No response for recipient	<b>Required:</b> Yes
<b>Data collection level:</b> Partner	<b>Data collection frequency:</b> Partnership initiation

---

**Partnership end date**

<b>Data element name:</b> Partnership end date	<b>Reporting question:</b> When did the partnership end?
<b>Description:</b> Date that the partner organization and the recipient stopped formally partnering on the project	
<b>Data type:</b> Date	<b>Select multiple values:</b> NA
<b>Measurement unit:</b> MM/DD/YYYY	<b>Allowed values:</b> 01/01/2023 – 12/31/2030
<b>Logic:</b> No response for recipient	<b>Required:</b> Yes
<b>Data collection level:</b> Partner	<b>Data collection frequency:</b> Partnership end quarter

---

**New partnership**

<b>Data element name:</b> New partnership	<b>Reporting question:</b> Is this a new partnership?
<b>Description:</b> A new partnership means that the recipient and the partner organization have not had a formal working relationship (under contract or on a grant) prior to the start of the project.	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b>
	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> <li>• I don't know</li> </ul>
<b>Logic:</b> No response for recipient	<b>Required:</b> Yes
<b>Data collection level:</b> Partner	<b>Data collection frequency:</b> Partnership initiation

---

**Partner total requested**

<b>Data element name:</b> Partner total requested	<b>Reporting question:</b> What is the total amount of funding the partner has requested to date from this project?
<b>Description:</b> Cumulative (total) amount of funds that the partner has requested reimbursement for from the recipient from the start of the partnership to the end of the reporting quarter. For each quarter's data entry, the value must be the sum of all previous entries plus the amount of funds requested in the reporting quarter. If there are no changes, report the value from the previous quarter.	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> NA
<b>Measurement unit:</b> Dollars	<b>Allowed values:</b> \$0-\$100,000,000
<b>Logic:</b> No response for recipient	<b>Required:</b> Yes
<b>Data collection level:</b> Partner	<b>Data collection frequency:</b> Quarterly

---



---

**Total match contribution**


---

**Data element name:** Total match contribution**Reporting question:** What is the total match value the organization has contributed to the project to date?

**Description:** Cumulative (total) value of funds and in-kind contributions (e.g., staff time, inputs, equipment rental, marketing support) that the partner has provided as a project match contribution from the start of the partnership to the end of the reporting quarter. For each quarter's data entry, the value must be the sum of all previous entries plus match contributions in the reporting quarter. If there are no changes, report the value from the previous quarter.

**Data type:** Decimal**Select multiple values:** NA**Measurement unit:** Dollars**Allowed values:** \$0-\$100,000,000**Logic:** None – all respond**Required:** Yes**Data collection level:** Partner**Data collection frequency:** Quarterly

---

**Total match incentives**


---

**Data element name:** Total match incentives**Reporting question:** What is the total value of match provided by this organization for producer incentives?

**Description:** Cumulative (total) value of funds for incentive payments directly to producers that the partner has provided as a project match contribution from the start of the partnership to the end of the reporting quarter. For each quarter's data entry, the value must be the sum of all previous entries plus match incentives in the reporting quarter. If there are no changes, report the value from the previous quarter.

**Data type:** Decimal**Select multiple values:** NA**Measurement unit:** Dollars**Allowed values:** \$0-\$100,000,000**Logic:** None – all respond**Required:** Yes**Data collection level:** Partner**Data collection frequency:** Quarterly

---

**Match type**


---

**Data element name:** Match type 1-3**Reporting question:** What types of match contributions has the organization provided to the project?

**Description:** Types of match contributions *other than incentives* provided directly to producers by the organization from the start of the partnership to the end of the reporting quarter. Enter up to the top three (in dollar value) types of match contributions provided. In-kind staff time could be used for technical assistance, marketing assistance, or other support to producers. Production inputs include seed, fertilizer, pesticides, equipment and other inputs for use in the field. The worksheet provides three columns with a drop-down list of the allowed values. Choose one value for each column. If fewer than 3 match types are used, leave unnecessary columns blank. If "other" is chosen, use the additional column to enter other match types as free text.

**Data type:** List**Select multiple values:** No**Measurement unit:** Category**Allowed values:**

- Equipment rental or use
- In-kind staff time
- Production inputs (reduced cost or free)
- Program income
- Software
- Other (specify)

**Logic:** None – all respond**Required:** Yes**Data collection level:** Partner**Data collection frequency:** Quarterly

---

**Match amount**


---

**Data element name:** Match amount 1-3**Reporting question:** What is the value of the match contributions the organization provided to the project?

**Description:** Cumulative (total) value of funds for each match type that the organization has provided as a project match contribution from the start of the partnership to the end of the reporting quarter. Enter amounts for up to the top three (in dollar value) match types. The worksheet provides three columns for this data element. Enter one value for each column. If fewer than 3 match types are used, leave unnecessary columns blank.

**Data type:** Decimal**Select multiple values:** NA**Measurement unit:** Dollars**Allowed values:** \$0-\$100,000,000**Logic:** None – all respond**Required:** Yes**Data collection level:** Partner**Data collection frequency:** Quarterly

---

**Training type provided**


---

**Data element name:** Training type 1-3 provided**Reporting question:** What types of training has the organization provided to project partners?

**Description:** Types of training provided to the project partner as a result of participating in the project during the past quarter. Training can come from the recipient, a project partner organization (including other divisions of their own organization, or an outside organization). Enter up to the top three (in dollar value) types of partner training provided. The worksheet provides three columns with a drop-down list of the allowed values. Choose one value for each column. If fewer than 3 training types are used, leave unnecessary columns blank. If “other” is chosen, use the additional column to enter other training types as free text.

**Data type:** List**Select multiple values:** No**Measurement unit:** Category**Allowed values:**

- Data collection
- Grant reporting
- Marketing opportunities
- Providing financial assistance
- Providing technical assistance
- Writing producer contracts
- Other (specify)

**Logic:** None – all respond**Required:** Yes**Data collection level:** Partner**Data collection frequency:** Quarterly

---

**Activity by partner**


---

**Data element name:** Activity 1-3 by partner**Reporting question:** What types of activities has the organization provided to the project?

**Description:** Types of activities that the recipient or partner organization has provided during the reporting quarter. Enter up to the top three (in dollar value) types of activities undertaken. The worksheet provides three columns with a drop-down list of the allowed values. Choose one value for each column. If fewer than 3 activity types are used, leave unnecessary columns blank. If “other” is chosen, use the additional column to enter other activity types as free text.

**Data type:** List**Select multiple values:** No**Measurement unit:** Category**Allowed values:**

- Marketing support
- MMRV support
- Producer outreach for enrollment
- Technical assistance to producers
- Training to other partner organizations
- Other (specify)

**Logic:** None – all respond**Required:** Yes**Data collection level:** Partner**Data collection frequency:** Quarterly



---

**Activity cost**


---

**Data element name:** Activity cost 1-3**Reporting question:** What is the value of the activities this organization has provided to the project?

**Description:** Cumulative (total) cost of each activity type that the organization has undertaken or offered from the start of the partnership to the end of the reporting quarter. Enter amounts for up to the top three (in dollar value) activity types. The worksheet provides three columns for this data element. Enter one value for each column. If fewer than 3 activity types are provided, leave unnecessary columns blank.

**Data type:** Decimal**Select multiple values:** NA**Measurement unit:** Dollars**Allowed values:** \$0-\$100,000,000**Logic:** None – all respond**Required:** Yes**Data collection level:** Partner**Data collection frequency:** Quarterly

---

**Products supplied**


---

**Data element name:** Products supplied**Reporting question:** What products or supplies were provided to enrolled fields?

**Description:** Name(s) of products supplied to enrolled producers as incentives or matching contributions. Enter the name of each product, including its brand. Separate each product name with a comma. If no products or supplies were provided by the organization, leave the column blank.

**Data type:** Text**Select multiple values:** NA**Measurement unit:** Name**Allowed values:** Text**Logic:** None – all respond**Required:** Yes**Data collection level:** Partner**Data collection frequency:** Quarterly

---

**Product source**


---

**Data element name:** Product source**Reporting question:** Which companies provided the supplies?

**Description:** Name of firm or company from which supplies were obtained.

**Data type:** Text**Select multiple values:** NA**Measurement unit:** Name**Allowed values:** Text**Logic:** Respond if text entered for 'Products supplied'**Required:** Yes**Data collection level:** Partner**Data collection frequency:** Quarterly

## Marketing Activities

---

### Commodity type

<b>Data element name:</b> Commodity type	<b>Reporting question:</b> What type of commodity is produced by the farmers enrolled in this project?
<b>Description:</b> List a single commodity produced or marketed through incentives from this project. If multiple commodities are produced by the project, use additional rows of the worksheet to report each commodity. Use the FSA commodity list in Appendix B and choose the commodity from the list.	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b> FSA commodity list
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Project	<b>Data collection frequency:</b> Quarterly

---

### Marketing channel type

<b>Data element name:</b> Marketing channel type	<b>Reporting question:</b> What type of marketing channel is used to sell this commodity?
<b>Description:</b> List a single type of marketing channel used to sell the commodity produced by farmers enrolled in the project. If a single commodity is marketed through multiple channels, use additional rows of the worksheet to report each combination of commodity and marketing channel. If “other” is chosen, use the additional column to enter the other marketing channel type(s) as free text.	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b> <ul style="list-style-type: none"> <li>• Agricultural marketing board</li> <li>• Biorefinery</li> <li>• Commodity broker</li> <li>• Direct to consumer</li> <li>• Direct to institution</li> <li>• Direct to restaurant</li> <li>• Distributor (including grain elevators)</li> <li>• Food hub or cooperative</li> <li>• Food processor</li> <li>• Non-food byproducts processor</li> <li>• Retailer</li> <li>• USDA</li> <li>• Other (specify)</li> </ul>
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Project	<b>Data collection frequency:</b> Quarterly

---

### Number of buyers

<b>Data element name:</b> Number of buyers	<b>Reporting question:</b> How many buyers are there in this marketing channel?
<b>Description:</b> List the number of individual firms or buyers in this marketing channel.	
<b>Data type:</b> Integer	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Count	<b>Allowed values:</b> 1-500
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Project	<b>Data collection frequency:</b> Quarterly

---

---

**Names of buyers**


---

<b>Data element name:</b> Names of buyers	<b>Reporting question:</b> What are the names of all of the buyers in this marketing channel?
<b>Description:</b> Provide the names of all buyers in this marketing channel. Separate each name with a comma.	
<b>Data type:</b> Text	<b>Select multiple values:</b> NA
<b>Measurement unit:</b> Name	<b>Allowed values:</b> Text
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Project	<b>Data collection frequency:</b> Quarterly

---

**Marketing channel geography**


---

<b>Data element name:</b> Marketing channel geography	<b>Reporting question:</b> What is the primary geography of the marketing channel?
<b>Description:</b> The primary geography of the type of marketing channel. Primary geography means the scale at which most of the activity of buying and selling happens. Local means within a single state or directly neighboring states. Regional means within a five-to-ten state area. National means across the United States. International means specific locations outside of the United States. Global means across the world or not to a specific international location.	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b> <ul style="list-style-type: none"> <li>• Local</li> <li>• Regional</li> <li>• National</li> <li>• Global</li> </ul>
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Project	<b>Data collection frequency:</b> Quarterly

---

**Value sold**


---

<b>Data element name:</b> Value sold	<b>Reporting question:</b> What is the value of the commodity sold in this marketing channel?
<b>Description:</b> The dollar value of the commodity sold in this marketing channel this quarter (non-cumulative).	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Dollars	<b>Allowed values:</b> \$1-\$100,000,000
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Project	<b>Data collection frequency:</b> Quarterly

---

**Volume sold**


---

<b>Data element name:</b> Volume sold	<b>Reporting question:</b> What is the volume of the commodity sold in this marketing channel?
<b>Description:</b> The volume of the commodity sold in this marketing channel this quarter (non-cumulative).	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Number	<b>Allowed values:</b> 1-100,000,000
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Project	<b>Data collection frequency:</b> Quarterly

---



---

**Volume sold unit**


---

**Data element name:** Volume sold unit**Reporting question:** What is the unit of volume?**Description:** The unit associated with the volume of the commodity sold in the marketing channel. If “other” is chosen, use the additional column to enter the appropriate unit as free text.**Data type:** List**Select multiple values:** No**Measurement unit:** Category**Allowed values:**

- Bales (500 pounds)
- Bushels
- Carcass pounds
- Gallons
- Kilograms
- Linear board feet
- Liveweight pounds
- Metric tons
- Pounds
- Short tons
- Other (specify)

**Logic:** None – all respond**Required:** Yes**Data collection level:** Project**Data collection frequency:** Quarterly

---

**Price premium**


---

**Data element name:** Price premium**Reporting question:** What price premium is received for the commodity sold in this marketing channel?**Description:** The price premium received for the commodity sold in this marketing channel this quarter. Price premium is the amount received above a ‘business as usual’ price.**Data type:** Decimal**Select multiple values:** No**Measurement unit:** Dollars**Allowed values:** \$0.01-\$10,000**Logic:** None – all respond**Required:** Yes**Data collection level:** Project**Data collection frequency:** Quarterly

---

**Price premium unit**


---

**Data element name:** Price premium unit**Reporting question:** What is the unit for the price premium?**Description:** The unit associated with the price premium for the commodity sold in the marketing channel. If “other” is chosen, use the additional column to enter the appropriate unit as free text.**Data type:** List**Select multiple values:** No**Measurement unit:** Category**Allowed values:**

- Per bale (500 pounds)
- Per bushel
- Per carcass pound
- Per gallon
- Per kilogram
- Per linear board foot
- Per live pound
- Per metric ton
- Per ounce
- Per short ton
- Other (specify)

**Logic:** None – all respond**Required:** Yes**Data collection level:** Project**Data collection frequency:** Quarterly

---

**Price premium to producer**


---

**Data element name:** Price premium to producer

**Reporting question:** What percent of the price premium is provided to the producer for the commodity sold in this marketing channel?

**Description:** The percent of the price premium provided to the producer for the commodity sold in this marketing channel this quarter. Price premium is the amount received above a 'business as usual' price.

**Data type:** Decimal

**Select multiple values:** No

**Measurement unit:** Percent

**Allowed values:** 0-100

**Logic:** None – all respond

**Required:** Yes

**Data collection level:** Project

**Data collection frequency:** Quarterly

---

**Product differentiation method**


---

**Data element name:** Product differentiation method 1-3

**Reporting question:** What methods are used to differentiate climate-smart commodities in this marketing channel?

**Description:** Provide the methods used to differentiate the climate-smart commodity in this market channel. Product differentiation methods are ways to distinguish or differentiate the climate-smart commodity in the marketplace. Include up to 3 methods, based on which methods are most commonly used for this project. The worksheet provides three columns with a drop-down list of the allowed values. Choose one value for each column. If fewer than 3 product differentiation methods are used, leave unnecessary columns blank. If "other" is chosen, use the additional column to enter other product differentiation methods as free text.

**Data type:** List

**Select multiple values:** No

**Measurement unit:** Category

**Allowed values:**

- Certification/verification for internal insetting
- Farm certification
- Label or badge used on packaging or marketing
- Third party certification/verification
- Trademark
- Other (specify)

**Logic:** None – all respond

**Required:** Yes

**Data collection level:** Project

**Data collection frequency:** Quarterly

---

**Marketing method**


---

**Data element name:** Marketing method 1-3

**Reporting question:** What methods are used to market climate-smart commodities in this marketing channel?

**Description:** Provide the method(s) used to market this commodity in this market channel. Marketing method is the way that potential buyers of the climate-smart commodity are engaged by the project partners as the sellers or facilitators of sale. Include up to 3 methods, based on which methods are most commonly used for this project. The worksheet provides three columns with a drop-down list of the allowed values. Choose one value for each column. If fewer than 3 marketing methods are used, leave unnecessary columns blank. If "other" is chosen, use the additional column to enter other marketing methods as free text

**Data type:** List

**Select multiple values:** No

**Measurement unit:** Category

**Allowed values:**

- Label or badge used on packaging or marketing materials
- Marketing partnership (e.g., promotion by buyer)
- Print marketing campaign
- Social media and digital marketing campaign
- Verbal marketing campaign (e.g., radio, word of mouth)
- Other (specify)

**Logic:** None – all respond

**Required:** Yes

**Data collection level:** Project

**Data collection frequency:** Quarterly

---



---

**Marketing channel identification method**


---

**Data element name:** Marketing channel identification method 1-3

**Reporting question:** What methods are used to generate interest in climate-smart commodities in this marketing channel?

**Description:** Provide the marketing channel identification method(s) used for this commodity in this market channel. Market channel identification methods are the ways that producers and project partners generate interest in purchasing the climate-smart commodity. Include up to 3 methods, based on which methods are most commonly used for this project. The worksheet provides three columns with a drop-down list of the allowed values. Choose one value for each column. If fewer than 3 marketing channel identification methods are used, leave unnecessary columns blank. If “other” is chosen, use the additional column to enter other marketing channel identification methods as free text

**Data type:** List

**Select multiple values:** No

**Measurement unit:** Category

**Allowed values:**

- Educational tours for buyers
- In-person lead generation
- Negotiated contracts with buyers
- Partnership network or project partner
- Other (specify)

**Logic:** None – all respond

**Required:** Yes

**Data collection level:** Project

**Data collection frequency:** Quarterly

---

**Traceability method**


---

**Data element name:** Traceability method 1-3

**Reporting question:** What traceability methods are used for climate-smart commodities in this channel?

**Description:** Provide the traceability method(s) used for the climate-smart commodity in this market channel. Traceability methods are ways to trace the climate-smart commodity or the climate-smart claims through the supply chain. Include up to 3 methods, based on which methods are most commonly used for this project. The worksheet provides three columns with a drop-down list of the allowed values. Choose one value for each column. If fewer than 3 traceability methods are used, leave unnecessary columns blank. If “other” is chosen, use the additional column to enter other traceability methods as free text.

**Data type:** List

**Select multiple values:** No

**Measurement unit:** Category

**Allowed values:**

- Barcode or unique ID
- Blockchain
- Book and claim
- Chain of custody
- Mass balance
- Recordkeeping
- Registry with certification
- Segregation
- Supply shed
- Volume proxy
- Other (specify)

**Logic:** None – all respond

**Required:** Yes

**Data collection level:** Project

**Data collection frequency:** Quarterly

---

**USDA** Partnerships for Climate-Smart Commodities Data Dictionary for Recipients  
February 2023

Producer Enrollment

**Unique IDs**

Farm ID	Unique Farm ID assigned by FSA
State or territory	State name (must match FSA farm enrollment data)
County of residence	County name (must match FSA farm enrollment data)

**Producer data change**

<b>Data element name:</b> Producer data change	<b>Reporting question:</b> Is there new/updated information for a producer who is re-enrolling in the project?
<b>Description:</b> Indicates that there is new or updated information for a producer who had previously enrolled in the project and is re-enrolling.	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b> <ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> </ul>
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Producer	<b>Data collection frequency:</b> Re-enrollment

**Producer start date**

<b>Data element name:</b> Producer start date	<b>Reporting question:</b> When did the producer enroll in the project?
<b>Description:</b> Date that the producer enrolled in the project by signing their first contract.	
<b>Data type:</b> Date	<b>Select multiple values:</b> NA
<b>Measurement unit:</b> MM/DD/YYYY	<b>Allowed values:</b> 01/01/2023 – 12/31/2030
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Producer	<b>Data collection frequency:</b> Initial enrollment

**Producer name**

<b>Data element name:</b> Producer name	<b>Reporting question:</b> What is the name of producer enrolled in the project?
<b>Description:</b> Name of the producer enrolled in the project; the name must match the name contained in the customer's Business Partner record and the Farm Operating Plan in FSA Business File for that Farm ID.	
<b>Data type:</b> Text	<b>Select multiple values:</b> NA
<b>Measurement unit:</b> NA	<b>Allowed values:</b> Text
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Producer	<b>Data collection frequency:</b> Initial enrollment

---

**Underserved status**


---

**Data element name:** Underserved status**Reporting question:** Is this producer considered an underserved and/or a small producer?

**Description:** Underserved status of the primary operator of the enrolled operation. Underserved producers generally include beginning farmers, socially disadvantaged farmers, veteran farmers, and limited resource farmers; women farmers and producers growing specialty crops are generally also included in these categories. Small farms are generally those with less than \$350,000 in annual gross cash farm income. Indicate whether this producer is considered underserved, a small producer, or both underserved and a small producer. Use "I don't know" if the producer declines to answer. Departmental Regulation 4370-001 provides USDA's policies for collecting demographic data, including race, ethnicity and gender. Providing demographic information is voluntary and at the discretion of the customer. Demographic information is used by USDA for statistical purposes only and will not be used to determine an applicant's eligibility for programs or services for which they apply.

**Data type:** List**Select multiple values:** No**Measurement unit:** Category**Allowed values:**

- Yes, underserved
- Yes, small producer
- Yes, underserved and small producer
- No
- I don't know

**Logic:** None – all respond**Required:** No**Data collection level:** Producer**Data collection frequency:** Initial enrollment

---

**Total area**


---

**Data element name:** Total area**Reporting question:** What is the total area of the farm?

**Description:** Total area of the farm associated with the Farm ID. Report total area of the farm, even if only a portion of the farm is enrolled in the project. If a producer is enrolled in the project for multiple years, review the total area each time a new contract is signed and provide any necessary updates.

**Data type:** List**Select multiple values:** No**Measurement unit:** Category**Allowed values:**

- Less than 1 acre
- 1 to 9 acres
- 10 to 49 acres
- 50 to 69 acres
- 70 to 99 acres
- 100 to 139 acres
- 140 to 179 acres
- 180 to 219 acres
- 220 to 259 acres
- 260 to 499 acres
- 500 to 999 acres
- 1,000 to 1,999 acres
- 2,000 to 4,999 acres
- 5,000 or more acres

**Logic:** None – all respond**Required:** Yes**Data collection level:** Producer**Data collection frequency:** Initial enrollment and subsequent enrollment(s), if applicable



---

**Total crop area**


---

**Data element name:** Total crop area      **Reporting question:** What percent of the current operation is cropland?

**Description:** Area of the total farm that is currently used as cropland. If a producer is enrolled in the project for multiple years, review the total crop area each time a new contract is signed and provide any necessary updates.

**Data type:** Integer

**Select multiple values:** No

**Measurement unit:** Acres

**Allowed values:** 0-100,000

**Logic:** None – all respond

**Required:** Yes

**Data collection level:** Producer

**Data collection frequency:** Initial enrollment and subsequent enrollment(s), if applicable

---

**Total livestock area**


---

**Data element name:** Total livestock area      **Reporting question:** What amount of the current operation is used for livestock (by area)?

**Description:** Area of the total farm that is currently used for pasture, grazing, rangeland; or animal housing, feeding or milking. If a producer is enrolled in the project for multiple years, review the total livestock area each time a new contract is signed and provide any necessary updates.

**Data type:** Integer

**Select multiple values:** No

**Measurement unit:** Acres

**Allowed values:** 0-100,000

**Logic:** None – all respond

**Required:** Yes

**Data collection level:** Producer

**Data collection frequency:** Initial enrollment and subsequent enrollment(s), if applicable

---

**Total forest area**


---

**Data element name:** Total forest area      **Reporting question:** What amount of the current operation is forested (by area)?

**Description:** Area of the total farm that is currently considered forest land use. Forest land use means that at least 10% of the land area is covered in trees that will be at least 13 feet tall when mature. If a producer is enrolled in the project for multiple years, review the total forest area each time a new contract is signed and provide any necessary updates.

**Data type:** Integer

**Select multiple values:** No

**Measurement unit:** Acres

**Allowed values:** 0-100,000

**Logic:** None – all respond

**Required:** Yes

**Data collection level:** Producer

**Data collection frequency:** Initial enrollment and subsequent enrollment(s), if applicable

---

---

**Livestock type**
**Data element name:** Livestock type 1-3

**Reporting question:** What types of livestock are raised on the farm?

**Description:** Up to top three types of livestock (by head count) on the farm. The worksheet provides three columns with a drop-down list of the allowed values. Choose one value for each column. If there are fewer than 3 livestock types, leave unnecessary columns blank. If "other" is chosen, use the additional column to enter other livestock types as free text. If a producer is enrolled in the project for multiple years, review the livestock type each time a new contract is signed and provide any necessary updates.

**Data type:** List

**Select multiple values:** No

**Measurement unit:** Category

**Allowed values:**

- Alpacas
- Beef cows
- Beefalo
- Buffalo or bison
- Chickens (broilers)
- Chickens (layers)
- Dairy cows
- Deer
- Ducks
- Elk
- Emus
- Equine
- Geese
- Goats
- Honeybees
- Llamas
- Reindeer
- Sheep
- Swine
- Turkeys
- Other (specify)

**Logic:** Respond if 'Total livestock area' >0

**Required:** Yes

**Data collection level:** Producer

**Data collection frequency:** Initial enrollment and subsequent enrollment(s), if applicable

---

**Livestock head**
**Data element name:** Livestock head 1-3

**Reporting question:** How many livestock (by type) are on this operation?

**Description:** Average annual head count for each type of livestock. Enter amounts for up to the top three livestock types by number. The worksheet provides three columns for this data element. Enter one value for each column. If there are fewer than 3 livestock types, leave unnecessary columns blank. If a producer is enrolled in the project for multiple years, review the average annual head count each time a new contract is signed and provide any necessary updates.

**Data type:** Integer

**Select multiple values:** NA

**Measurement unit:** Head count

**Allowed values:** 1-10,000,000

**Logic:** Respond if 'Total livestock area' >0

**Required:** Yes

**Data collection level:** Producer

**Data collection frequency:** Initial enrollment and subsequent enrollment(s), if applicable

---

**Organic farm**
**Data element name:** Organic farm**Reporting question:** Is any part of the farm currently USDA-certified organic or transitioning to USDA-certified organic?

**Description:** USDA-certified organic means that the farm has been certified by an accredited organic certifying agent or is transitioning to USDA-certified organic by not using any of the prohibited substances. Yes means that some or all of the farm is certified organic or transitioning to certified organic. No means that no part of the farm is certified organic or transitioning to certified organic. If a producer is enrolled in the project for multiple years, review the organic certification status of the farm each time a new contract is signed and provide any necessary updates.

**Data type:** List**Select multiple values:** No**Measurement unit:** Category**Allowed values:**

- Yes
- No
- I don't know

**Logic:** None – all respond**Required:** No**Data collection level:** Producer**Data collection frequency:** Initial enrollment and subsequent enrollment(s), if applicable

---

**Organic fields**
**Data element name:** Organic fields**Reporting question:** Are any of the fields enrolled in the project currently USDA-certified organic or transitioning to USDA-certified organic?

**Description:** USDA-certified organic means that the operation has been certified by an accredited organic certifying agent or is transitioning to USDA-certified organic by not using any of the prohibited substances. Yes means that some or all of the fields enrolled in the project are certified organic or transitioning to certified organic. No means that no part of the fields enrolled in the project are certified organic or transitioning to certified organic. If a producer is enrolled in the project for multiple years, review the organic certification status of the enrolled fields each time a new contract is signed and provide any necessary updates.

**Data type:** List**Select multiple values:** No**Measurement unit:** Category**Allowed values:**

- Yes
- No
- I don't know

**Logic:** Respond if yes to 'Organic operation'**Required:** No**Data collection level:** Producer**Data collection frequency:** Initial enrollment and subsequent enrollment(s), if applicable

---

**Producer motivation**
**Data element name:** Producer motivation**Reporting question:** Which of the following was the primary reason the producer enrolled in this project?**Description:** Primary operator's motivation for enrolling in the project.**Data type:** List**Select multiple values:** No**Measurement unit:** Category**Allowed values:**

- Financial benefit
- Environmental benefit
- New market opportunity
- Partnerships or networks
- Other

**Logic:** None – all respond**Required:** Yes**Data collection level:** Producer**Data collection frequency:** Initial enrollment



---

**Producer outreach**

**Data element name:** Producer outreach 1-3      **Reporting question:** What types of outreach were provided to producers?

**Description:** Up to three most common types of outreach provided to producer prior to enrollment. Outreach activities are those focused on identifying and enrolling producers in the project. Outreach can come from the recipient or project partners. The worksheet provides three columns with a drop-down list of the allowed values. Choose one value for each column. If there are fewer than 3 outreach types, leave unnecessary columns blank. If “other” is chosen, use the additional column to enter other outreach types as free text.

**Data type:** List

**Select multiple values:** Yes

**Measurement unit:** Category

**Allowed values:**

- Commodity organizations
- Conferences
- Cooperative extension
- Digital communications and resources
- Education workshops, field days, and town halls
- Existing partner networks
- Farm visits and one-on-one meetings
- General advertising
- Peer referrals and producer groups
- Phone calls
- Print communications and resources
- Retailers
- State agencies
- Targeted messaging using proprietary data
- Technical service providers
- Other (specify)

**Logic:** None – all respond

**Required:** Yes

**Data collection level:** Producer

**Data collection frequency:** Initial enrollment

---

**CSAF experience**

**Data element name:** CSAF experience      **Reporting question:** Has the primary operator implemented CSAF practices in the last ten years anywhere on the farm?

**Description:** Has this farm implemented climate-smart agriculture or forestry (CSAF) practices anywhere on the farm in the past 10 years or since the current primary operator took control (whichever time period is shorter)? CSAF practices are included in a list in Appendix A.

**Data type:** List

**Select multiple values:** No

**Measurement unit:** Category

**Allowed values:**

- Yes
- No
- I don't know

**Logic:** None – all respond

**Required:** Yes

**Data collection level:** Producer

**Data collection frequency:** Initial enrollment

---

---

**CSAF federal funds**
**Data element name:** CSAF federal funds**Reporting question:** Were prior CSAF practices supported by federal funds?

**Description:** If this farm (under the primary operator) has implemented CSAF practices in the last ten years, was implementation supported by federal funds? Federal funds are defined as being from programs including, but not limited to, those from the Natural Resources Conservation Service ((NRCS), including through Environmental Quality Incentives Program (EQIP), Conservation Stewardship Program (CSP), Regional Conservation Partnership Program (RCP), or related programs), the Farm Service Agency Conservation Reserve Program (CRP), as well as funds from other USDA programs or other federal agencies.

**Data type:** List**Select multiple values:** No**Measurement unit:** Category**Allowed values:**

- Yes
- No
- I don't know

**Logic:** Respond if yes to 'CSAF experience'**Required:** Yes**Data collection level:** Producer**Data collection frequency:** Initial enrollment

---

**CSAF state or local funds**
**Data element name:** CSAF state or local funds**Reporting question:** Were prior CSAF practices supported by state or local funds?

**Description:** If this farm (under the primary operator) has implemented CSAF practices in the last ten years, was implementation supported by state funds? State or local funds are those from state departments of agriculture or other state agencies, local water quality districts and other local agencies.

**Data type:** List**Select multiple values:** No**Measurement unit:** Category**Allowed values:**

- Yes
- No
- I don't know

**Logic:** Respond if yes to 'CSAF experience'**Required:** Yes**Data collection level:** Producer**Data collection frequency:** Initial enrollment

---

**CSAF nonprofit funds**
**Data element name:** CSAF nonprofit funds**Reporting question:** Were CSAF practices supported by nonprofit funds?

**Description:** If this farm (under the primary operator) has implemented CSAF practices in the last ten years, was implementation supported by nonprofit funds? Nonprofit funds are those offered directly from a nonprofit organization to a producer.

**Data type:** List**Select multiple values:** No**Measurement unit:** Category**Allowed values:**

- Yes
- No
- I don't know

**Logic:** Respond if yes to 'CSAF experience'**Required:** Yes**Data collection level:** Producer**Data collection frequency:** Initial enrollment



---

**CSAF market incentives**


---

**Data element name:** CSAF market incentives      **Reporting question:** Were CSAF practices supported by market incentives?

**Description:** If this farm (under the primary operator) has implemented CSAF practices in the last ten years, was implementation supported by market incentives? Market incentives include premiums paid by a commodity buyer or by a consumer based on branding or labeling as a climate-smart commodity.

**Data type:** List

**Select multiple values:** No

**Measurement unit:** Category

**Allowed values:**

- Yes
- No
- I don't know

**Logic:** Respond if yes to 'CSAF experience'

**Required:** Yes

**Data collection level:** Producer

**Data collection frequency:** Initial enrollment

---

### Field Enrollment

#### Unique IDs

Farm ID	Unique Farm ID assigned by FSA
Tract ID	Unique Tract ID assigned by FSA
Field ID	Unique Field ID assigned by FSA
State or territory of field	State name (must match FSA farm enrollment data)
County of field	County name (must match FSA farm enrollment data)
Prior Field ID, if applicable	Prior Field ID assigned by FSA if there has been reconstitution of the farm resulting in a new Field ID during the field's enrollment in the project

#### Field data change

**Data element name:** Field data change

**Reporting question:** Has the information previously reported for this field changed?

**Description:** Indicator that this entry is being used to report any relevant changes, such as a new Field ID number or changes to the commodity or practice combinations, for a field that has previously been enrolled in the project.

**Data type:** List

**Select multiple values:** No

**Measurement unit:** Category

**Allowed values:**

- Yes
- No

**Logic:** None – all respond

**Required:** Yes

**Data collection level:** Field

**Data collection frequency:** Re-enrollment

#### Contract start date

**Data element name:** Contract start date

**Reporting question:** What is the start date of the contract with the producer that includes this field?

**Description:** Start date listed on the contract that enrolls the field in the project.

**Data type:** Date

**Select multiple values:** NA

**Measurement unit:** MM/DD/YYYY

**Allowed values:** 01/01/2023 – 12/31/2030

**Logic:** None – all respond

**Required:** Yes

**Data collection level:** Field

**Data collection frequency:** Initial enrollment

#### Total field area

**Data element name:** Total field area

**Reporting question:** What is the total size of the enrolled field?

**Description:** Total size of the field enrolled with the project.

**Data type:** Decimal

**Select multiple values:** No

**Measurement unit:** Acres

**Allowed values:** .01-500

**Logic:** None – all respond

**Required:** Yes

**Data collection level:** Field

**Data collection frequency:** Initial enrollment

---

**Commodity category**


---

**Data element name:** Commodity category**Reporting question:** What category of commodity(ies) is (are) produced from this field?**Description:** Category of commodity(ies) produced in field enrolled in the project**Data type:** List**Select multiple values:** No**Measurement unit:** Category**Allowed values:**

- Crops
- Livestock
- Trees
- Crops and livestock
- Crops and trees
- Livestock and trees
- Crops, livestock and trees

**Logic:** None – all respond**Required:** Yes**Data collection level:** Field**Data collection frequency:** Initial enrollment

---

**Commodity type**


---

**Data element name:** Commodity type**Reporting question:** What type of commodity is produced from this field?**Description:** Type of commodity produced in field enrolled in the project. See full list in Appendix B. The worksheet provides a drop-down list of the allowed values. Choose the appropriate value. Enter additional commodities in subsequent rows.**Data type:** List**Select multiple values:** No**Measurement unit:** Category**Allowed values:** FSA commodity list**Logic:** None – all respond**Required:** Yes**Data collection level:** Field**Data collection frequency:** Initial enrollment

---

**Baseline yield**


---

**Data element name:** Baseline yield**Reporting question:** What is the baseline yield of this field?**Description:** Average annual yield of commodity in 3 years prior to enrollment. Provide yield for the enrolled field if possible. If not at field level, provide average annual yield for the specific commodity for the operation.**Data type:** Decimal**Select multiple values:** No**Measurement unit:** Production per acre or animal**Allowed values:** .01-100,000**Logic:** None – all respond**Required:** Yes**Data collection level:** Field**Data collection frequency:** Initial enrollment

---

**Baseline yield unit**


---

**Data element name:** Baseline yield unit**Reporting question:** Baseline yield unit

**Description:** Unit of average annual yield of commodity in enrolled field in 3 years prior to enrollment. The worksheet provides a drop-down list of choices for this data element. If “other” is chosen, use the additional column to enter the appropriate yield unit as free text.

**Data type:** List**Select multiple values:** No**Measurement unit:** Category**Allowed values:**

- Animal units per acre
- Bushels per acre
- Carcass pounds per animal
- Head per acre
- Hundred-weights (or pounds) per head
- Linear feet per acre
- Liveweight pounds per animal
- Pounds per acre
- Tons per acre
- Other (specify)

**Logic:** None – all respond**Required:** Yes**Data collection level:** Field**Data collection frequency:** Initial enrollment

---

**Baseline yield location**


---

**Data element name:** Baseline yield location**Reporting question:** For what portion of the operation is the baseline yield being reported?

**Description:** Location of the reported average annual yield of commodity in 3 years prior to enrollment. If “other” is chosen, use the additional column to enter the appropriate location as free text.

**Data type:** List**Select multiple values:** No**Measurement unit:** Category**Allowed values:**

- Enrolled field
- Whole operation
- Other (specify)

**Logic:** None – all respond**Required:** Yes**Data collection level:** Field**Data collection frequency:** Initial enrollment

---

**Field land use**


---

**Data element name:** Field land use**Reporting question:** What is this field’s land use history?

**Description:** Prior to enrollment, what was the most common land use for this field in the past 3 years?

**Data type:** List**Select multiple values:** No**Measurement unit:** Category**Allowed values:**

- Crop land
- Forest land
- Non-agriculture
- Other agricultural land
- Pasture
- Range

**Logic:** None – all respond**Required:** Yes**Data collection level:** Field**Data collection frequency:** Initial enrollment



---

**Field irrigated**


---

**Data element name:** Field irrigated**Reporting question:** What is this field's irrigation history?**Description:** Prior to enrollment, what was the most common irrigation practice on this field the past 3 years?**Data type:** List**Select multiple values:** No**Measurement unit:** Category**Allowed values:**

- No irrigation
- Center pivot
- Drip-subsurface
- Drip-surface
- Flood/border
- Furrow/ditch
- Lateral/linear sprinklers
- Micro-sprinklers
- Seepage
- Side roll
- Solid set sprinklers
- Supplemental
- Surface
- Traveling gun/towline
- Wheel Line
- Other

**Logic:** None – all respond**Required:** Yes**Data collection level:** Field**Data collection frequency:** Initial enrollment

---

**Field tillage**


---

**Data element name:** Field tillage**Reporting question:** What is this field's tillage history?**Description:** Prior to enrollment, what was the most common tillage approach during the past 3 years?**Data type:** List**Select multiple values:** No**Measurement unit:** Category**Allowed values:**

- None
- Conventional, inversion
- Conventional, vertical
- No-till, direct seed
- Reduced till, inversion
- Reduced till, vertical
- Strip till
- Other

**Logic:** None – all respond**Required:** Yes**Data collection level:** Field**Data collection frequency:** Initial enrollment



---

**Practice past extent - farm**


---

**Data element name:** Practice past extent - farm

**Description:** Prior to enrollment, on what portion of the whole farm had this (these) CSAF practice(s) ever been used by the primary operator? If multiple practices are planned to be implemented in this field, enter the value that best corresponds to the farm's prior experience with the planned set of practices.

**Data type:** List

**Measurement unit:** Category

**Reporting question:** What percent of the farm has implemented this CSAF practice (combination) previously?

**Select multiple values:** No

**Allowed values:**

- Never used
- Used on less than 25% of operation
- Used on 25-50% of operation
- Used on 51-75% of operation
- Used on more than 75% of operation

**Required:** Yes

**Logic:** None – all respond

**Data collection level:** Field

**Data collection frequency:** Initial enrollment

---

**Field any CSAF practice**


---

**Data element name:** Field any CSAF practice

**Description:** Prior to enrollment, have any CSAF practice or practices been used in this field in the past 3 years? CSAF practices are included in a list in Appendix A.

**Data type:** List

**Measurement unit:** Category

**Reporting question:** What is this field's prior experience with CSAF practices?

**Select multiple values:** No

**Allowed values:**

- Yes
- No
- I don't know

**Required:** Yes

**Logic:** None – all respond

**Data collection level:** Field

**Data collection frequency:** Initial enrollment

---

**Practice past use - this field**


---

**Data element name:** Practice past use - this field

**Description:** Prior to enrollment, had this (these) CSAF practice(s) been used in this field in the in the past 3 years? Enter yes if all of the practices had been used previously in this field; enter some if multiple practices are being implemented and one or more, but not all of the practices had been used previously in this field; and enter no if none of the practices had been used previously in this field.

**Data type:** List

**Measurement unit:** Category

**Reporting question:** Have this CSAF practice (combination) been implemented previously in this field?

**Select multiple values:** No

**Allowed values:**

- Yes
- Some
- No
- I don't know

**Required:** Yes

**Logic:** None – all respond

**Data collection level:** Field

---

**Data collection frequency:** Initial enrollment

---

**Practice type**

<b>Data element name:</b> Practice type 1-7	<b>Reporting question:</b> What CSAF practice is being implemented in this field through the project?
<b>Description:</b> Which CSAF practice or practices will be implemented on this field as part of enrollment in the project? CSAF practices are included in a list in Appendix A. The worksheet provides seven columns for this data element. Enter one value for each column. If there are fewer than 7 practices being implemented on this field through enrollment in the project, leave unnecessary columns blank.	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b> See list in Appendix A
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Initial enrollment

---

**Practice standard**

<b>Data element name:</b> Practice standard 1-7	<b>Reporting question:</b> What standard does the CSAF practice follow?
<b>Description:</b> Is the CSAF practice being implemented on the field as part of enrollment in the project following a defined practice standard? The worksheet provides seven columns for this data element. Enter one value for each column, corresponding to the practice types entered in the previous columns. If there are fewer than 7 practices being implemented on this field through enrollment in the project, leave unnecessary columns blank.	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b> <ul style="list-style-type: none"> <li>• NRCS</li> <li>• Other (specify)</li> </ul>
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Initial enrollment

---

**Planned practice implementation year**

<b>Data element name:</b> Practice 1-7 implementation year	<b>Reporting question:</b> What year is the CSAF practice planned to be implemented?
<b>Description:</b> Year that the CSAF practice is planned to be implemented on the field. Use 2022 for early adopters, defined as fields that have the practice actively implemented in 2022 (prior to contract being signed for this project). The worksheet provides seven columns for this data element. Enter one value for each column, corresponding to the practice types entered in the previous columns. If there are fewer than 7 practices being implemented on this field through enrollment in the project, leave unnecessary columns blank.	
<b>Data type:</b> Integer	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Year	<b>Allowed values:</b> 2022-2030
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Initial enrollment

---

**Practice extent**

<b>Data element name:</b> Practice 1-7 extent	<b>Reporting question:</b> To what extent is the practice implemented?
<b>Description:</b> Total area, length, or head where the practice is being implemented in the field specified by the contract.	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Extent	<b>Allowed values:</b> .01-100,000
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Initial enrollment

---

---

**Practice extent unit**


---

**Data element name:** Practice 1-7 extent unit      **Reporting question:** Unit for extent of practice implementation extent unit

**Description:** Unit for extent of practice implementation on the field specified by the contract. If “other” is chosen, use the additional column to enter the appropriate unit.

**Data type:** List

**Select multiple values:** No

**Measurement unit:** Category

**Allowed values:**

- Acres
- Head of livestock
- Linear feet
- Square feet
- Other (specify)

**Logic:** None – all respond

**Required:** Yes

**Data collection level:** Field

**Data collection frequency:** Initial enrollment

---

### CSAF Practice Sub-questions

For certain practices, additional questions are asked that provide information necessary to estimate greenhouse gas benefits from implementation of the practice. See Table 11 in the *CSAF Practice Sub-questions* section for descriptions of individual questions to be answered depending on the CSAF practices selected.



**USDA** Partnerships for Climate-Smart Commodities Data Dictionary for Recipients  
February 2023

Farm Summary

**Unique IDs**

Farm ID	Unique Farm ID assigned by FSA
State or territory	State name (must match FSA farm enrollment data)
County of residence	County name (must match FSA farm enrollment data)

**Producer TA received**

**Data element name:** Producer TA received 1-3  
**Reporting question:** What types of technical assistance were provided to this producer?

**Description:** Did the recipient or any partner provide technical assistance (TA) to the producer this year? Technical assistance is any training, education, capacity building or other support provided by any project partner(s) directly to producers enrolled in the project. List up to the top three most common types of TA provided to this producer. The worksheet provides three columns with a drop-down list of the allowed values. Choose one value for each column. If there are fewer than 3 TA types, leave unnecessary columns blank. If "other" is chosen, use the additional column to enter other TA types as free text.

**Data type:** List

**Select multiple values:** No

**Measurement unit:** Category

**Allowed values:**

- Demonstration plots
- Equipment demonstrations
- Group field days or in-person field workshops
- Hotline
- One-on-one enrollment assistance
- One-on-one field visits
- One-on-one producer mentorship
- Producer networks and peer-to-peer groups
- Retailer consultation
- Social media/digital tools
- Train-the-trainer opportunities
- Virtual meetings or field days
- Webinars and videos
- Written materials
- None
- Other (specify)

**Logic:** None – all respond

**Required:** Yes

**Data collection level:** Producer

**Data collection frequency:** Quarterly

**Producer incentive amount**

**Data element name:** Producer incentive amount  
**Reporting question:** What is the total value of financial incentives provided to this producer?

**Description:** Total incentive payment received by the producer from USDA project funds for the year (non-cumulative). Do not include incentive payments made with partner match funds.

**Data type:** Decimal

**Select multiple values:** NA

**Measurement unit:** Dollars

**Allowed values:** \$0-\$5,000,000

**Logic:** None – all respond

**Required:** Yes

**Data collection level:** Producer

**Data collection frequency:** Quarterly



---

**Incentive reason**


---

**Data element name:** Incentive reason 1-4    **Reporting question:** Why were incentives provided to this producer?

**Description:** List up to four reasons for producer incentive payments. List the top 4 based on total value of the incentive for each reason. The worksheet provides four columns with a drop-down list of the allowed values. Choose one value for each column. If there are fewer than 4 reasons, leave unnecessary columns blank. If "other" is chosen, use the additional column to enter other reasons as free text.

**Data type:** List

**Select multiple values:** No

**Measurement unit:** Category

**Allowed values:**

- Avoided conversion
- Conference or training attendance
- Demographics/equity payment
- Enrollment
- Foregone revenue
- Historic data collection
- Identity preservation (supply chain tracing)
- Implementation of practices
- MMRV (e.g., data collection, reporting)
- Passing audit
- Price premium on output
- Yield change
- Other (specify)

**Logic:** None – all respond

**Required:** Yes

**Data collection level:** Producer

**Data collection frequency:** Quarterly

---

**Incentive structure**


---

**Data element name:** Incentive structure 1-4    **Reporting question:** What are the units for the financial incentives provided to this producer?

**Description:** List the structures (units) corresponding to the top 4 (by dollar value) incentive payments to producers. Production unit is weight or volume (bushel, kilogram, ton). The worksheet provides four columns with a drop-down list of the allowed values. Choose one value for each column. If there are fewer than 4 structure types, leave unnecessary columns blank. If "other" is chosen, use the additional column to enter other structure types as free text.

**Data type:** List

**Select multiple values:** No

**Measurement unit:** Category

**Allowed values:**

- Flat rate
- Per animal head
- Per area
- Per length
- Per production unit
- Per ton GHG
- Per tree
- Other (specify)

**Logic:** None – all respond

**Required:** Yes

**Data collection level:** Producer

**Data collection frequency:** Quarterly

---

---

**Incentive type**


---

**Data element name:** Incentive type 1-4**Reporting question:** What type of incentives were provided to each producer?

**Description:** List the top 4 types of incentive payments to producers (based on dollar value). The worksheet provides four columns with a drop-down list of the allowed values. Choose one value for each column. If there are fewer than 4 incentive types, leave unnecessary columns blank. If “other” is chosen, use the additional column to enter other incentive types as free text.

**Data type:** List**Select multiple values:** No**Measurement unit:** Category**Allowed values:**

- Cash payment
- Equipment loan
- Guaranteed commodity premium payment
- Inputs and supplies
- Land rental
- Loan
- Paid labor
- Post-harvest transportation
- Tuition or fees for training
- Other (specify)

**Logic:** None – all respond**Required:** Yes**Data collection level:** Producer**Data collection frequency:** Quarterly

---

**Payment on enrollment**


---

**Data element name:** Payment on enrollment**Reporting question:** What portion of the financial incentive is provided to the producer upon enrollment in the project?

**Description:** Any incentive payment provided to the producer upon enrollment/signing a contract, and not related to any implementation, MMRV or sales activities. Full payment means the full incentive amount for any contract held by the producer is paid upon enrollment. Partial payment means that only part of the full incentive amount for any contract held by the producer is paid upon enrollment. No payment means that none of the full incentive amount for any contract held by the producer is paid upon enrollment.

**Data type:** List**Select multiple values:** No**Measurement unit:** Category**Allowed values:**

- Full payment
- Partial payment
- No payment

**Logic:** None – all respond**Required:** Yes**Data collection level:** Producer**Data collection frequency:** Quarterly

---

**Payment on implementation**


---

**Data element name:** Payment on implementation**Reporting question:** What portion of the financial incentive is provided to the producer upon implementation of the practices?

**Description:** Any incentive payment provided to the producer upon implementing the practices included in the contract. Full payment means the full incentive amount for any contract held by the producer is paid upon implementation. Partial payment means that only part of the full incentive amount for any contract held by the producer is paid upon implementation. No payment means that none of the full incentive amount for any contract held by the producer is paid upon implementation.

**Data type:** List**Select multiple values:** No**Measurement unit:** Category**Allowed values:**

- Full payment
- Partial payment
- No payment

**Logic:** None – all respond**Required:** Yes**Data collection level:** Producer**Data collection frequency:** Quarterly



---

**Payment on harvest**


---

**Data element name:** Payment on harvest**Reporting question:** What portion of the financial incentive is provided to the producer upon harvest of the commodity?

**Description:** Any incentive payment provided to the producer upon harvesting or slaughtering the commodity included in the contract. Full payment means the full incentive amount for any contract held by the producer is paid upon harvest. Partial payment means that only part of the full incentive amount for any contract held by the producer is paid upon harvest. No payment means that none of the full incentive amount for any contract held by the producer is paid upon harvest.

**Data type:** List**Select multiple values:** No**Measurement unit:** Category**Allowed values:**

- Full payment
- Partial payment
- No payment

**Logic:** None – all respond**Required:** Yes**Data collection level:** Producer**Data collection frequency:** Quarterly

---

**Payment on MMRV**


---

**Data element name:** Payment on MMRV**Reporting question:** What portion of the financial incentive is provided to the producer upon completing MMRV requirements?

**Description:** Any incentive payment provided to the producer upon completing the annual MMRV requirements included in the contract. Full payment means the full incentive amount for any contract held by the producer is paid upon MMRV being complete. Partial payment means that only part of the full incentive amount for any contract held by the producer is paid upon MMRV being complete. No payment means that none of the full incentive amount for any contract held by the producer is paid upon MMRV being complete.

**Data type:** List**Select multiple values:** No**Measurement unit:** Category**Allowed values:**

- Full payment
- Partial payment
- No payment

**Logic:** None – all respond**Required:** Yes**Data collection level:** Producer**Data collection frequency:** Quarterly

---

**Payment on sale**


---

**Data element name:** Payment on sale**Reporting question:** What portion of the financial incentive is provided to producer upon sale of the commodity?

**Description:** Any incentive payment provided to the producer upon sale of the commodity included in the contract. Full payment means the full incentive amount for any contract held by the producer is paid upon sale. Partial payment means that only part of the full incentive amount for any contract held by the producer is paid upon sale. No payment means that none of the full incentive amount for any contract held by the producer is paid upon sale.

**Data type:** List**Select multiple values:** No**Measurement unit:** Category**Allowed values:**

- Full payment
- Partial payment
- No payment

**Logic:** None – all respond**Required:** Yes**Data collection level:** Producer**Data collection frequency:** Quarterly

**USDA** Partnerships for Climate-Smart Commodities Data Dictionary for Recipients  
February 2023

Field Summary

**Unique IDs**

Farm ID	Unique Farm ID assigned by FSA
Tract ID	Unique Tract ID assigned by FSA
Field ID	Unique Field ID assigned by FSA
State or territory of field	State name (must match FSA farm enrollment data)
County of field	County name (must match FSA farm enrollment data)

**Commodity type**

<b>Data element name:</b> Commodity type	<b>Reporting question:</b> What type of commodity is produced from this field?
<b>Description:</b> Type of commodity produced in field enrolled in the project. See full list in Appendix B. The worksheet provides multiple columns with a drop-down list of the allowed values. Choose one value for each column. Leave unnecessary columns blank.	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b> FSA commodity list
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Quarterly

**Practice type**

<b>Data element name:</b> Field practice type 1-7	<b>Reporting question:</b> What CSAF practice is being implemented in this field through the project?
<b>Description:</b> Which climate-smart agriculture or forestry (CSAF) practice or practices are being implemented in this project? CSAF practices are included in a list in Appendix A. The worksheet provides seven columns for this data element. Enter one value for each column. If there are fewer than 7 practices being implemented on this field through enrollment in the project, leave unnecessary columns blank.	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b> See list in Appendix A
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Quarterly

**Date practice complete**

<b>Data element name:</b> Date practice complete	<b>Reporting question:</b> When did the project certify CSAF practice implementation as complete?
<b>Description:</b> Date that the project certifies that implementation of the CSAF practice is complete on the field. Use January of the year prior to contract year for early adopters, defined as fields that have the practice actively implemented in the year prior to a contract associated with this project is signed). The worksheet provides seven columns for this data element. Enter one value for each column, corresponding to the practice types entered in the previous columns. If there are fewer than 7 practices being implemented on this field through enrollment in the project, leave unnecessary columns blank.	
<b>Data type:</b> Date	<b>Select multiple values:</b> No
<b>Measurement unit:</b> MM/DD/YYYY	<b>Allowed values:</b> 01/01/2023 – 12/31/2030
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Quarterly



**Contract end date**

<b>Data element name:</b> Contract end date	<b>Reporting question:</b> Contract end date
<b>Description:</b> End date listed on the contract that enrolls the field in the project. If contract end date changes, submit updated end date during the next quarter's reporting.	
<b>Data type:</b> Date	<b>Select multiple values:</b> No
<b>Measurement unit:</b> MM/DD/YYYY	<b>Allowed values:</b> 01/01/2023 – 12/31/2030
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Quarterly

**MMRV assistance provided**

<b>Data element name:</b> MMRV assistance provided	<b>Reporting question:</b> Was MMRV assistance provided?
<b>Description:</b> Was any MMRV assistance provided to the primary operator for this field? MMRV assistance includes in-field support for the use of technologies, consultation on data collection and input, and other support related to MMRV. MMRV is defined a measurement (calculations or estimations of GHG emissions), monitoring (ongoing review and confirmation that the climate-smart practice has been implemented according to the agreed upon standard and documentation of any changes in the site, implementation, or GHG emissions impacts over time), reporting (documenting and sharing monitoring and measurement results with project partners, the recipient, and any third-party verification organization), and verification (independent confirmation that measurement, monitoring and reporting information are complete, accurate and reliable).	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b>
	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> <li>• I don't know</li> </ul>
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Quarterly

**Marketing assistance provided**

<b>Data element name:</b> Marketing assistance provided	<b>Reporting question:</b> Was marketing assistance provided?
<b>Description:</b> Was any marketing assistance provided to the primary operator for the commodity(ies) produced from this field? Marketing assistance includes guaranteeing the sale of the commodity(ies), providing a platform for the sale of the commodity(ies), providing a label, branding, or other support related to marketing.	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b>
	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> <li>• I don't know</li> </ul>
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Quarterly

**Incentive per acre or head**

<b>Data element name:</b> Incentive per acre or head	<b>Reporting question:</b> Is this field receiving a per-acre or per-head incentive?
<b>Description:</b> Is this field receiving an incentive payment to implement a specific CSAF practice or set of practices on a per-acre or per-head (livestock) basis?	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b>
	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> <li>• I don't know</li> </ul>
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Quarterly

---

**Field commodity value**


---

<b>Data element name:</b> Field commodity value	<b>Reporting question:</b> What is the value of the commodity produced on the enrolled field?
<b>Description:</b> The dollar value of the commodity produced on the enrolled field.	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Dollars	<b>Allowed values:</b> \$1-\$10,000,000
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Quarterly

---

**Field commodity volume**


---

<b>Data element name:</b> Field commodity volume	<b>Reporting question:</b> What is the volume of commodity produced on the enrolled field?
<b>Description:</b> The volume of the commodity produced on the enrolled field	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Number	<b>Allowed values:</b> 1-10,000,000
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Quarterly

---

**Field commodity volume unit**


---

<b>Data element name:</b> Field commodity volume unit	<b>Reporting question:</b> What is the unit of volume?
<b>Description:</b> The unit associated with the volume of the commodity produced on the enrolled field. If “other” is chosen, enter the appropriate value in the additional column.	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b> <ul style="list-style-type: none"> <li>• Bushels</li> <li>• Carcass weight pounds</li> <li>• Gallons</li> <li>• Head</li> <li>• Linear feet</li> <li>• Liveweight pounds</li> <li>• Pounds</li> <li>• Tons</li> <li>• Other (specify)</li> </ul>
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Quarterly

---

**Cost of implementation**


---

<b>Data element name:</b> Cost of implementation	<b>Reporting question:</b> What is the cost of practice implementation in the field?
<b>Description:</b> Total annual estimated cost per unit of implementing the practice(s) in the enrolled field.	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Dollars	<b>Allowed values:</b> \$1-\$10,000,000
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Quarterly

---



**Cost unit****Data element name:** Cost unit**Reporting question:** What is the unit for cost?**Description:** The unit associated with the cost of implementing CSAF practices in the field. If “other” is chosen, enter the appropriate value in the additional column.**Data type:** List**Select multiple values:** No**Measurement unit:** Category**Allowed values:**

- Per acre
- Per bushel
- Per head
- Per linear foot
- Per pound
- Per ton
- Other (specify)

**Logic:** None – all respond**Required:** Yes**Data collection level:** Field**Data collection frequency:** Quarterly**Cost coverage****Data element name:** Cost coverage**Reporting question:** What percent of the practice cost is covered by the incentive?**Description:** Estimated proportion of total annual cost of implementing the practice(s) that is covered by project incentives.**Data type:** Integer**Select multiple values:** No**Measurement unit:** Percent**Allowed values:** 0-100**Logic:** None – all respond**Required:** Yes**Data collection level:** Field**Data collection frequency:** Quarterly**Field GHG monitoring****Data element name:** Field GHG monitoring 1-3**Reporting question:** How were GHG impacts monitored in this field?**Description:** Up to the top three forms of monitoring GHG benefits as part of MMRV requirements. Monitoring is defined as ongoing review and confirmation that the climate-smart practice has been implemented according to the agreed upon standard and documentation of any changes in the site, implementation, or GHG emissions impacts over time. Include up to 3 methods, based on which methods are most commonly used for this field. The worksheet provides three columns with a drop-down list of the allowed values. Choose one value for each column. If fewer than 3 GHG monitoring methods are used, leave unnecessary columns blank. If “other” is chosen, use the additional column to enter other GHG monitoring methods as free text.**Data type:** List**Select multiple values:** No**Measurement unit:** Category**Allowed values:**

- Drones
- Ground-level photos and videos
- On-farm inspection
- Plot-based sampling (e.g., soil, water)
- Producer records or attestation
- Satellite monitoring or remote sensing
- Soil metagenomics
- Soil sensors
- Water sensors
- Other (specify)

**Logic:** None – all respond**Required:** Yes**Data collection level:** Field**Data collection frequency:** Quarterly

---

**Field GHG reporting**


---

**Data element name:** Field GHG reporting 1-3      **Reporting question:** How were GHG benefits reported for this field?

**Description:** Up to the top three forms of reporting on GHG benefits as part of MMRV requirements. Reporting is defined as documenting and sharing monitoring and measurement results with project partners, the recipient, and any third-party verification organization. Include up to 3 methods, based on which methods are most commonly used for this field. The worksheet provides three columns with a drop-down list of the allowed values. Choose one value for each column. If fewer than 3 GHG reporting methods are used, leave unnecessary columns blank. If “other” is chosen, use the additional column to enter other GHG reporting methods as free text.

**Data type:** List

**Select multiple values:** No

**Measurement unit:** Category

**Allowed values:**

- Automated devices
- Email
- Mobile app
- Paper
- Third-party actors
- Website
- Other (specify)

**Logic:** None – all respond

**Required:** Yes

**Data collection level:** Field

**Data collection frequency:** Quarterly

---

**Field GHG verification**


---

**Data element name:** Field GHG verification 1-3      **Reporting question:** How was implementation of practices to reduce GHG emissions verified for this field?

**Description:** Up to the top three of verification of GHG benefits as part of MMRV requirements. Verification is defined as independent confirmation that measurement, monitoring and reporting information are complete, accurate and reliable. Include up to 3 methods, based on which methods are most commonly used for this field. The worksheet provides three columns with a drop-down list of the allowed values. Choose one value for each column. If fewer than 3 GHG verification methods are used, leave unnecessary columns blank. If “other” is chosen, use the additional column to enter other GHG verification methods as free text.

**Data type:** List

**Select multiple values:** No

**Measurement unit:** Category

**Allowed values:**

- Artificial intelligence
- Computer modeling
- Recipient audit
- Photos
- Record audit
- Satellite imagery
- Site or field visit
- Third-party audit
- Other (specify)

**Logic:** None – all respond

**Required:** Yes

**Data collection level:** Field

**Data collection frequency:** Quarterly

---



---

**Field GHG calculations**


---

<b>Data element name:</b> Field GHG calculations	<b>Reporting question:</b> What methods are used to calculate GHG benefits in this field?
<b>Description:</b> List the method(s) used to calculate GHG benefits in this field. If yes to direct physical measurements, submit result reports (see <i>Supplemental Data Submission – Field direct GHG measurement results</i> ).	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b> <ul style="list-style-type: none"> <li>• Models</li> <li>• Direct field measurements</li> <li>• Both</li> </ul>
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Quarterly

---

**Field official GHG calculation**


---

<b>Data element name:</b> Field official GHG calculation	<b>Reporting question:</b> What method was used to calculate the official GHG benefits in this field?
<b>Description:</b> List the method used to calculate the official GHG benefits in this field that are reported as part of the project's aggregate impact.	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b> <ul style="list-style-type: none"> <li>• Models</li> <li>• Direct field measurements</li> </ul>
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Quarterly

---

**Field official GHG ER**


---

<b>Data element name:</b> Field official GHG emission reductions	<b>Reporting question:</b> What are the estimated total GHG emission reductions (CO <sub>2</sub> eq) in this field?
<b>Description:</b> Estimated greenhouse gas emission reductions from practice implementation in this field that are reported as part of the project's aggregate impact. This data element must be entered upon practice completion or annually, as appropriate.	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Metric tons CO <sub>2</sub> eq	<b>Allowed values:</b> 0-10,000,000
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Quarterly

---

**Field official carbon stock**


---

<b>Data element name:</b> Field official carbon stock	<b>Reporting question:</b> How much carbon has been sequestered in this field?
<b>Description:</b> Estimated total change in carbon stock based on practice implementation in this field. This data element can be reported in any quarter and is cumulative for the year. Conversion rate is one ton of carbon = 3.67 tons of CO <sub>2</sub> eq.	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Metric tons CO <sub>2</sub> eq	<b>Allowed values:</b> 0-10,000,000
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Quarterly

---

---

**Field official CO2 ER**


---

<b>Data element name:</b> Field official CO2 emission reductions	<b>Reporting question:</b> What are the estimated total CO2 emission reductions in this field?
<b>Description:</b> Estimated total carbon dioxide emission reductions based on practice implementation in this field that are reported as part of the project's aggregate impact. This data element must be entered upon practice completion or annually, as appropriate.	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Metric tons CO <sub>2</sub>	<b>Allowed values:</b> 0-10,000,000
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Quarterly

---

**Field official CH4 ER**


---

<b>Data element name:</b> Field official CH4 emission reductions	<b>Reporting question:</b> What are the estimated total CH4 emission reductions in this field?
<b>Description:</b> Estimated total methane emission reductions based on practice implementation in this field that are reported as part of the project's aggregate impact. This data element must be entered upon practice completion or annually, as appropriate. Conversion rate is one ton of CH <sub>4</sub> = 25 tons of CO <sub>2</sub> eq.	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Metric tons CH4 reduced in CO <sub>2</sub> eq	<b>Allowed values:</b> 0-10,000,000
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Quarterly

---

**Field official N2O ER**


---

<b>Data element name:</b> Field official N2O emission reductions	<b>Reporting question:</b> What are the estimated total N2O emission reductions in this field?
<b>Description:</b> Estimated total nitrous oxide emission reductions based on practice implementation in this field that are reported as part of the project's aggregate impact. This data element must be entered upon practice completion or annually, as appropriate. Conversion rate is one ton of N <sub>2</sub> O = 298 tons of CO <sub>2</sub> eq.	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Metric tons N2O reduced in CO <sub>2</sub> eq	<b>Allowed values:</b> 0-10,000,000
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Quarterly

---

**Field offsets produced**


---

<b>Data element name:</b> Field offsets produced	<b>Reporting question:</b> How many carbon offsets have been produced in this field?
<b>Description:</b> Total carbon offsets produced in the field during the quarter (not cumulative). Offsets are defined as having been verified and certified using an accepted standard and sold into the carbon marketplace.	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Metric tons CO <sub>2</sub> eq	<b>Allowed values:</b> 0-10,000,000
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Quarterly

---

---

**Field insets produced**


---

**Data element name:** Field insets produced      **Reporting question:** How many carbon insets have been produced in this field?

**Description:** Total carbon insets produced in the field during the quarter (not cumulative). Insets are defined as having been verified and certified using an accepted standard and accounted for within Scope 3 emissions for a firm.

**Data type:** Decimal

**Select multiple values:** No

**Measurement unit:** Metric tons CO<sub>2</sub>eq

**Allowed values:** 0-10,000,000

**Logic:** None – all respond

**Required:** Yes

**Data collection level:** Field

**Data collection frequency:** Quarterly

---

**Other field measurement**


---

**Data element name:** Other field measurement

**Reporting question:** Were data collected from the field for reasons other than GHG benefit estimation?

**Description:** Direct physical measurements or data collection taken in the field for any reason other than GHG benefits estimation. These reasons could include calibration of GHG estimation tools or models, tracking other environmental benefits (see Field environmental benefits report), and other reasons. If yes, submit corresponding reports (see *Supplemental data submission - Field direct measurement results*).

**Data type:** List

**Select multiple values:** No

**Measurement unit:** Category

**Allowed values:**

- Yes
- No
- I don't know

**Logic:** None – all respond

**Required:** Yes

**Data collection level:** Field

**Data collection frequency:** Quarterly

---



### GHG Benefits - Alternate Modeled

#### **Unique IDs**

Farm ID	Unique Farm ID assigned by FSA
Tract ID	Unique Tract ID assigned by FSA
Field ID	Unique Field ID assigned by FSA
State or territory of field	State name (must match FSA farm enrollment data)
County of field	County name (must match FSA farm enrollment data)

#### **Commodity type**

<b>Data element name:</b> Commodity type 1-6	<b>Reporting question:</b> What type of commodity(ies) is produced from this field?
<b>Description:</b> Type of commodity(ies) produced in field enrolled in the project. See full list of commodity options in Appendix B. The worksheet provides multiple columns with drop-down lists of the allowed values. Choose one value for each column. Leave unnecessary columns blank	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b> FSA commodity list
<b>Logic:</b> None – all respond	<b>Required:</b> If project calculates GHG benefits using multiple methods
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Annual

#### **Practice type**

<b>Data element name:</b> Practice type 1-7	<b>Reporting question:</b> What CSAF practice is being implemented by this project?
<b>Description:</b> Which CSAF practice or practices are being implemented in this project? CSAF practices are included in a list in Appendix A. The worksheet provides seven columns for this data element. Enter one value for each column. If there are fewer than 7 practices being implemented by the project, leave unnecessary columns blank.	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b> See list in Appendix A
<b>Logic:</b> None – all respond	<b>Required:</b> If project calculates GHG benefits using multiple methods
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Annual



**GHG model**

**Data element name:** GHG model      **Reporting question:** What model was used for alternate calculation of GHG benefits?

**Description:** Select the model used for the alternate calculation of the field's GHG benefits.

**Data type:** List

**Select multiple values:** No

**Measurement unit:** Category

**Allowed values:**

- ACC Calculator
- Agriculture, Forestry and Other Land Use (AFOLU) Carbon Calculator
- AIRES
- APEX
- Bowen Ratio Energy Balance
- Carat-Calculator
- CArPE
- CDFA web-based calculator
- COMET-Farm
- COMET-Planner
- CoolFarm
- Cover Crop Explore
- CropTrak
- CultivateAI's FMIS
- DayCent-CR
- DNDC
- DSSAT
- Earth Optics
- EcoPractices
- EPIC
- Extrapolation based on literature
- FieldPrint
- Granular
- GREET
- gTIR
- IFSM
- IPCC default emissions factors & models
- itree
- Nitrogen Balance
- Nutrient Tracking Tool (NTT)
- RCD Project Tracker
- Revised Universal Soil Loss equation 2 (RUSLE2)
- RuFaS
- SAFE-Link
- SALUS (CIBO)
- SNAPGRAZE
- SquareRoots
- SWAT-C
- SYMFONI
- Truterra Sustainability Tool
- Verra
- WEPP
- YardStick
- Other (specify)

**Logic:** None – all respond

**Required:** If project calculates GHG benefits using multiple methods

**Data collection level:** Field

**Data collection frequency:** Annual

**Model start date**

<b>Data element name:</b> Model start date	<b>Reporting question:</b> For what time period are the GHG benefits modeled (model start date)?
<b>Description:</b> Date that the model parameters begin.	
<b>Data type:</b> Date	<b>Select multiple values:</b> NA
<b>Measurement unit:</b> MM/DD/YYYY	<b>Allowed values:</b> 01/01/1950 – 12/31/2030
<b>Logic:</b> None – all respond	<b>Required:</b> If project calculates GHG benefits using multiple methods
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Annual

**Model end date**

<b>Data element name:</b> Model end date	<b>Reporting question:</b> For what time period are the GHG benefits modeled (model end date)?
<b>Description:</b> Date that the model parameters end.	
<b>Data type:</b> Date	<b>Select multiple values:</b> NA
<b>Measurement unit:</b> MM/DD/YYYY	<b>Allowed values:</b> 01/01/2023– 12/31/2030
<b>Logic:</b> None – all respond	<b>Required:</b> If project calculates GHG benefits using multiple methods
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Annual

**Total GHG benefits estimated**

<b>Data element name:</b> Total GHG benefits estimated	<b>Reporting question:</b> What is the alternate estimate of the field's total GHG emission reductions?
<b>Description:</b> Total greenhouse gas emission reductions from practice implementation in the field estimated using an alternate model.	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Metric tons CO <sub>2</sub> eq	<b>Allowed values:</b> 0-10,000,000
<b>Logic:</b> None – all respond	<b>Required:</b> If project calculates GHG benefits using multiple methods
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Annual

**Total carbon stock estimated**

<b>Data element name:</b> Total carbon stock estimated	<b>Reporting question:</b> What is the alternate estimate of how much carbon has the field has sequestered?
<b>Description:</b> Total change in carbon stock based on practice implementation in the field estimated using an alternate model. Conversion rate is one ton of carbon = 3.67 tons of CO <sub>2</sub> eq.	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Metric tons CO <sub>2</sub> eq	<b>Allowed values:</b> 0-10,000,000
<b>Logic:</b> None – all respond	<b>Required:</b> If project calculates GHG benefits using multiple methods
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Annual

**Total CO<sub>2</sub> estimated**

<b>Data element name:</b> Total CO <sub>2</sub> estimated	<b>Reporting question:</b> What is the alternate estimate of the field's total CO <sub>2</sub> emission reductions?
<b>Description:</b> Total carbon dioxide emission reductions based on practice implementation in the field estimated using an alternate model.	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Metric tons CO <sub>2</sub>	<b>Allowed values:</b> 0-10,000,000
<b>Logic:</b> None – all respond	<b>Required:</b> If project calculates GHG benefits using multiple methods
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Annual

---

**Total CH4 estimated**


---

**Data element name:** Total CH4 estimated

**Reporting question:** What is the alternate estimate of the field's total CH4 emission reductions?

**Description:** Total methane emission reductions based on practice implementation in the field estimated using an alternate model. Conversion rate is one ton of CH<sub>4</sub> = 25 tons of CO<sub>2</sub>eq.

**Data type:** Decimal

**Select multiple values:** No

**Measurement unit:** Metric tons CH4 reduced in CO<sub>2</sub>eq

**Allowed values:** 0-10,000,000

**Logic:** None – all respond

**Required:** If project calculates GHG benefits using multiple methods

**Data collection level:** Field

**Data collection frequency:** Annual

---

**Total field N2O estimated**


---

**Data element name:** Total N2O estimated

**Reporting question:** What is the alternate estimate of the field's total N2O emission reductions?

**Description:** Total nitrous oxide emission reductions based on practice implementation in the field estimated using an alternate method. Conversion rate is one ton of N<sub>2</sub>O = 298 tons of CO<sub>2</sub>eq.

**Data type:** Decimal

**Select multiple values:** No

**Measurement unit:** Metric tons N2O reduced in CO<sub>2</sub>eq

**Allowed values:** 0-10,000,000

**Logic:** None – all respond

**Required:** If project calculates GHG benefits using multiple methods

**Data collection level:** Field

**Data collection frequency:** Annual

---

**USDA** Partnerships for Climate-Smart Commodities Data Dictionary for Recipients  
February 2023

GHG Benefits - Measured

**Unique IDs**

Farm ID	Unique Farm ID assigned by FSA
Tract ID	Unique Tract ID assigned by FSA
Field ID	Unique Field ID assigned by FSA
State or territory of field	State name (must match FSA farm enrollment data)
County of field	County name (must match FSA farm enrollment data)

**GHG measurement method**

**Data element name:** GHG measurement method

**Reporting question:** What measurement method is used to calculate GHG benefits?

**Description:** Field-based measurement method used to calculate GHG benefits. If “other” is chosen, enter the appropriate value as free text in the additional column.

**Data type:** List

**Measurement unit:** Category

**Select multiple values:** No

**Allowed values:**

- Emissions measurement unit
- Flux towers
- Litterbags
- Plant measurements
- Portable emissions analyzers
- Soil flux chambers
- Soil samples
- Soil sensors
- Vehicle-mounted sensors
- Other (specify)

**Required:** If a project conducts soil samples or takes carbon stock or greenhouse gas emission measurements in this field

**Logic:** None – all respond

**Data collection level:** Field

**Data collection frequency:** Annual

**Lab name**

**Data element name:** Lab name

**Reporting question:** What is the name of the lab that processed the measurement samples?

**Description:** Name of entity that received data and conducted analysis of samples.

**Data type:** Text

**Select multiple values:** No

**Measurement unit:** NA

**Allowed values:** Free text

**Logic:** None – all respond

**Required:** If applicable

**Data collection level:** Field

**Data collection frequency:** Annual



**Measurement start date****Data element name:** Measurement start date**Reporting question:** On what date did the measurement start?**Description:** Date that the measurements began. If it was a single point in time, use the same date for start date and end date. If multiple measurements took place over a time period, use the date that the measurements first began.**Data type:** Date**Select multiple values:** No**Measurement unit:** MM/DD/YYYY**Allowed values:** 01/01/2023 – 12/31/2030**Logic:** None – all respond**Required:** If a project conducts soil samples or takes carbon stock or greenhouse gas emission measurements in this field**Data collection level:** Field**Data collection frequency:** Annual**Measurement end date****Data element name:** Measurement end date**Reporting question:** On what date did the measurement end?**Description:** Date that the measurements began. If it was a single point in time, use the same date for start date and end date. If multiple measurements took place over a time period, use the date that the measurements were completed.**Data type:** Date**Select multiple values:** No**Measurement unit:** MM/DD/YYYY**Allowed values:** 01/01/2023– 12/31/2030**Logic:** None – all respond**Required:** If a project conducts soil samples or takes carbon stock or greenhouse gas emission measurements in this field**Data collection level:** Field**Data collection frequency:** Annual**Total CO2 reduction calculated****Data element name:** Total CO2 reduction calculated**Reporting question:** What are the total measured CO2 emission reductions?**Description:** Total annual CO2 emission reductions based on practice implementation in the field calculated from in-field measurements.**Data type:** Decimal**Select multiple values:** No**Measurement unit:** Metric tons CO<sub>2</sub>**Allowed values:** 0-10,000,000**Logic:** None – all respond**Required:** If a project takes carbon stock or greenhouse gas emission measurements in this field**Data collection level:** Field**Data collection frequency:** Annual**Total field carbon stock measured****Data element name:** Total field carbon stock measured**Reporting question:** What is the total amount of carbon sequestered based on repeat measurements in this field?**Description:** Change in carbon stock based on practice implementation in the field calculated from repeat soil sampling in this field. (Results for initial field soil samples should be reported in the 'Soil sample result' and 'Measurement type' columns.) Conversion rate is one ton of carbon = 3.67 tons of CO<sub>2</sub>eq.**Data type:** Decimal**Select multiple values:** No**Measurement unit:** Metric tons CO<sub>2</sub>eq**Allowed values:** 0-10,000,000**Logic:** None – all respond**Required:** If a project conducts soil samples or takes carbon stock measurements in this field**Data collection level:** Field**Data collection frequency:** Annual

---

**Total CH4 reduction calculated**

<b>Data element name:</b> Total CH4 reduction calculated	<b>Reporting question:</b> What are the total measured CH4 emission reductions?
<b>Description:</b> Total annual methane emission reductions based on practice implementation in the field calculated from in-field measurements. Conversion rate is one ton of CH <sub>4</sub> = 25 tons of CO <sub>2</sub> eq.	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Metric tons CH4 reduced in CO <sub>2</sub> eq	<b>Allowed values:</b> 0-10,000,000
<b>Logic:</b> None – all respond	<b>Required:</b> If a project conducts soil samples or takes carbon stock or greenhouse gas emission measurements in this field
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Annual

---

**Total N2O reduction calculated**

<b>Data element name:</b> Total N2O reduction calculated	<b>Reporting question:</b> What are the total measured N2O emission reductions?
<b>Description:</b> Total annual nitrous oxide emission reductions based on practice implementation in the field calculated from in-field measurements. Conversion rate is one ton of N <sub>2</sub> O = 298 tons of CO <sub>2</sub> eq.	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Metric tons N2O reduced in CO <sub>2</sub> eq	<b>Allowed values:</b> 0-10,000,000
<b>Logic:</b> None – all respond	<b>Required:</b> If a project conducts soil samples or takes carbon stock or greenhouse gas emission measurements in this field
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Annual

---

**Soil sample result**

<b>Data element name:</b> Soil sample result	<b>Reporting question:</b> What is the numeric result from this soil sample?
<b>Description:</b> Results of measurement(s) taken to determine the carbon stock of a soil (the tons of carbon found in a specified volume of soil).	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Amount	<b>Allowed values:</b> .00001-100,000
<b>Logic:</b> None – all respond	<b>Required:</b> If a project conducts soil samples in this field
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Annual

---

---

**Soil sample result unit**


---

**Data element name:** Soil sample result unit      **Reporting question:** What is unit for the soil sample result?

**Description:** Unit for the corresponding soil sample result. The worksheet provides a drop-down list of choices for this data element. If “other” is chosen, use the additional column to enter the appropriate yield unit as free text.

**Data type:** List

**Select multiple values:** No

**Measurement unit:** Category

**Allowed values:**

- Percent
- Ppm
- Grams
- Grams per cubic centimeter
- Other (specify)

**Logic:** None – all respond

**Required:** If a project conducts soil samples in this field

**Data collection level:** Field

**Data collection frequency:** Annual

---

**Measurement type**


---

**Data element name:** Measurement type

**Reporting question:** What type of analysis was conducted for this soil sample?

**Description:** Type of soil analysis conducted. The worksheet provides a drop-down list of choices for this data element. If “other” is chosen, use the additional column to enter the appropriate yield unit as free text.

**Data type:** List

**Select multiple values:** No

**Measurement unit:** Category

**Allowed values:**

- Organic matter
- Total organic carbon
- Bulk density
- Other (specify)

**Logic:** None – all respond

**Required:** If a project conducts soil samples in this field

**Data collection level:** Field

**Data collection frequency:** Annual

---



### Additional Environmental Benefits

#### **Unique IDs**

Farm ID	Unique Farm ID assigned by FSA
Tract ID	Unique Tract ID assigned by FSA
Field ID	Unique Field ID assigned by FSA
State or territory of field	State name (must match FSA farm enrollment data)
County of field	County name (must match FSA farm enrollment data)

#### **Environmental benefits**

<b>Data element name:</b> Environmental benefits	<b>Reporting question:</b> Are environmental benefits other than GHGs being tracked in the field?
<b>Description:</b> Tracking of environmental benefits other than greenhouse gas emission reductions and carbon sequestration in the enrolled field. Tracking means at a minimum using some form of monitoring and reporting that can quantify benefits.	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b> <ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> <li>• I don't know</li> </ul>
<b>Logic:</b> None – all respond	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Annual

#### **Reduction in nitrogen loss**

<b>Data element name:</b> Reduction in nitrogen loss	<b>Reporting question:</b> Are reductions in nitrogen losses being tracked in the field?
<b>Description:</b> Tracking reductions in nitrogen losses in the enrolled field. Tracking means at a minimum using some form of monitoring and reporting that can quantify benefits.	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b> <ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> <li>• I don't know</li> </ul>
<b>Logic:</b> Respond if yes to 'Environmental benefits'	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Annual

#### **Reduction in nitrogen loss amount**

<b>Data element name:</b> Reduction in nitrogen loss amount	<b>Reporting question:</b> How much reduction in nitrogen losses have been measured in the field?
<b>Description:</b> Total amount of reduction in nitrogen losses that is measured and reported in the enrolled field.	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Amount	<b>Allowed values:</b> 0-1,000,000
<b>Logic:</b> Respond if yes to 'Reduction in nitrogen loss'	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Annual



---

**Reduction in nitrogen loss amount unit**


---

<b>Data element name:</b> Reduction in nitrogen loss amount unit	<b>Reporting question:</b> What is the unit for how much reduction in nitrogen losses have been measured in the field?
<b>Description:</b> Unit for the total amount of reduction in nitrogen losses that is measured and reported in the enrolled field. If “other” is chosen, enter the appropriate value as free text in the additional column.	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b>
	<ul style="list-style-type: none"> <li>• Kilograms</li> <li>• Metric tons</li> <li>• Pounds</li> <li>• Other (specify)</li> </ul>
<b>Logic:</b> Respond if yes to ‘Reduction in nitrogen loss’	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Annual

---

**Reduction in nitrogen loss purpose**


---

<b>Data element name:</b> Reduction in nitrogen loss purpose	<b>Reporting question:</b> What is the purpose of tracking reduction in nitrogen losses?
<b>Description:</b> Purpose of tracking reduction in nitrogen losses in the enrolled field. If “other” is chosen, enter the appropriate value as free text in the additional column.	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b>
	<ul style="list-style-type: none"> <li>• Commodity marketing</li> <li>• Producing insets</li> <li>• Producing offsets</li> <li>• I don’t know</li> <li>• Other (specify)</li> </ul>
<b>Logic:</b> Respond if yes to ‘Reduction in nitrogen loss’	<b>Required:</b> Yes
<b>Data collection level:</b> Project	<b>Data collection frequency:</b> Annual

---

**Reduction in phosphorus loss**


---

<b>Data element name:</b> Reduction in phosphorus loss	<b>Reporting question:</b> Are reductions in phosphorus losses being tracked in the field?
<b>Description:</b> Tracking of reductions in phosphorus losses in the enrolled field. Tracking means at a minimum using some form of monitoring and reporting that can quantify benefits.	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b>
	<ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> <li>• I don’t know</li> </ul>
<b>Logic:</b> Respond if yes to ‘Environmental benefits’	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Annual

---

**Reduction in phosphorus loss amount**


---

<b>Data element name:</b> Reduction in phosphorus loss amount	<b>Reporting question:</b> How much reduction in phosphorus losses have been measured in the field?
<b>Description:</b> Total amount of reduction in phosphorus losses that is measured in the field.	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Amount	<b>Allowed values:</b> 0-1,000,000
<b>Logic:</b> Respond if yes to ‘Reduction in phosphorus loss’	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Annual

---

---

**Reduction in phosphorus loss amount unit**


---

<p><b>Data element name:</b> Reduction in phosphorus loss amount unit</p> <p><b>Description:</b> Unit for the total amount of reduction in phosphorus losses that is measured in the enrolled field. If “other” is chosen, enter the appropriate value as free text in the additional column.</p> <p><b>Data type:</b> List</p> <p><b>Measurement unit:</b> Category</p> <p><b>Logic:</b> Respond if yes to ‘Reduction in phosphorus loss’</p> <p><b>Data collection level:</b> Field</p>	<p><b>Reporting question:</b> What is the unit for the reduction in phosphorus losses measured in the field?</p> <p><b>Select multiple values:</b> No</p> <p><b>Allowed values:</b></p> <ul style="list-style-type: none"> <li>• Kilograms</li> <li>• Metric tons</li> <li>• Pounds</li> <li>• Other (specify)</li> </ul> <p><b>Required:</b> Yes</p> <p><b>Data collection frequency:</b> Annual</p>
---	---

---

**Reduction in phosphorus loss purpose**


---

<p><b>Data element name:</b> Reduction in phosphorus loss purpose</p> <p><b>Description:</b> Purpose of tracking reduction in phosphorus losses in the enrolled field. If “other” is chosen, enter the appropriate value as free text in the additional column.</p> <p><b>Data type:</b> List</p> <p><b>Measurement unit:</b> Category</p> <p><b>Logic:</b> Respond if yes to ‘Reduction in phosphorus loss’</p> <p><b>Data collection level:</b> Field</p>	<p><b>Reporting question:</b> What is the purpose of tracking reductions in phosphorus losses?</p> <p><b>Select multiple values:</b> No</p> <p><b>Allowed values:</b></p> <ul style="list-style-type: none"> <li>• Commodity marketing</li> <li>• Producing insets</li> <li>• Producing offsets</li> <li>• I don’t know</li> <li>• Other (specify)</li> </ul> <p><b>Required:</b> Yes</p> <p><b>Data collection frequency:</b> Annual</p>
---	---

---

**Other water quality**


---

<p><b>Data element name:</b> Other water quality</p> <p><b>Description:</b> Project tracking of other water quality metrics in the enrolled field. Tracking means at a minimum using some form of monitoring and reporting that can quantify benefits.</p> <p><b>Data type:</b> List</p> <p><b>Measurement unit:</b> Category</p> <p><b>Logic:</b> Respond if yes to ‘Environmental benefits’</p> <p><b>Data collection level:</b> Field</p>	<p><b>Reporting question:</b> Are other water quality metrics being tracked in the field?</p> <p><b>Select multiple values:</b> No</p> <p><b>Allowed values:</b></p> <ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> <li>• I don’t know</li> </ul> <p><b>Required:</b> Yes</p> <p><b>Data collection frequency:</b> Annual</p>
--	--

---

---

**Other water quality type**


---

<b>Data element name:</b> Other water quality type	<b>Reporting question:</b> What type of other water quality metric have been measured in the field?
<b>Description:</b> Type of other water quality metric (besides nitrogen loss and phosphorus loss reductions) that is measured in the field. If “other” is chosen, enter the appropriate value as free text in the additional column.	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b> <ul style="list-style-type: none"> <li>• Sediment load reduction</li> <li>• Temperature</li> <li>• Other (specify)</li> </ul>
<b>Logic:</b> Respond if yes to ‘Other water quality’	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Annual

---

**Other water quality amount**


---

<b>Data element name:</b> Other water quality amount	<b>Reporting question:</b> How much reduction in other water quality metrics have been measured in the field?
<b>Description:</b> Total amount of reduction in other water quality metrics that is measured in the enrolled field.	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Amount	<b>Allowed values:</b> 0-1,000,000
<b>Logic:</b> Respond if yes to ‘Other water quality’	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Annual

---

**Other water quality amount unit**


---

<b>Data element name:</b> Other water quality amount unit	<b>Reporting question:</b> What is the unit for the reduction in other water quality metrics measured in the field?
<b>Description:</b> Unit for the total amount of reduction in other water quality metrics that is measured in the enrolled field. If “other” is chosen, enter the appropriate value as free text in the additional column.	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b> <ul style="list-style-type: none"> <li>• Degrees F</li> <li>• Kilograms</li> <li>• Kilograms per liter</li> <li>• Metric tons</li> <li>• Pounds</li> <li>• Other (specify)</li> </ul>
<b>Logic:</b> Respond if yes to ‘Other water quality’	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Annual

---



---

**Other water quality purpose**

<p><b>Data element name:</b> Other water quality purpose</p> <p><b>Description:</b> Purpose of tracking other water quality benefits in the enrolled field. If “other” is chosen, enter the appropriate value as free text in the additional column.</p> <p><b>Data type:</b> List</p> <p><b>Measurement unit:</b> Category</p> <p><b>Logic:</b> Respond if yes to ‘Other water quality’</p> <p><b>Data collection level:</b> Field</p>	<p><b>Reporting question:</b> What is the purpose of tracking other water quality benefits?</p> <p><b>Select multiple values:</b> No</p> <p><b>Allowed values:</b></p> <ul style="list-style-type: none"> <li>• Commodity marketing</li> <li>• Producing insets</li> <li>• Producing offsets</li> <li>• I don’t know</li> <li>• Other (specify)</li> </ul> <p><b>Required:</b> Yes</p> <p><b>Data collection frequency:</b> Annual</p>
---	--

---

**Water quantity**

<p><b>Data element name:</b> Water quantity</p> <p><b>Description:</b> Tracking of water conservation or reduction in use in the enrolled field. Tracking means at a minimum using some form of monitoring and reporting that can quantify benefits.</p> <p><b>Data type:</b> List</p> <p><b>Measurement unit:</b> Category</p> <p><b>Logic:</b> Respond if yes to ‘Environmental benefits’</p> <p><b>Data collection level:</b> Field</p>	<p><b>Reporting question:</b> Is water conservation being tracked in the field?</p> <p><b>Select multiple values:</b> No</p> <p><b>Allowed values:</b></p> <ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> <li>• I don’t know</li> </ul> <p><b>Required:</b> Yes</p> <p><b>Data collection frequency:</b> Annual</p>
--	--

---

**Water quantity amount**

<p><b>Data element name:</b> Water quantity amount</p> <p><b>Description:</b> Total amount of water conservation or reduction that is measured in the field.</p> <p><b>Data type:</b> Decimal</p> <p><b>Measurement unit:</b> Amount</p> <p><b>Logic:</b> Respond if yes to ‘Water quantity’</p> <p><b>Data collection level:</b> Field</p>	<p><b>Reporting question:</b> How much water conservation has been measured in the field?</p> <p><b>Select multiple values:</b> No</p> <p><b>Allowed values:</b> 0-1,000,000</p> <p><b>Required:</b> Yes</p> <p><b>Data collection frequency:</b> Annual</p>
---	--

---

**Water quantity amount unit**

<p><b>Data element name:</b> Water quantity amount unit</p> <p><b>Description:</b> Unit for the total amount of water conservation or reduced use that is measured and reported in the enrolled field. If “other” is chosen, enter the appropriate value as free text in the additional column.</p> <p><b>Data type:</b> List</p> <p><b>Measurement unit:</b> Category</p> <p><b>Logic:</b> Respond if yes to ‘Water quantity’</p> <p><b>Data collection level:</b> Field</p>	<p><b>Reporting question:</b> What is the unit for the amount of water conservation measured in the field?</p> <p><b>Select multiple values:</b> No</p> <p><b>Allowed values:</b></p> <ul style="list-style-type: none"> <li>• Acre-feet</li> <li>• Cubic feet</li> <li>• Other (specify)</li> </ul> <p><b>Required:</b> Yes</p> <p><b>Data collection frequency:</b> Annual</p>
---	--

---



---

**Water quantity purpose**


---

**Data element name:** Water quantity purpose

**Reporting question:** What is the purpose of tracking water conservation?

**Description:** Purpose of tracking water conservation or reductions in water use in the enrolled field. If “other” is chosen, enter the appropriate value as free text in the additional column.

**Data type:** List

**Select multiple values:** No

**Measurement unit:** Category

**Allowed values:**

- Commodity marketing
- Producing insets
- Producing offsets
- I don’t know
- Other (specify)

**Logic:** Respond if yes to ‘Water quantity’

**Required:** Yes

**Data collection level:** Field

**Data collection frequency:** Annual

---

**Reduced erosion**


---

**Data element name:** Reduced erosion

**Reporting question:** Is reduced soil erosion being tracked in the field?

**Description:** Tracking of reduced soil erosion in the enrolled field. Tracking means at a minimum using some form of monitoring and reporting that can quantify benefits.

**Data type:** List

**Select multiple values:** No

**Measurement unit:** Category

**Allowed values:**

- Yes
- No
- I don’t know

**Logic:** Respond if yes to ‘Environmental benefits’

**Required:** Yes

**Data collection level:** Field

**Data collection frequency:** Annual

---

**Reduced erosion amount**


---

**Data element name:** Reduced erosion amount

**Reporting question:** How much erosion reduction has been measured in the field?

**Description:** Total amount of erosion reduction that is measured in the enrolled field.

**Data type:** Decimal

**Select multiple values:** No

**Measurement unit:** Amount

**Allowed values:** 0-1,000,000

**Logic:** Respond if yes to ‘Reduced erosion’

**Required:** Yes

**Data collection level:** Field

**Data collection frequency:** Annual

---

**Reduced erosion amount unit**


---

**Data element name:** Reduced erosion unit

**Reporting question:** What is the unit for the amount of erosion reduction measured?

**Description:** Unit for the total amount of erosion reduction from enrolled fields that is measured and reported by the project. If “other” is chosen, enter the appropriate value as free text in the additional column.

**Data type:** List

**Select multiple values:** No

**Measurement unit:** Category

**Allowed values:**

- Tons
- Other (specify)

**Logic:** Respond if yes to ‘Reduced erosion’

**Required:** Yes

**Data collection level:** Field

**Data collection frequency:** Annual

---

---

**Reduced erosion purpose**


---

**Data element name:** Reduced erosion purpose

**Description:** Purpose of tracking reduced erosion the enrolled field. If “other” is chosen, enter the appropriate value as free text in the additional column.

**Data type:** List

**Measurement unit:** Category

**Reporting question:** What is the purpose of tracking reduced erosion in the field?

**Select multiple values:** No

**Allowed values:**

- Commodity marketing
- Producing insets
- Producing offsets
- I don’t know
- Other (specify)

**Logic:** Respond if yes to ‘Reduced erosion’

**Required:** Yes

**Data collection level:** Field

**Data collection frequency:** Annual

---

**Reduced energy use**


---

**Data element name:** Reduced energy use

**Reporting question:** Is reduced energy use being tracked in the field?

**Description:** Tracking of reduced energy use in the enrolled field. Tracking means at a minimum using some form of monitoring and reporting that can quantify benefits.

**Data type:** List

**Measurement unit:** Category

**Select multiple values:** No

**Allowed values:**

- Yes
- No
- I don’t know

**Logic:** Respond if yes to ‘Environmental benefits’

**Required:** Yes

**Data collection level:** Field

**Data collection frequency:** Annual

---

**Reduced energy use amount**


---

**Data element name:** Reduced energy use amount

**Reporting question:** How much energy use reduction has been measured in the field?

**Description:** Total amount of energy use reduction that is measured in the enrolled field.

**Data type:** Decimal

**Measurement unit:** Amount

**Select multiple values:** No

**Allowed values:** 0-1,000,000

**Logic:** Respond if yes to ‘Reduced energy use’

**Required:** Yes

**Data collection level:** Field

**Data collection frequency:** Annual

---

**Reduced energy use amount unit**


---

**Data element name:** Reduced energy use unit

**Reporting question:** What is the unit for the energy use reduction measured in the field?

**Description:** Unit for the total amount of energy use reduction that is measured in the enrolled field. If “other” is chosen, enter the appropriate value as free text in the additional column.

**Data type:** List

**Measurement unit:** Category

**Select multiple values:** No

**Allowed values:**

- Kilowatt hours
- Other (specify)

**Logic:** Respond if yes to ‘Reduced energy use’

**Required:** Yes

**Data collection level:** Field

**Data collection frequency:** Annual

---

---

**Reduced energy use purpose**


---

**Data element name:** Reduced energy use purpose

**Reporting question:** What is the purpose of tracking reduced energy use in the field?

**Description:** Purpose of tracking reduced energy use in the enrolled field. If “other” is chosen, enter the appropriate value as free text in the additional column.

**Data type:** List

**Select multiple values:** No

**Measurement unit:** Category

**Allowed values:**

- Commodity marketing
- Producing insets
- Producing offsets
- I don’t know
- Other (specify)

**Logic:** Respond if yes to ‘Reduced energy use’

**Required:** Yes

**Data collection level:** Field

**Data collection frequency:** Annual

---

**Avoided land conversion**


---

**Data element name:** Avoided land conversion

**Reporting question:** Is avoided land conversion being tracked in the field?

**Description:** Tracking of avoided land conversion in the enrolled field. Tracking means at a minimum using some form of monitoring and reporting that can quantify benefits. Land conservation means land use changing from agricultural uses to non-agricultural uses.

**Data type:** List

**Select multiple values:** No

**Measurement unit:** Category

**Allowed values:**

- Yes
- No
- I don’t know

**Logic:** Respond if yes to ‘Environmental benefits’

**Required:** Yes

**Data collection level:** Field

**Data collection frequency:** Annual

---

**Avoided land conversion amount**


---

**Data element name:** Avoided land conversion amount

**Reporting question:** How much avoided land conversion has been measured in the field?

**Description:** Total amount of avoided land conversion that is measured in the enrolled field.

**Data type:** Decimal

**Select multiple values:** No

**Measurement unit:** Amount

**Allowed values:** 0-1,000,000

**Logic:** Respond if yes to ‘Avoided land conversion’

**Required:** Yes

**Data collection level:** Field

**Data collection frequency:** Annual

---

**Avoided land conversion amount unit**


---

**Data element name:** Avoided land conversion unit

**Reporting question:** What is the unit for the amount of avoided land conversion measured in the field?

**Description:** Unit for the total amount of avoided land conversion that is measured in the enrolled field. If “other” is chosen, enter the appropriate value as free text in the additional column.

**Data type:** List

**Select multiple values:** No

**Measurement unit:** Category

**Allowed values:**

- Acres
- Other (specify)

**Logic:** Respond if yes to ‘Avoided land conversion’

**Required:** Yes

**Data collection level:** Field

**Data collection frequency:** Annual

---



---

**Avoided land conversion purpose**


---

<b>Data element name:</b> Avoided land conversion purpose	<b>Reporting question:</b> What is the purpose of tracking avoided land conversion in the field?
<b>Description:</b> Purpose of tracking avoided land conversion in the enrolled field. If “other” is chosen, enter the appropriate value as free text in the additional column.	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b> <ul style="list-style-type: none"> <li>• Commodity marketing</li> <li>• Producing insets</li> <li>• Producing offsets</li> <li>• I don’t know</li> <li>• Other (specify)</li> </ul>
<b>Logic:</b> Respond if yes to ‘Avoided land conversion’	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Annual

---

**Improved wildlife habitat**


---

<b>Data element name:</b> Improved wildlife habitat	<b>Reporting question:</b> Are improvements to wildlife habitat being tracked in the field?
<b>Description:</b> Tracking of improvements to wildlife in and around the enrolled field. Tracking means at a minimum using some form of monitoring and reporting that can quantify benefits.	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b> <ul style="list-style-type: none"> <li>• Yes</li> <li>• No</li> <li>• I don’t know</li> </ul>
<b>Logic:</b> Respond if yes to ‘Environmental benefits’	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Annual

---

**Improved wildlife habitat amount**


---

<b>Data element name:</b> Improved wildlife habitat amount	<b>Reporting question:</b> How much improved wildlife habitat has been measured in the field?
<b>Description:</b> Total amount of improved wildlife habitat that is measured in and around the enrolled fields.	
<b>Data type:</b> Decimal	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Amount	<b>Allowed values:</b> 0-1,000,000
<b>Logic:</b> Respond if yes to ‘Improved wildlife habitat’	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Annual

---

**Improved wildlife habitat amount unit**


---

<b>Data element name:</b> Improved wildlife habitat unit	<b>Reporting question:</b> What is the unit for the amount of improved wildlife habitat measured in the field?
<b>Description:</b> Unit for the total amount of improved wildlife habitat that is measured in and around enrolled fields. If “other” is chosen, enter the appropriate value as free text in the additional column.	
<b>Data type:</b> List	<b>Select multiple values:</b> No
<b>Measurement unit:</b> Category	<b>Allowed values:</b> <ul style="list-style-type: none"> <li>• Acres</li> <li>• Linear feet</li> <li>• Other (specify)</li> </ul>
<b>Logic:</b> Respond if yes to ‘Improved wildlife habitat’	<b>Required:</b> Yes
<b>Data collection level:</b> Field	<b>Data collection frequency:</b> Annual

---



---

**Improved wildlife habitat purpose**


---

**Data element name:** Improved wildlife habitat purpose

**Description:** Purpose of tracking improved wildlife habitat in the enrolled field. If “other” is chosen, enter the appropriate value as free text in the additional column.

**Data type:** List

**Measurement unit:** Category

**Reporting question:** What is the purpose of tracking improved wildlife habitat in the field?

**Select multiple values:** No

**Allowed values:**

- Commodity marketing
- Producing insets
- Producing offsets
- I don't know
- Other (specify)

**Logic:** Respond if yes to 'Improved wildlife habitat'

**Required:** Yes

**Data collection level:** Field

**Data collection frequency:** Annual

---

### CSAF Practice Sub-questions

For some CSAF practices, there is an additional set of questions that are unique to each practice. Responses to these questions are needed to verify estimated GHG benefits of these practices. If a field is implementing a CSAF practice with an NRCS CPS code in Table 11, answer the follow-up questions listed next to the relevant practice name in the table. Use the *Supplemental Reporting Workbook – CSAF Practice Sub-questions* to report the required information.

Table 11. Follow-on questions for select CSAF practices

Practice name and code	Follow-up question	Options (select one)
Alley Cropping (CPS 311)	Species category (select most common/extensive type if using more than one)	Coniferous trees Deciduous trees Shrubs
	Species density (number of trees planted per acre)	1-10,000
Anaerobic Digester (CPS 366)	Waste storage system prior to installing anaerobic digester	Aerobic lagoon
		Anaerobic digester (complex mix) with energy generation
		Anaerobic digester (plug flow) with energy generation
		Anaerobic lagoon
		Composting
		Covered lagoon (no energy generation or flaring)
		Covered lagoon with energy generation
		Covered lagoon with flaring
		Daily spread
		Deep bedding pack
Digester type	Digester type	Deep pit
		Dry lot
		Dry stacking/solid storage
		Pasture/range/paddock
		Poultry with bedding
		Poultry without bedding (e.g., high rise)
		Slurry tank/basin
		Covered lagoon with energy generation
		Covered lagoon with flaring
		Covered lagoon (no energy generation or flaring)
Additional feedstock source (select most common if using more than one)	Additional feedstock source (select most common if using more than one)	Complex mix with energy generation
		Plug flow with energy generation
		Other (specify)
		Food waste
Additional feedstock source (select most common if using more than one)	Additional feedstock source (select most common if using more than one)	Straw or bedding
		Wastewater
		Other (specify)

Combustion System Improvement (CPS 372)	Fuel type before installation	Coal Diesel Electricity Gasoline Kerosene Liquified petroleum gas (LPG) Natural gas Propane Wood Other (specify)
	Fuel amount before installation	0-1,000,000
	Fuel amount unit before installation	Cubic feet (natural gas) Gallons (diesel, gasoline, propane, LPG, kerosene) Kilowatt-hours (electricity) Pounds (wood, coal) Other (specify)
	Fuel type after installation	Coal Diesel Electricity Gasoline Kerosene Liquified petroleum gas (LPG) Natural gas Propane Wood Other (specify)
	Fuel amount after installation	0-1,000,000
	Fuel amount unit after installation	Cubic feet (natural gas) Gallons (diesel, gasoline, propane, LPG, kerosene) Kilowatt-hours (electricity) Pounds (wood, coal) Other (specify)
Conservation Cover (CPS 327)	Species category (select most common/extensive type if using more than one)	Brassicas Grasses Legumes Non-legume broadleaves Shrubs

Conservation Crop Rotation (CPS 328)	Conservation crop type	Brassica Broadleaf Cool season Grass Legume Warm season
	Change implemented	Added perennial crop Reduced fallow period Both
	Conservation crop rotation tillage type	Conventional (plow, chisel, disk) No-till, direct seed Reduced till Strip till None Other (specify)
	Total conservation crop rotation length in days	1-120
Contour Buffer Strips (CPS 332)	Strip width (feet)	1-100
	Species category	Grasses Forbs Mix
Cover Crop (CPS 340)	Species category (select most common/extensive type if using more than one)	Brassicas Forbs Grasses Legume Non-legume broadleaves
	Cover crop planned management	Grazing Haying Termination
	Cover crop termination method	Burning Herbicide application Incorporation Mowing Rolling/crimping Winter kill/frost
	Species category (select most common/extensive type if using more than one)	Grass Grass legume/forb mix Herbaceous woody mix Perennial or reseeding Shrubs Trees
Feed Management (CPS 592)	Crude protein (percent)	0-100
	Fat (percent)	0-100
	Feed additives/supplements	Chemical Edible oils/fats Seaweed/kelp Other (specify)
Field Border (CPS 386)	Species category (select most common/extensive type if using more than one)	Forbs Grasses Mix Shrubs




**Partnerships for Climate-Smart Commodities Data Dictionary for Recipients**  
 February 2023

	Strip width (feet)	20-1,000
Filter Strip (CPS 393)	Species category (select most common/extensive type if using more than one)	Forbs Grasses Mix Shrubs
Forest Farming (CPS 379)	Land use in previous year	Forest Multi-story cropping Pasture/grazing land Row crops Other agroforestry
Forest Stand Improvement (CPS 666)	Purpose for implementation	Maintain or improve forest carbon stocks Maintain or improve forest health and productivity Maintain or improve forest structure and composition Maintain or improve wildlife, fish, and pollinator habitat Manage natural precipitation more efficiently Reduce forest pest pressure Reduce forest wildfire hazard
Grassed Waterway (CPS 412)	Species category (select most common/extensive type if using more than one)	Flowering Plants Forbs Grasses
Hedgerow Planting (CPS 422)	Species category (select most common/extensive type if using more than one)	Grasses Shrubs Trees
	Species density (number of trees planted per acre)	1-10,000
Herbaceous Wind Barriers (CPS 603)	Species category (select most common/extensive type if using more than one)	Forbs Grasses Mix Shrubs
	Barrier width (feet)	1-1,000
	Number of rows	1-100
Mulching (CPS 484)	Mulch type	Gravel Natural Synthetic Wood
	Mulch cover (percent of field)	0-100

	Nutrient type with CPS 590	Biosolids Commercial fertilizers Compost EEf (nitrification inhibitor) EEf (slow or controlled release) EEf (urease inhibitor) Green manure Liquid animal manure Organic by-products Organic residues or materials Solid/semi-solid animal manure Wastewater
	Nutrient application method with CPS 590	Banded Broadcast Injection Irrigation Surface application Surface application with tillage Variable rate
Nutrient management (CPS 590)	Nutrient application method in the previous year	Banded Broadcast Injection Irrigation Surface application Surface application with tillage Variable rate
	Nutrient application timing with CPS 590	Single pre-planting Single post-planting Split pre- and post-planting Split post-planting
	Nutrient application timing in the previous year	Single pre-planting Single post-planting Split pre- and post-planting Split post-planting
	Nutrient application rate with CPS 590	0-20,000
	Nutrient application rate unit with CPS 590	Gallons per acre Pounds per acre
	Nutrient application rate change	Decrease compared to previous year Increase compared to previous year No change
Pasture and Hay Planting (CPS 512)	Species category (select most common/extensive type if using more than one)	Cool-season broadleaf Cool-season grass Warm-season broadleaf Warm-season grass
	Termination process	Grazing Haying (i.e., cutting and baling) Other (specify)
Prescribed Grazing (CPS 528)	Grazing type	Cell grazing Deferred rotational Management intensive Rest-rotation


 Partnerships for Climate-Smart Commodities Data Dictionary for Recipients  
 February 2023

Range Planting (CPS 550)	Species category (select most common/extensive type if using more than one)	Forbs Grasses Legumes Shrubs Trees
Residue and Tillage Management – No-till (CPS 329)	Surface disturbance	None Seed row only
Residue and Tillage Management – Reduced Till (CPS 345)	Surface disturbance	None Seed row/ridge tillage for planting Shallow across most of the soil surface Vertical/mulch
Riparian Forest Buffer (CPS 391)	Species category (select most common/extensive type if using more than one)	Coniferous trees Deciduous trees Shrubs
	Species density (number of trees planted per acre)	1-10,000
Riparian Herbaceous Cover (CPS 390)	Species category (select most common/extensive type if using more than one)	Ferns Forbs Grasses Legumes Rushes Sedges
Roofs and Covers (CPS 367)	Roof/cover type	Concrete Flexible geomembrane Metal Timber Other (specify)
Silvopasture (CPS 381)	Species category (select most common/extensive type if using more than one)	Coniferous trees Deciduous trees Forage Shrubs
	Species density (number of trees planted per acre)	1-10,000
Stripcropping (CPS 585)	Strip width (feet)	1-1,000
	Crop category (select most common/extensive type if using more than one)	Erosion resistant crops Fallow Sediment trapping crops
	Number of strips	2-100
Tree/Shrub Establishment (CPS 612)	Species category (select most common/extensive type if using more than one)	Coniferous trees Deciduous trees Shrubs
	Species density (number of trees planted per acre)	1-10,000
Vegetative Barrier (CPS 601)	Species category (select most common/extensive type if using more than one)	Grasses Grass forb mix Grass legume mix
	Barrier width (feet)	3-1,000


**Partnerships for Climate-Smart Commodities Data Dictionary for Recipients**  
 February 2023

Waste Separation Facility (CPS 632)	Separation type	Chemical (e.g., salts, polymers) Mechanical (e.g., screens, presses) Settling basin
	Most common use of solids	Bedding Field applied Other (specify)
Waste Storage Facility (CPS 313)	Waste storage system prior to installing your waste storage facility	Aerobic lagoon Anaerobic digester (complex mix) with energy generation Anaerobic digester (plug flow) with energy generation Anaerobic lagoon Composting Covered lagoon (no energy generation or flaring)
		Covered lagoon with energy generation Covered lagoon with flaring Daily spread Deep bedding pack Deep pit Dry lot Dry stacking/solid storage Pasture/range/paddock Poultry with bedding Poultry without bedding (e.g., high rise) Slurry tank/basin
Waste Treatment (CPS 629)	Treatment type	Biological Chemical Mechanical
	Waste Treatment Lagoon (CPS 359)	Waste storage system prior to installing waste treatment lagoon
Is there a lagoon cover/crust?		Yes No
	Is there lagoon aeration?	Yes No



**USDA** Partnerships for Climate-Smart Commodities Data Dictionary for Recipients  
February 2023

Windbreak/Shelterbelt Establishment and Renovation (CPS 380)	Species category (select most common/extensive type if using more than one)	Coniferous trees Deciduous trees Shrubs
	Species density (number of trees planted per acre)	1-10,000

## Appendix A: Climate-smart Agriculture and Forestry Practices

### All NRCS Practice Standards (not limited to climate-smart practices)

309, Agrichemical Handling Facility	390, Riparian Herbaceous Cover
311, Alley Cropping	391, Riparian Forest Buffer
313, Waste Storage Facility	393, Filter Strip
314, Brush Management	394, Firebreak
315, Herbaceous Weed Treatment	395, Stream Habitat Improvement and Management
316, Animal Mortality Facility	396, Aquatic Organism Passage
317, Composting Facility	397, Aquaculture Pond
318, Short Term Storage of Animal Waste and By-Products	398, Fish Raceway or Tank
319, On-Farm Secondary Containment Facility	399, Fishpond Management
320, Irrigation Canal or Lateral	400, Bivalve Aquaculture Gear and Biofouling Control
324, Deep Tillage	402, Dam
325, High Tunnel System	410, Grade Stabilization Structure
326, Clearing and Snagging	412, Grassed Waterway
327, Conservation Cover	420, Wildlife Habitat Planting
328, Conservation Crop Rotation	422, Hedgerow Planting
329, Residue and Tillage Management, No Till	423, Hillside Ditch
330, Contour Farming	428, Irrigation Ditch Lining
331, Contour Orchard and Other Perennial Crops	428A, Irrigation Water Conveyance, Ditch and Canal Lining, Plain Concrete
332, Contour Buffer Strips	428B, Irrigation Water Conveyance, Ditch and Canal Lining, Flexible Membrane
333, Amending Soil Properties with Gypsum Products	428C, Irrigation Water Conveyance, Ditch and Canal Lining, Galvanized Steel
334, Controlled Traffic Farming	430, Irrigation Pipeline
336, Soil Carbon Amendment	432, Dry Hydrant
338, Prescribed Burning	436, Irrigation Reservoir
340, Cover Crop	441, Irrigation System, Microirrigation
342, Critical Area Planting	442, Sprinkler System
345, Residue and Tillage Management, Reduced Till	443, Irrigation System, Surface and Subsurface
348, Dam, Diversion	447, Irrigation and Drainage Tailwater Recovery
350, Sediment Basin	449, Irrigation Water Management
351, Well Decommissioning	450, Anionic Polyacrylamide (PAM) Application
353, Monitoring Well	453, Land Reclamation, Landslide Treatment
355, Groundwater Testing	455, Land Reclamation, Toxic Discharge Control
356, Dike and Levee	457, Mine Shaft and Adit Closing
359, Waste Treatment Lagoon	460, Land Clearing
360, Waste Facility Closure	462, Precision Land Forming and Smoothing
362, Diversion	464, Irrigation Land Leveling
366, Anaerobic Digester	466, Land Smoothing
367, Roofs and Covers	468, Lined Waterway or Outlet
368, Emergency Animal Mortality Management	472, Access Control
371, Air Filtration and Scrubbing	484, Mulching
372, Combustion System Improvement	490, Tree/Shrub Site Preparation
373, Dust Control on Unpaved Roads and Surfaces	500, Obstruction Removal
374, Energy Efficient Agricultural Operation	511, Forage Harvest Management
375, Dust Management for Pen Surfaces	512, Pasture and Hay Planting
376, Field Operations Emissions Reduction	516, Livestock Pipeline
378, Pond	520, Pond Sealing or Lining, Compacted Soil Treatment
379, Forest Farming	521, Pond Sealing or Lining, Geomembrane or Geosynthetic Clay Liner
380, Windbreak/Shelterbelt Establishment and Renovation	521A, Pond Sealing or Lining, Flexible Membrane
381, Silvopasture	521B, Pond Sealing or Lining, Soil Dispersant
382, Fence	521C, Pond Sealing or Lining, Bentonite Sealant
383, Fuel Break	
384, Woody Residue Treatment	
386, Field Border	
388, Irrigation Field Ditch	


 Partnerships for Climate-Smart Commodities Data Dictionary for Recipients  
 February 2023

521D, Pond Sealing or Lining, Compacted Clay Treatment	632, Waste Separation Facility
522, Pond Sealing or Lining - Concrete	633, Waste Recycling
527, Sinkhole Treatment	634, Waste Transfer
528, Prescribed Grazing	635, Vegetated Treatment Area
533, Pumping Plant	636, Water Harvesting Catchment
543, Land Reclamation, Abandoned Mined Land	638, Water and Sediment Control Basin
544, Land Reclamation, Currently Mined Land	640, Waterspreading
548, Grazing Land Mechanical Treatment	642, Water Well
550, Range Planting	643, Restoration of Rare or Declining Natural Communities
554, Drainage Water Management	644, Wetland Wildlife Habitat Management
555, Rock Wall Terrace	645, Upland Wildlife Habitat Management
557, Row Arrangement	646, Shallow Water Development and Management
558, Roof Runoff Structure	647, Early Successional Habitat Development-Mgt
560, Access Road	649, Structures for Wildlife
561, Heavy Use Area Protection	650, Windbreak/Shelterbelt Renovation
562, Recreation Area Improvement	654, Road/Trail/Landing Closure and Treatment
566, Recreation Land Improvement and Protection	655, Forest Trails and Landings
570, Stormwater Runoff Control	656, Constructed Wetland
572, Spoil Disposal	657, Wetland Restoration
574, Spring Development	658, Wetland Creation
575, Trails and Walkways	659, Wetland Enhancement
576, Livestock Shelter Structure	660, Tree-Shrub Pruning
578, Stream Crossing	666, Forest Stand Improvement
580, Streambank and Shoreline Protection	670, Energy Efficient Lighting System
582, Open Channel	672, Energy Efficient Building Envelope
584, Channel Bed Stabilization	736, Crop By-Product Transfer, interim
585, Stripcropping	724, Water Treatment Facility, interim
587, Structure for Water Control	735, Waste Gasification Facility, interim
588, Crosswind Ridges	737, Reduced Water and Energy Coffee Conveyance System, interim
589, Cross Wind Trap Strips	740, Pond Sealing and Lining, Soil Cement, interim
590, Nutrient Management	751, Individual Terrace, interim
591, Amendments for Treatment of Agricultural Waste	753, Infiltration Ditch, interim
592, Feed Management	755, Well Plugging, interim
595, Pest Management Conservation System	770, Livestock Confinement Facility, interim
600, Terrace	775, Drainage Ditch Covering, interim
601, Vegetative Barrier	782, Phosphorus Removal System, interim
602, Equitable Relief	800, Controlling Existing Flowing Wells, interim
603, Herbaceous Wind Barriers	803, Water Well Disinfection, interim
604, Saturated Buffer	805, Amending Soil Properties with Lime, interim
605, Denitrifying Bioreactor	808, Soil Carbon Amendment, interim
606, Subsurface Drain	809, Conservation Harvest Management, interim
607, Surface Drain, Field Ditch	810, Annual Forages for Grazing Systems, interim
608, Surface Drain, Main or Lateral	812, Raised Beds, interim
609, Surface Roughening	815, Groundwater Recharge Basin or Trench, interim
610, Salinity and Sodic Soil Management	817, On-Farm Recharge, interim
612, Tree/Shrub Establishment	818, Water Conservation System, interim
614, Watering Facility	821, Low Tunnel Systems, interim
620, Underground Outlet	823, Organic Management, interim
629, Waste Treatment	
630, Vertical Drain	



Other CSAF Practices

Traditional or cultural practices

Microbial products

Solar power generation

Grain bin construction

Pre-season drainage



## Appendix B: Commodity List

CROPS

ALFALFA	CINNAMON	HYBRID POPLAR TREES
ALMONDS	CLOVER	IDLE
AMARANTH GRAIN	COCONUTS	INDIGO
APPLES	COFFEE	ISRAEL MELONS
APRICOTS	CORN	JACK FRUIT
ARONIA (CHOKEBERRY)	COTTON ELS	JERUSALEM ARTICHOKE
ARTICHOKE	COTTON UPLAND	JICAMA
ASPARAGUS	CRANBERRIES	JOJOBA
ATEMOYA	CRENSHAW MELON	JUJUBE
AVOCADOS	CRUSTACEAN	JUNE BERRIES
BAMBOO SHOOTS	CUCUMBERS	KENAF
BANANAS	CURRENTS	KHORASAN
BARLEY	DASHEEN	KIWIBERRY
BEANS	DATES	KIWIFRUIT
BEETS	DURIAN	KOCHIA (PROSTRATA)
BIRDSFOOT/TREFOIL	EGGPLANT	KOHLRABI
BLUEBERRIES	EINKORN	KOREAN GOLDEN MELON
BREADFRUIT	ELDERBERRIES	KUMQUATS
BROCCOFLOWER	EMMER	LAMBS EAR
BROCCOLI	FIGS	LEEK
BROCCOLINI	FINFISH	LEMONS
BRUSSEL SPROUTS	FLAX	LENTILS
BUCKWHEAT	FLOWERS	LESPEDEZA
CABBAGE	FORAGE SOYBEAN/SORGHUM	LETTUCE
CACAO	GAILON	LIMES
CACTUS	GARLIC	LONGAN
CAIMITO	GENIP	LOQUATS
CALABAZA MELON	GINGER	LYCHEE
CALALOO	GINSENG	MANGOS
CAMELINA	GOOSEBERRIES	MANGOSTEEN
CANARY MELON	GOURDS	MAPLE SAP
CANARY SEED	GRAPEFRUIT	MAYHAW BERRIES
CANE BERRIES	GRAPES	MEADOWFOAM
CANISTEL	GRASS	MILKWEED
CANOLA	GREENS	MILLET
CANTALOUPE	GROUND CHERRY	MIXED FORAGE
CARAMBOLA (STAR FRUIT)	GUAMABANA/SOURSOP	MOHAIR
CARROTS	GUAR	MOLLUSK
CASHEW	GUAVA	MORINGA
CASSAVA	GUAVABERRY	MULBERRIES
CAULIFLOWER	GUAYULE	MUSHROOMS
CELERIAC	HAZEL NUTS	MUSTARD
CELERY	HEMP	NECTARINES
CHERIMOYA	HERBS	NIGER SEED
CHERRIES	HESPERALOE	NONI
CHESTNUTS	HONEY	OATS
CHICORY/RADICCHIO	HONEY BERRIES	OKRA
CHINESE BITTER MELON	HONEYDEW	OLIVES
CHRISTMAS TREES	HOPS	ONIONS
CHUFAS	HORSERADISH	ORANGES
	HUCKLEBERRIES	PAPAYA


 Partnerships for Climate-Smart Commodities Data Dictionary for Recipients  
 February 2023

PARSNIP	STRAWBERRIES	
PASSION FRUITS	SUGAR BEETS	
PAWPAW	SUGARCANE	<u>LIVESTOCK</u>
PEACHES	SUNFLOWERS	ALPACAS
PEANUTS	SUNN HEMP	BEEF COWS
PEARS	TANGELOS	BEEFALO
PEAS	TANGERINES	BUFFALO OR BISON
PECANS	TANGORS	CHICKENS (BROILERS)
PENNYCRESS	TANGOS	CHICKENS (LAYERS)
PEPPERS	TANNIER	DAIRY COWS
PERENNIAL PEANUTS	TARO	DEER
PERIQUE TOBACCO	TEA	DUCKS
PERSIMMONS	TEFF	ELK
PINE NUTS	TI	EMUS
PINEAPPLE	TOBACCO CIGAR WRAPPER	EQUINE
PISTACHIOS	TOBACCO BURLEY	GEESE
PITAYA/DAGONFRUIT	TOBACCO BURLEY 31V	GOATS
PLANTAIN	TOBACCO CIGAR BINDER	HONEYBEES
PLUMCOTS	TOBACCO CIGAR FILLER	LLAMAS
PLUMS	TOBACCO CIGAR FILLER BINDER	REINDEER
POMEGRANATES	TOBACCO DARK AIR CURED	SHEEP
POTATOES	TOBACCO FIRE CURED	SWINE
POTATOES SWEET	TOBACCO FLUE CURED	TURKEYS
PRUNES	TOBACCO MARYLAND	
PSYLLIUM	TOBACCO VIRGINIA FIRE CURED	
PUMMELO	TOMATILLOS	
PUMPKINS	TOMATOES	
QUINCES	TREES TIMBER	
QUINOA	TRITICALE	
RADISHES	TRUFFLES	
RAISINS	TURNIPS	
RAMBUTAN	VETCH	
RAPESEED	WALNUTS	
RHUBARB	WAMPEE	
RICE	WASABI	
RICE SWEET	WATERMELON	
RICE WILD	WAX JAMBOO FRUIT	
RUTABAGA	WHEAT	
RYE	WILLOW SHRUB	
SAFFLOWER	WINTER MELON	
SAPODILLA	WOLFBERRY/GOJI	
SAPOTE	YAM	
SCALLIONS		
SESAME		
SHALLOTS		
SORGHUM		
SORGHUM DUAL PURPOSE		
SORGHUM FORAGE		
SOYBEANS		
SPELT		
SQUASH		
STAR GOOSEBERRY		

# Partnerships for Climate-Smart Commodities

## Additional Specific Terms and Conditions

### February 2023

#### I. Overarching Statement

The following award terms and conditions are applicable to Partnerships for Climate-Smart Commodities agreements and are in addition to the USDA FPAC General Terms and Conditions. The award recipient must abide by all terms of this grant including, but not limited to, the General Terms and Conditions, the terms in the Funding Opportunity and associated Frequently Asked Questions, and this addendum. The recipient must also deliver on the planned objectives in the project narrative and budget narrative associated with this grant.

#### II. Eligibility and Highly Erodible Lands and Wetlands Compliance

In order to be eligible for an incentive payment as a part of the Partnerships for Climate-Smart Commodities, a producer must:

- Establish Farm Records with the Farm Service Agency (FSA) (have farm, tract, and field numbers in place);
- Complete an AD-2047 (Customer Data Worksheet to facilitate the collection of customer data for Business Partner Record);
- Certify highly erodible land conservation (HEL) and wetland conservation (WC) compliance via Form AD-1026, Highly Erodible Land Conservation (HEL) and Wetland Conservation (WC) Certification; and
- Certify that they are not a foreign person or entity.

Farm, tract, and field numbers are required for the producer, and ultimately the Partnerships for Climate-Smart Commodities recipient, to report climate-smart practice implementation to USDA, as well as to certify and maintain HELC/WC compliance. This will require that some producers who do not already have these numbers, like perennial crop growers or feedlots, establish these records with USDA's FSA. Farm, tract, field numbers, producer name, and Core Customer I.D. (CCID) will be provided by the recipient to the National Program Officer as a part of routine grant reporting. Recipients must ensure that producers receiving financial assistance or incentives through this project use the same name as is included in the relevant FSA Business File for that Farm ID in any contracts or similar documentation kept by the recipient.

Producers are not bound by the payment limitations and the adjusted gross income (AGI) limitations that are in place for other USDA programs.

In order to demonstrate HELC/WC compliance for Partnerships for Climate-Smart Commodities incentive payments, producers will need to request a copy of their subsidiary print from their



USDA FSA field office. The Subsidiary Print includes print year specific eligibility related information about a selected producer. The producer will then provide this documentation to the Partnerships for Climate-Smart Commodities recipients as proof of compliance. A current year subsidiary print will be required for each crop year that the producer receives a payment, and HELC/WC eligibility information is provided under the AD-1026 and Conservation Compliance sections of subsidiary (determined by year, which can change at any time during the year or in a subsequent year). As is the case already, field offices will not be expected to provide documentation to anyone besides the producer themselves (and must always comply with Section 1619 limitations if they ever do provide documentation to third parties). Producers must have control of the land for the term of their beneficiary contract.

Recipients are responsible for determining producer eligibility within the funding opportunity requirements. Recipients must inform producers of eligibility requirements and direct them to local USDA offices for requested information as necessary, including but not limited to, farm and tract establishment and Highly Erodible Land and Wetland Compliance determinations. Privacy of producers is a priority throughout this process, and recipients are responsible for maintaining producer privacy in the process.

At minimum, the recipient will collect and review subsidiary reports from participating producers. They will ensure that the producer is listed as “compliant” in all sections of the conservation compliance portion of subsidiary and “certified” for AD-1026 before an incentive payment is made. If payments to a producer span more than one Federal fiscal year, the recipient will review an updated subsidiary print each fiscal year to ensure that the status is still compliant.

### **III. Other Environmental and Cultural Resources Reviews**

A Finding of No Significant Impact (FONSI) was signed by USDA NRCS on August 26, 2022. A copy of the Programmatic Environmental Assessment for Partnerships for Climate-Smart Commodities is available at [www.usda.gov/climate-smart-commodities](http://www.usda.gov/climate-smart-commodities). USDA may determine that additional environmental and cultural resources review is needed for any particular action under Partnerships for Climate-Smart Commodities. The recipient must not execute any beneficiary contracts under this grant agreement prior to receipt of a letter from USDA that specifically details:

- 1) further procedures deemed appropriate by the Agency to ensure a completed National Environmental Policy Act (NEPA) review and all appropriate consultation requirements are met, and
- 2) additional instructions for any unanticipated discoveries or conditions.

A resolution of support is required for projects on Tribal lands from the governing body of the Tribe with jurisdiction over that land, if the applicant is not the Tribe nor an entity owned or



operated by that Tribe. USDA may approve alternative documentation for resolutions when USDA deems necessary and legally sufficient.

#### **IV. Producer Benefits**

USDA encourages the recipient to disclose to participating producers the manner and amount for which any market premiums derived from the development of the relevant climate-smart commodity will be shared between participating parties, including producers. USDA will be monitoring producer benefits, in particular those to small and underserved producers, throughout the grant period. Recipients agree that their project(s) will implement a plan for engaging small and underserved producers as laid out in this agreement.

#### **V. Producer Data Protection and Disclosure**

Recipients must ensure each producer has convenient access to any data collected from that producer or the producer's land and any associated modeling as part of the project. The recipient must provide each producer applying for benefits under this grant a description in writing of how their information, including but not limited to data about their farm and commodities, will be utilized, protected and shared as applicable.

#### **VI. Other Data and Reporting Requirements**

In addition to the reporting information provided in the statement of work and General Terms and Conditions, USDA will provide a template for the Detailed Progress Report, also known as the Partnerships for Climate-Smart Commodities (PSCS) Project Reporting Workbook. Within 30 calendar days of execution of this grant, a copy of this workbook will be posted at [www.usda.gov/climate-smart-commodities](http://www.usda.gov/climate-smart-commodities) or an alternative location provided to the recipient by the National Program Officer. USDA may provide updates to the PCSC Project Reporting Workbook or submission methods to streamline the data collection process and/or reduce the burden on the recipient throughout the grant period. Generally, these updates will be provided at least 3 months in advance of any required changes. The recipient must not transfer any data to foreign governments or foreign entities without prior approval from USDA.

USDA will provide a Technical Contact for this grant. The Technical Contact will have the responsibility of technical oversight for USDA for the project. The recipient is responsible for providing the technical assistance required to successfully implement and complete the project. The recipient must comply with any requests for information from the Technical Contact. The Technical Contact for this award is the National Program Officer assigned to this grant.

Prior to execution of this grant, the recipient must provide a shapefile depicting the project boundary for enrollment under this grant. Producer enrollment may not occur outside this boundary without modification of this grant.

Within 30 calendar days of execution of this grant, the recipient must provide to the National Program Officer a website address where enrollment information will be posted for producers for the project associated with this grant. Recipients will be responsible for the following reports:

- Submit quarterly performance reports that include a written progress report, as well as additional reporting on specific data elements contained in the most up-to-date version of the Partnerships for Climate-Smart Commodities Project Reporting Workbook. Additional information about each reported element is described in the Data Dictionary.
- Submit supplemental reports required to validate greenhouse gas (GHG) benefit data, including: (1) an initial project MMRV plan, (2) field-modeled GHG benefit reports, and (3) field-direct GHG measurement results, as applicable. Additional information about these reports is included in the Data Dictionary.
- Submit copies of project outputs and deliverables (e.g., fact sheets, reports) as attachments in ezFedGrants along with quarterly performance reports.
- Report the version of COMET-Planner used to estimate GHG benefits of the project within each quarterly performance report. As COMET-Planner is updated, recipients must adopt the latest version of the tool as directed by USDA for use in performance reports.

Recipients must designate an individual as a member of the USDA Partnerships for Climate-Smart Commodities Learning Network (Partnerships Network); this representative should be identified in the Project Narrative for this grant. Each project includes a plan for up to two Partnerships Network virtual meetings and two in-person meetings a year during the project duration. Dates and other details on events will be posted at [www.usda.gov/climate-smart-commodities](http://www.usda.gov/climate-smart-commodities) or an alternative location provided to the recipient by the National Program Officer.

The Partnerships Network will be co-chaired by representative from the USDA Office of the Chief Economist and the Farm Production and Conservation Mission Area. The Partnerships Network will inform synthesis reports to be assembled by USDA on a range of topics related to the implementation of Partnerships for Climate-Smart Commodities projects, including:

- Lessons-learned as projects are implemented;
- Options for providing technical assistance;
- Procedures for measurement/quantification, monitoring, reporting, and verifying GHG benefits;
- Options for tracing climate-smart commodities through the supply chain;
- Mechanisms for reducing costs of implementation;
- A forum for discussion and learning regarding approaches to climate-smart agriculture and forestry implementation (including but not limited to deployment and



measurement/quantification, monitoring, reporting, tracking, and verification of associated greenhouse gas benefits and marketing of climate-smart commodities).

- Synthesis of outcomes; and
- Opportunities for USDA and others to inform future approaches to generating new and expanded markets for climate-smart commodities.

The Partnerships Network topics to be discussed will cover at minimum the areas described in previous FAQs and will evolve with USDA's ongoing project data analysis efforts and with input from the project recipients on the kinds of sessions that will be most helpful to them in building the diverse climate-smart markets associated with their projects. Participation may include at least one interview a year and include questions related to the following areas:

- Technical assistance approaches, methods, and successes and/or challenges
- Producer outreach approaches, methods, and successes and/or challenges
- Monitoring, measurement, reporting, and verification (MMRV) approaches, methods, and successes and/or challenges
- Marketing approaches, methods, and successes and/or challenges
- Partnership approaches, methods, and successes and/or challenges
- Data collection and storage approaches, methods, and successes and/or challenges
- Supply chain approaches, methods and successes and/or challenges, including approaches to traceability
- Supply chain benefits and demand for climate-smart commodities
- Perspectives on program design, climate-smart commodity definitions, and future approaches or opportunities
- Project successes and stories

USDA may also request producer exit reports at a later date. Additional marketing and branding-related requirements may be provided by USDA, including signage related to Partnerships for Climate-Smart Commodities.

## **VII. Competition and Anti-Competitive Practices**

In connection with this grant, recipients may not prohibit or otherwise limit a producer from changing the provider of other services or materials not included as part of this grant. Recipients may not condition, limit, steer, or discriminate in their provision or sale of non-project business functions or products to producers based on their participation or non-participation in or use of any services provided as part of this grant. Additionally, funds in this agreement shall not be used for purposes or activities related to mergers or acquisitions.

### **VIII. Suspension and Disbarment**

The provisions governing Suspension and Disbarment in subsection 1.a.8 shall also apply to fraud, embezzlement, theft, forgery, bribery, falsification, or destruction of records, making false statements, or violations of the Federal civil antitrust or unfair trade practice laws.

### **IX. Special provisions for awards to for-profit entities as recipients**

This section contains provisions that apply to awards to for-profit entities. These provisions are in addition to other applicable provisions of these terms and conditions, or they make exceptions from other provisions of the terms and conditions for awards to for-profit entities. For-profit entities that receive awards have two options regarding audits:

- 1) A financial related audit of a particular award in accordance with Generally Accepted Government Auditing Standards issued by the Comptroller General of the United States, in those cases where the for-profit entity receives awards under only one USDA program; or, if awards are received under multiple USDA programs, a financial related audit of all awards in accordance with Generally Accepted Government Auditing Standards issued by the Comptroller General of the United States; or
- 2) An audit that meets the requirements contained in 2 CFR 200 subpart F.

For-profit entities that receive annual awards totaling less than the audit requirement threshold in 2 CFR 200 subpart F are exempt from USDA audit requirements for that year, but records must be available for review by appropriate officials of Federal agencies or the Government Accountability Office.

### **X. Non-Disparagement**

Recipients may not engage in any advertising deemed by USDA as disparaging to another agricultural commodity or competing product, or in violation of the prohibition against false and misleading advertising. Disparagement is defined as anything that depicts other commodities in a negative or unpleasant light via overt or subjective video, photography, or statements. Comparative advertising is allowable, provided the presentation of facts is truthful, objective, not misleading, and supported by a reasonable basis.