



NOTICE OF GRANT AND AGREEMENT AWARD

1. Award Identifying Number NR233A750004G089	2. Amendment Number	3. Award /Project Period DATE OF FINAL SIGNATURE - 08/31/2028	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) YALE UNIVERSITY P. O. BOX 208327 NEW HAVEN CT 06520-8327 UEI Number / DUNS Number: FL6GV84CKN57 / 043207562 EIN:	
7. NRCS Program Contact Name: Jade Nield	8. NRCS Administrative Contact Name: ADAM CARL	9. Recipient Program Contact Name: Noah Planavsky	10. Recipient Administrative Contact Name: Amy Ellis
(b)(6)			
11. CFDA 10.937	12. Authority 15 USC 714 et seq	13. Type of Action New Agreement	14. Program Director Name: Noah Planavsky <div style="background-color: cyan; padding: 2px;">(b)(6)</div>
15. Project Title/ Description: Expands climate-smart vegetable, corn, soybean, barley, rye, peanut, chicken, and beef markets in IL, MO, and GA and supports farmers implementing and monitoring climate-smart practices.			
16. Entity Type: O = Private Institution of Higher Education			
17. Select Funding Type			
Select funding type:	<input checked="" type="checkbox"/> Federal	<input type="checkbox"/> Non-Federal	
Original funds total	\$4,898,690.00	\$0.00	
Additional funds total	\$0.00	\$0.00	
Grand total	\$4,898,690.00	\$0.00	
18. Approved Budget			

Personnel	\$1,781,376.81	Fringe Benefits	\$546,882.68
Travel	\$153,326.88	Equipment	\$0.00
Supplies	\$3,780.00	Contractual	\$85,680.00
Construction	\$0.00	Other	\$2,327,643.63
Total Direct Cost	\$4,342,156.62	Total Indirect Cost	\$556,533.38
		Total Non-Federal Funds	\$0.00
		Total Federal Funds Awarded	\$4,898,690.00
		Total Approved Budget	\$4,898,690.00

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 KATINA HANSON Digitally signed by KATINA HANSON Date: 2023.09.01 08:52:12 -05'00'	Date
Name and Title of Authorized Recipient Representative AMY ELLIS Director, Proposal and Award Manager	Signature Amy Ellis Digitally signed by Amy Ellis Date: 2023.08.31 11:34:58 -04'00'	Date 31-Aug-2023

NONDISCRIMINATION STATEMENT

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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 Yale University 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 \$ 4,898,689.98

TOTAL FEDERAL FUNDS \$ 4,898,689.98

PERSONNEL \$ 1,413,791.12

FRINGE BENEFITS \$ 434,033.87

TRAVEL \$ 121,688.00

EQUIPMENT \$ 0.00

SUPPLIES \$ 3,000.00

CONTRACTUAL \$ 68,000.00

CONSTRUCTION \$ 0.00

OTHER \$ 2,301,643.61 (INCLUDES PRODUCER INCENTIVES \$967,292.01)

TOTAL DIRECT COSTS \$ 4,342,156.60

INDIRECT COSTS \$ 556,533.38

TOTAL NON-FEDERAL FUNDS \$ 0

PERSONNEL \$ 0

FRINGE BENEFITS \$ 0.00

TRAVEL \$ 0

EQUIPMENT \$ 0

SUPPLIES \$ 0

CONTRACTUAL \$ 0

CONSTRUCTION \$ 0.00

OTHER \$ 0 (INCLUDES PRODUCER INCENTIVES \$ 0)

TOTAL DIRECT COSTS \$ 0

INDIRECT COSTS \$ 0

Recipient has an approved Negotiated Indirect Cost Rate Agreement (NICRA) with a rate of 26 percent and a base of \$2,140,512.99.

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

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of the Freedom of Information and Privacy Act

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I. *Executive Summary of Pilot Project: Creating climate-smart commodities through enhanced rock weathering in agricultural settings*

Contact Information

Noah Planavsky, Associate Professor of Earth & Planetary Sciences, noah.planavsky@yale.edu

List of Project Partners

- Yale University
- Georgia Inst. of Technology
- Grodan
- Agoro Carbon Alliance
- The Land Connection
- Zumwalt Acres
- Farm Foundation
- Carolina Sunrock

List of underserved/minority-focused project partners

Of these project partners, the following focus on underserved/minority groups: The Land Connection (small farmers in central Illinois), and Zumwalt Acres (female beginning farmers and small farmers in Illinois).

Compelling need for the project

Farmland has enormous potential to contribute to the fight against climate change through climate-smart agriculture and forestry (CSAF) techniques. The United States has 46% of its total land area in pastureland and cropland and these soils are frequently disturbed and amended, releasing greenhouse gasses (GHGs) into the atmosphere (Bigelow & Borchers, 2017). In particular, on farms throughout the country, millions of tons of CO₂-emitting agricultural lime are applied to fields to reduce soil acidity and optimize growing conditions (West & McBride, 2005). A novel technological shift in pH balancing techniques can eliminate these emissions, and permanently sequester atmospheric carbon in the soil, all while providing a boost to farmers' bottom lines. Specifically, by using basalt dust instead of agricultural lime to increase soil pH through a method known as Enhanced Rock Weathering (ERW), which speeds up a natural carbon sequestration process, farmers can permanently store carbon on most types of croplands and pasture. At the same time, this process creates economic opportunities for the marketing of climate-smart commodities (CSCs) produced through CO₂-reducing ERW techniques. ERW also has the potential to provide other direct and immediate agricultural and economic benefits, especially for small and underserved producers often operating within tight economic constraints, by enhancing nutrients in the soil, minimizing the need for crop inputs, and improving soil structure. Therefore, because of characteristics inherent to this approach, ERW can fill a much-needed gap in the suite of conservation and carbon sequestration tools available to small and underserved producers.

The goal of the project's partnerships, uniting small and underserved farmer networks and advocacy organizations, innovative basalt suppliers, and high-tech horticulture companies, is to deploy ERW for long-term carbon capture and pH balancing on farms in targeted regions. Through this effort, the project will provide a robust demonstration of how basalt dust addition to soils can be a cost-effective means of carbon dioxide removal (CDR) with clear co-benefits to a wide range of farmers, including marketing opportunities for CSCs, pH balancing, and increased crop yields.

This partnership will explore atmospheric CDR on croplands through ERW, building off of successful field trials by Yale to bring this opportunity for scaling directly to small and underserved producers. The project will consistently and accurately quantify the extent of carbon removal and will determine the extent to which this process can increase crop yields, reduce agricultural nitrous oxide emissions (N₂O), and decrease fertilizer and lime costs, much of which may benefit agricultural producers at a time of record high input costs and increasing economic pressures. Finally, the project will include a life cycle assessment of the process from basalt procurement to ‘grocery shelf’, culminating in a successful marketing plan for CSCs to bring other revenue opportunities to growers.

Approach to minimize transaction costs associated with project activities

This project will emphasize minimization of transaction costs by sourcing feedstock from existing waste reserves of basalt dust (additionally reducing environmental impact), optimizing rail transportation efficiency, using existing farm machinery, and improving modeling accuracy of GHG monitoring.

Approach to reduce barriers to implementing CSAF practices for the purpose of marketing CSCs

These strategies will ensure low barriers for producers seeking to participate and market CSCs. Capturing carbon through basalt application is a simple yet powerful solution by using existing machinery and farming practices while substituting in an amendment that is proven to sequester carbon (Beerling et al., 2018). Over 70% of corn and soy farmers in the corn belt and 92% of peanut growers in Georgia apply lime to their fields (Agriculture Resource Management Survey 2004 & 2010). Basalt can be applied in the same way and replace lime, without significant adaptation. Finally, as an easily traceable and verifiable method of carbon sequestration on an annual basis, this project will make producers, including early adopters, immediately eligible for marketing of CSCs and/or high-quality carbon credits through an accurate and robust quantification process of additional and permanent carbon sequestration.

Geographic Focus

This project will focus on two geographic hubs: (1) small row crop farmers and ranchers in Illinois and Missouri, including the historically Black community of Pembroke Township. And (2) row crop and vegetable crop farmers in Georgia and the Southeast (almost all small farmers). In carrying out the project, grants funds will be utilized to compensate farmers in the geographic hubs for employing ERW to sequester CO₂ from the atmosphere. Grant funds will also cover all material, application, and monitoring costs for farmers, which will equate to approximately \$550 per acre of in-kind funding. Furthermore, grant funds will be used to develop markets for the low-carbon CSCs grown by participating farmers, in coordination with product partners and marketing experts. These hubs cover the Midwest, as the most productive and intensively farmed agricultural region in the U.S., and the Southeast, as the region with the most farmers of color and a history of agricultural harm, and whose soil and climate hold the highest potential for benefits from ERW.

This synergistic partnership model will expediently direct expertise and technical assistance to a cross-section of American agriculture that represents both the highest impact commodities for CSC adoption, as well as growers historically underserved by federal funding programs.

Project management capacity of partners

The project will be led by PI Planavsky (Yale) and Co-PI Reinhard (Georgia Tech), whose expertise is in empirical geochemistry and geochemical modeling, ***given the core of the project is***

on geochemical carbon dioxide removal. The PI and Co-PI will ensure coordination between all of the partners in the team and that project goals are being met through biweekly targeted team meetings and monthly ‘all hands’ meetings. If the project is funded, Planavsky will be relieved of teaching duties at Yale (at no cost to the grant) in the first or second year of the grant. We have also requested a project manager (who will be part of the Yale Center for Natural Carbon Capture) that will help coordinate between the various partners on the teams. The program manager will also ensure that during upscaling of deployments, commercial (e.g., Agoro Carbon) and research interests (Yale & Georgia Tech leads) are aligned. The ultimate goal of this proposal is to help farmers. With that in mind, the program manager will also be a ‘constantly available’ contact for farmers for assistance in execution. To keep as much of the budget going directly to farmers as possible, all team meetings will be virtual. As noted in the text, all major activities (e.g., life cycle assessment) will have specified leads.

All partners have a successful history in this project area. Zumwalt Acres is a small grain and vegetable farm in Illinois that has implemented one of the largest basalt dust ERW field trials in the world, having collaborated with neighboring farmers to enroll over 100 acres (with the potential for thousands of acres). The Land Connection and Farm Foundation have successfully collaborated with Conservation Districts, Extension Offices, private food companies, and over 4,000 growers to provide technical assistance and cost-share programs and are trusted regional leaders in furthering agriculture. Agoro Carbon Alliance has enrolled millions of acres of farmlands in regenerative processes and this project will facilitate them entering into the ERW space. Together, all involved partners have strong existing relationships and a successful history of collaborating with and supporting farmers to achieve a more resilient and climate-smart agricultural system.

This project builds from a 5-year study on basalt amendments at the University of Illinois Energy Farm plots (the Yale team are collaborators) and subsequent Yale-led deployments on working farms in Eastern Illinois and Wisconsin (see below for initial results). The Yale group’s first large-scale trials occurred at Zumwalt Acres, a small farm run by beginning female farmers, in Iroquois County, Illinois, growing grain, hay, and vegetables across 25 acres. In 2021, a total of 20-acres of test plots received between 0.5 and 24 tons of basalt dust per acre, applied to corn, alfalfa hay, and oats, in addition to 4.8 tons of basalt dust applied to one acre of vegetables. During this season, methods for basalt application on a working farm, soil testing and data collection, and yield monitoring were refined. After the first season, yield increases were measured across all crop types, with oat straw seeing an increase of 35% and oat seed an increase of almost 50% (Fig. 1). In 2022, enrollment expanded to 3 neighboring farmers who expressed interest, all small farmers with a combined 1,000 acres of corn and soy. This spring, these fields received application of basalt amendment across four plots with different soil types, including one pasture, totaling 113 acres of basalt application.

II. Plan to Pilot CSAF Practices on a Large-Scale

The plan to pilot ERW practices on a large scale consists of yearly expansion of farmers in ERW trials, research implementation, outreach and technical training events, and support for marketing CSCs. The full timeline of this plan can be seen in Table 1. In Year 1, basalt will be applied to 89 acres, permanently storing carbon and immediately creating crops that are marketable as CSCs.

Research monitoring will begin, with Yale-supplied equipment being deployed on specific farms to assess ecosystem-scale CO₂ and N₂O emissions as well as researchers overseeing the collection of soil samples and yield measurements to accurately quantify CO₂ capture and co-benefits. Basalt application will increase for the rest of the grant period. Partners such as TLC and Agoro Carbon will begin farmer outreach in Year 1 and continue these efforts for the duration of the grant period. Finally, Yale will pilot its Life Cycle Assessment (LCA) in Year 1 and expand to other farms in subsequent years, and Zumwalt Acres will begin marketing their products in the Chicago area. This project will provide a path to CSAF practices at scale by ramping up the number of farms enrolled throughout the trial, as well as increasing the acreage enrolled at each farm throughout the trial. Efforts to market climate-smart products will likewise build from year to year.

Year	1	2	3	4
Zumwalt Acres	2	2	2	2
The Land Connection	0	4	8	12
Agoro Carbon Alliance	3	4	10	12
Total	5	10	20	26

Table 1. Plan for increasing farm enrollment based on recruitment by participating farms and organizations

| Background and motivation

CDR from Earth's atmosphere will be crucial to keep global temperature increases below those predicted to cause significant degradation of livelihoods, food security, and water supplies in the coming century (IPCC, 2019). Considering the overwhelming percentage of land area dedicated to agricultural production combined with the fact that the agricultural sector is currently estimated to contribute ~20-25% of total GHG emissions worldwide (~10% of US emissions), agricultural settings provide a clear opportunity for deployment of GHG mitigation strategies (EPA, 2022). Further, CSCs have the potential to fill a significant portion of the expanding voluntary carbon market and resolve some of its outstanding issues (TSVCM, 2021). Currently, U.S. farmers face challenges from skyrocketing input costs, especially impacting small farmers who operate on especially tight margins (ERS 2022). It is crucial to develop technology that reduces cost barriers and maximizes revenue when pursuing development of CSCs. Historically, initiatives aimed at reducing costs for American farmers and increasing their capacity for the adoption of sustainable and climate-smart practices have overlooked underserved populations, small producers, and early adopters (Fagundes et al., 2020; Van Sant et al., 2022). Small farmers have demonstrated lower participation in existing conservation programs, highlighting a need for simple-to-adopt climate-smart practices that will result in CSCs (Reimer & Prokopy, 2014). Finally, currently promoted practices, such as cover cropping and no-till, can yield uncertain results for tracking carbon capture, and even increase N₂O emissions, leaving farmers with a low-value option for entering the CSC market. This proposal includes on-the-ground organizations that primarily serve small and underserved farmers at each stage of the research and implementation of CDR.

| Basics of ERW and project goals

The basic idea behind ERW is simple: atmospheric CO₂ readily reacts with basalt minerals in the presence of water ("weathering"), leading to the removal of carbon from the atmosphere on

permanent timescales (hundreds of thousands to millions of years) (Moosdorf et al., 2014). Crushed basalt rock, or basalt dust, applied as a soil amendment achieves this reaction, requiring no additional technology or practice change. At the same time, basalt adds crucial minerals to soils and neutralizes pH, delivering exciting co-benefits to farmers such as increased yield and improved soil health (Kelland et al., 2020). CDR rates using ERW are significantly higher than is achievable with any organic carbon storage technique (e.g., cover cropping and modified tilling practices typically lead to capture of less than 0.5 tons per acre) (Lorenz & Lal, 2018). This project will demonstrate that spreading basalt dust on any agricultural field will lead to measurable carbon removal from the atmosphere, paving the way for adoption for all producers, especially those who are beginning, small, or underserved. Given the potential to have high confidence in extents of CO₂ removal with ERW (relative to organic carbon storage), this process is ideally suited for creating CSCs. Therefore, this funding is crucial to ensuring this promising technology is available to those who serve to benefit most.

This partnership includes universities, non-profit agricultural organizations that work with small and minority producers, companies selling mineral feedstocks or recycled waste products, grower cooperatives, and carbon credit companies. The goals are straightforward:

1. Partner with small and underserved farmers, regenerative and conservation agriculture institutes, and other advocacy/training programs to achieve scaled up deployment of basalt dust that will explicitly meet the needs of minority producers in a wide range of American agricultural products, supporting rural economies and historically underserved producers.
2. Pilot innovative and cost-effective methods for measurement/quantification, monitoring, reporting, and verification of permanent CO₂ capture and associated agronomic benefits via ERW to generate results specifically on small operations across diverse crops and provide directly to producers, alongside estimates for N₂O reductions associated with this process.
3. Drive down the cost of basalt dust deployment in agricultural settings by developing a robust distribution network of crushed basalt products from recycled feedstock sources to the field.
4. Create new validated and branded CSCs that are net-zero or carbon negative and connect growers with expanded market opportunities for CSCs based on ERW.

With a targeted focus on small farms and Black producers in the Midwest and diverse farmers in the Southeast, this project will serve to fill an important gap in knowledge towards deployment on a variety of agricultural settings and greatly speed up enrollment for those historically underfunded, providing an immediate path for the marketing of CSCs.

Description of CSAF practices to be applied

ERW with basalt converts CO₂ and rock into aqueous bicarbonate, releasing Ca, K, Mg, and P into the soil. ERW can be used instead of liming as a means of pH regulation. Liming is already widely implemented and economically feasible even without subsidies because of increase in crop yields (Goulding, 2016). Liming has become an essential aspect of large-scale agricultural production, but it is a net CO₂ source to the atmosphere (e.g., IPCC, 2006). Basalt, in contrast to agricultural lime, regulates soil pH in the same way, but leads to CO₂ drawdown. The composition of basalt, a silicate rock, does not have available carbon that can be released as CO₂ in acidic soils. Further, normal application rates of greater than 3 tons of basalt dust per acre will meet typical P and K loads to soils, providing a co-benefit to farmers (Beerling et al., 2018). Similarly, basalt can be applied in the same way as lime, with existing machinery. Basalt application can occur either preceding spring planting or after fall harvest. In the interim, farmers may continue with all of their

typical practices. Based on our field trials (e.g., Fig. 1), basalt can be applied at >10 tons per acre for maximum carbon capture potential and without any detrimental effects. However, farmers enrolled in this project, with input from the project team, can determine their own optimal rates of application based on preference and site-specific characteristics such as soil type, pH level, and crop type (Fig. 3).

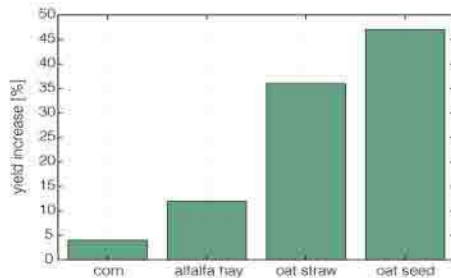


Figure 1. Yield data for a range of row crops during field trials of carbon capture through ERW at Zumwalt Acres (Sheldon, IL). Yields are an average percent increase in between control plots (no basalt application) and basalt application rates of 12 tons acre⁻¹ y⁻¹.

Predicting lime application rates to reach a target soil pH is fairly straightforward—carbonate mineral dissolution is well understood, with the chemical composition remaining unchanged as the lime dissolves. The Yale and Georgia Tech research team recently developed a biogeochemical model, “Soil Cycles of Elements simulator for Predicting TERrestrial regulation of greenhouse gases” (SCEPTER), that can predict basalt dissolution rates with similar accuracy, even as basalt dissolution rates are more complex (Kanzaki et al., 2022). The model predicts soil pH and CO₂ (among other factors) for a given climate, soil characteristics, and crop rotation (Fig. 2).

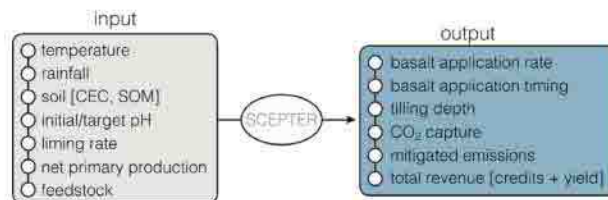


Figure 2. An overview of the SCEPTER biogeochemical model. The model takes soil characteristics and climate information to produce an optimum basalt application rate for a given crop.

Soil testing, even on small farms, is standard and widespread—we will use the same soil tests that are done before lime or fertilizer application. Similar to liming, soil testing will be a relatively small portion of the overall soil amendment cost. Each site’s soil data will be fed into SCEPTER to generate recommendations and predict capture rates prior to deployment.

The proposed partnership includes multiple organizations for basalt feedstock procurement. Although crushed basalt can be purchased regionally, basalt cannot currently be efficiently distributed to agricultural fields like lime. However, there are substantial stockpiles of agricultural-grade waste basalt as a by-product of construction materials. Groups providing recycled material include: Grodan (recapturing its basaltic rock wool product used in grow-houses) and Carolina Sunrock (producing fine basaltic material from aggregate formation).

Grodan will provide one source of basalt feedstock for the Midwest. Feedstock will be transported by rail and truck, aiming to minimize CO₂ emissions. In all cases, basalt feedstock is derived from waste material, initiating a circular economy and reducing additional energy costs (no mining or grinding to produce the crushed basalt). Additionally, basalt amendment is compatible with organic operations. Some basalt dust feedstocks are already Organic Materials Review Institute

(OMRI) certified, and Grodan and Sunrock will work to obtain certification during the grant period.

The base cost of feedstock is < \$10 a ton. Thus, transport and spreading costs will be a significant portion of the overall costs of deploying on far fields. As such, there will be initially higher deployment costs selecting from more limited availability of sites, followed by lower overall costs through more strategic and developed deployment mechanisms (see below). Collectively, these groups can produce hundreds of thousands of tons of basalt feedstock annually, with the potential to produce millions of tons of feedstock.

ERW practices used in this project will adhere to all guidelines defined in the Conservation Practice Standard Variance: Soil Amendment for Climate Smart Markets CSCG Project: Amending Soil Properties with Lime Code 805.

This proposal does not require implementation of any practices on land not currently used for agricultural production and does not involve any practices that disturb the ground below the plow zone. No concentrated animal feeding operations (CAFOs) are involved in any potential project activities.

Plan to recruit producers and landowners

Specific focus will be on working farms in each regional hub, enrolling a range of producers and rigorously tracking effects on soil, crop yields, and carbon capture. Deployment will increase from roughly 89 acres in year 1 to 804 acres in year 4 (Table 2). These numbers include acres that are re-enrolled each year, while also expanding acreage on existing farms and enrolling new farms. Each farm will enroll between 1-20 acres in its first year and expand in subsequent years. Partners that are managing or consulting on agronomic practices, such as Agoro, will ensure this successful application.

	Potential tCO2 capture	tons basalt moved	cost/basalt ton (material + transport)	total basalt cost	spreading (at \$8.50/ton)	basalt + spreading	cost of direct capture/t	annual acreage*	farmer incentives
Year 1		401	\$100	\$40,050	\$3,404	\$43,454		89	\$16,000
Year 2	133.5	806	\$90	\$72,495	\$6,847	\$79,342	\$325	179	\$33,950
Year 3	268.5	1607	\$60	\$96,390	\$13,655	\$110,045	\$296	357	\$52,350
Year 4	535.5	2412	\$50	\$120,600	\$20,502	\$141,102	\$205	536	\$64,800
Year 5	804	0	0	0	0	0	\$176		0
Total	1741.5	5228	\$63	\$329,535	\$44,408	\$373,943	\$215	1161	\$167,100

Table 2. Cost of estimated basalt feedstock use, enrolled acreage, farmer incentives, and CDR potentials.

Recruitment will be conducted primarily through partner organizations and existing relationships. The Land Connection has an impressive history in farmer training, helping to create the Farm Beginning Collaborative, which trains farmers in 11 states. Farmers who have already committed to participating in Year 1 enrollment include: Zumwalt Acres with 3 neighboring farms in Iroquois County, IL. The Land Connection will engage in outreach and enrollment beginning in Year 1, with goals to enroll at least 10 growers in the first year. The Land Connection will hold two enrollment events per year. The Farm Foundation will hold two intensive regionally-focused

workshops in Years 2 and 3 to reach a targeted 90 farmers, extension agents and industry-representatives from the corn, soybeans, fruit, vegetable, beef and chicken CSC supply chain. These organizations are experienced with holding field days and providing technical assistance. Agoro Carbon Alliance will enroll farmers in the Midwest and Southeast to bridge any remaining gap towards target acreage.

Finally, these organizations will provide input towards creating a successful outreach strategy for farmers, ensuring clear and compelling messaging for growers. For example, “weathering” traditionally has negative connotations in an agricultural setting, referring to weathered soils that are depleted of nutrients. Therefore, ERW will be advertised to farmers as a type of climate-friendly rock amendment with significant value add to their operations. Growers will maintain autonomy in deciding the number and location of acres enrolled, withing certain specifications.

Plan to provide technical assistance for producers/landowners

Alongside the regional organizations that will provide technical assistance to their producers, an independent technical assistant (the project manager based at the Yale Center for Natural Carbon Capture) as well as a consultant will be hired to support farmers during the planting and harvesting seasons, and as they set up test plots, take soil samples, and monitor crop yields. While these tasks are designed to be easy for a farmer to navigate, this support will be used to ensure rigorous scientific data as well as support growers during the initial implementation. All enrolled farmers will also directly consult with PI Planavsky and/or Co-PIs Raymond or Reinhard about ERW and their monitoring plans.

Plan to provide financial assistance for producers/landowners

Farmers will receive compensation to enroll in ERW trials at \$50 per acre of land in test plots annually for farms 40 acres or larger. Farms smaller than 40 acres will receive a base payment of \$2,000. This number is commensurate with other conservation initiatives, but the design of this payment program will also incorporate feedback from farmers. All material, application, and monitoring costs will be supplied for farmers, which will equate to \$550 per acre of in-kind funding due to reductions in input costs participating farmers would otherwise be required to expend.

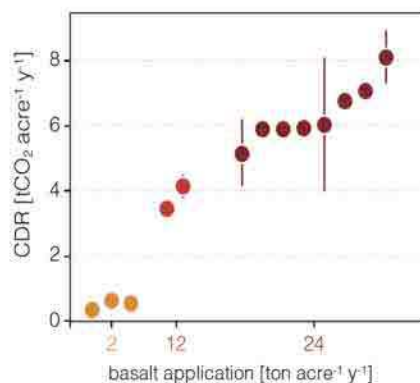
Plan to enroll underserved and small producers

Small and underserved producers represent a critically important population of American growers who contribute substantially to their communities and care deeply about their land, while facing serious instability and challenges to their bottom-line. The inequity of women and minorities in the agriculture industry is evident in the 2017 Census of Agriculture, with the majority of agricultural land in the United States owned and operated by white farmers (96% of farmers, NASS 2017). Only 13% of women operate farms on which they are the only producer, compared to 36% of men, and 62% of female-operated farms had sales and payments that were less than \$10,000 (NASS 2017). At the same time, female-operated farms are increasing rapidly, with a jump of 23% between 2012 and 2017 as compared to a decline of 3% in total number of farms, suggesting a need to support female-led operations. According to the 2017 Census of Agriculture, 1.7% of farmers are Black, operating just 0.5% of farmland. The same data shows that farms owned by farmers of color are, on average, approximately 30-40% the size of those of white farmers. Notably, the market value of products sold by Black farmers averages \$39,000, compared to \$190,000 for white farmers (NASS 2017). While initial proposals for large-scale deployment of

ERW has focused on larger farms, this project focus primarily on ensuring equitable access and generating data on diverse producers to decrease costs at scale and increase accessibility.

This project involves underserved and small producers in the following ways: (1) targeting crops that represent the highest acreage totals for farmers of color and more historically diverse regions, (2) partnering with diverse producer networks and (3) ensuring eligibility for early adopters. In total, this project will involve 20 small and underserved producers. These producers will receive \$544/acre of financial assistance and in-kind funding and the equivalent value of a researcher providing direct technical assistance. In addition to providing direct payments to farmers, which will especially serve the bottom-line of small and underserved producers, previously research have demonstrated the many co-benefits associated with basalt application, leading to revenue increases through boosted crop yield and lower input costs (Reynolds et al., 2009; Swoboda et al., 2022).

ERW operates on an annual basis, providing increased income generation from CSC practices for early adopters of conservation practices who have been left out of other recent conservation and climate contracts on tilling and cover cropping. Early adopters of conservation practices have, until now, been unable to enroll in voluntary carbon programs such as Nori, Gradable Carbon, and the Ecosystem Services Market Consortium because they do not meet the additionality criteria required to produce agricultural carbon credits. Similarly, this process works especially well with producers who face additional barriers such as those on highly acidic or nutrient-poor soils, and those with crops that require deep tillage. The deep persistent tillage enhances initial rates of ERW with basalt dust as the material can be worked more deeply into the soil and where CO₂ concentrations are elevated.



By partnering with Georgia Tech and farmer networks in the Southeast, we can direct funding and technical assistance to a region of the United States that has experienced historic land loss by farmers of color while struggling with erodible and acidic soils. In Georgia, two of the top five highest-producing peanut counties also have some of the most Black-farmed acres in the state (GPC Fact Sheet 2021). In general, the Georgia peanut belt includes all Georgia counties with the most Black-farmed acres. ***Measurement/quantification, Monitoring, Reporting, and Verification Plan***

Approach to quantification of GHG benefits

Attribution—clear and reliable demonstration of permanent carbon capture and storage over specified time intervals—is an essential aspect of any negative emission technology. However, attribution is difficult and/or costly for many CDR techniques and poor or underdeveloped attribution confidence remains a significant hurdle in attempts to assign trusted carbon capture metrics to agricultural products and register carbon as a fungible commodity itself.

Our attribution framework has a number of significant advantages. First, it is extremely simple to sample for; local growers or soil sampling companies need no expertise or specialized equipment. Second, only two rounds of sampling are needed, without any continuous monitoring, in order to constrain carbon capture accurately.

Using this approach, we have found in our trials that the initial extent of CO₂ removal scales in a coherent fashion with application rates, even with

Figure 3. Extents of CDR from 2021 trail data from Zumwalt acres using our novel isotope dilution mass balance approach.

exceptionally high application rates (>10 tons per acre) (Fig. 3). We have developed a simple, robust, and cost-effective approach toward capture attribution for ERW in agricultural systems based on measuring the abundance of trace and major elements in a bulk soil sample. This method is described in detail in the paper [A new soil-based approach for empirical monitoring of enhanced rock weathering rate](https://doi.org/10.48550/arXiv.2302.05004) (Reershemius, T, and Kelland, ME, in review). A preprint of the paper which expands on methodologies described in this section is available here: <https://doi.org/10.48550/arXiv.2302.05004>

In essence, this approach uses an immobile trace element (for example Ti) to establish the amount of basalt relative to soil, and then uses the difference between measured and predicted major element composition (for example Mg and Ca) to establish the fraction of applied basalt that has been removed through a reaction. This can be conceptualized as a two-component mixing model with an algebraic solution. Given typical basalt soil application rates of 11–55 tons/ha (e.g., Beerling et al., 2018), most methods of measuring soil chemistry are not accurate enough for this approach to work. Basalt is typically less than 5% of the soil, prompting the Yale research group’s development of a novel method that uses an isotope spike ‘cocktail’ and an inductively coupled plasma mass spectrometer to reduce error of key elements by an order of magnitude (to <0.5%). This is a means of empirically estimating CDR during ERW—remediating a problem that has been holding up reliable quantification of ERW for over a decade.

| Monitoring of nitrous oxide (N₂O) emissions

In addition to CO₂ removal, researchers will measure N₂O emissions associated with agriculture. N₂O is a long-lived and potent GHG; it has a perturbation lifetime of 114 years and a 100-year global warming potential of 296 (Ehhalt et al., 2001). The concentration of N₂O has risen roughly 20% since pre-industrial times, from 270 parts per billion in 1850 (IPCC 2013) to 333 parts per billion in 2020, and its growth rate has been increasing in recent years (Dlugokencky, NOAA/GML, gml.noaa.gov/ccgg/trends_n2o/). Currently, N₂O in the atmosphere is responsible for approximately 7.3% of warming (Myhre et al. 2018).

Agricultural activities significantly contribute to U.S. nitrous oxide emissions (80%), largely due to increasing use of reactive nitrogen (N) fertilizer (IPCC 2013). Given its outsized effect in agricultural settings (Fig. 4), a sound understanding of the effects of CO₂ removal practices on N₂O fluxes is an essential aspect of developing a robust CSC. For instance, modified tilling practices and some forms of cover cropping can lead to greater N₂O emissions that can offset GHG reduction by organic carbon sequestration (Guenet et al., 2021). In contrast, ERW should significantly reduce N₂O emissions since N₂O emissions are reduced with higher soil pH (Blanc-Betes et al., 2021). Higher soil pH significantly decreases N₂O emissions due to a suite of consequences: altered nitrification and denitrification rates; favored N₂ production over N₂O; increased plant productivity, resulting in higher N uptake and therefore reduced N availability in soils (Abalos et al., 2021; Bakken et al., 2012; Barton, Gleeson, et al., 2013; Barton, Murphy,

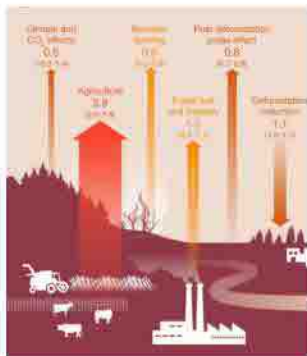


Figure 4. Overview of the most up-to-date accounting of anthropogenic nitrous oxide fluxes. Fertilization in agricultural settings is the largest anthropogenic N₂O source. ERW can significantly reduce this flux. Modified from Tian et al., 2020

Barton, Gleeson, et al., 2013; Barton, Murphy,

et al., 2013; Bergaust et al., 2010; Liu et al., 2010; Samad et al., 2016; Stevens & Laughlin, 1998; Vázquez et al., 2020).

We will provide new constraints on N₂O emissions during ERW through field-based emissions measurements on 5 participating farms. Given that N₂O emissions are notoriously sporadic, research assistants from Yale will provide continuous measurements using a Picarro Cavity Ringdown Spectrometer (CRDS) model G2508 paired with 5 Eosense automated soil flux chambers (eosAS-LT/LO) and an Eosense recirculating multiplexer (eosMX). Yale will purchase this equipment at no cost to the grant. Previously, GHG emissions in basalt trials have been measured sporadically, but this method will allow us to take continuous measurements *in situ* of N₂O, CO₂, CH₄, NH₃, H₂O.

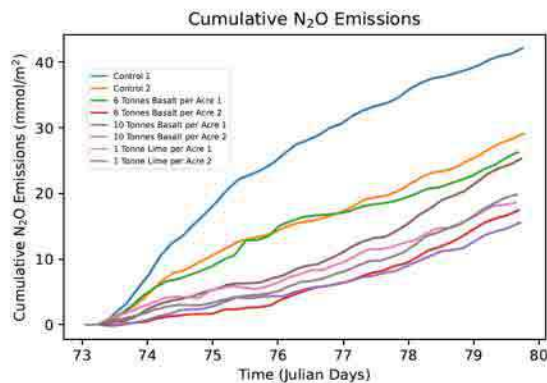


Figure 5. Example of N₂O flux measurements in corn trials using the Picarro CRDS.

We have an established method with this system that shows differences between amended basalt, amended lime, and control soils (Fig. 5). Although the eddy covariance approach provides robust regional signals, soil chambers can provide very low error and direct comparisons between controls while also monitoring soil temperature and moisture. We will deploy 10 sensors (10 chambers with 1 mass spectrometers and 1 multiplexers) at once for the duration of the 5-year project. Chambers will be run in control plots and basalt amended fields. Deployment sites will be decided after producer enrollment to ensure the widest range of soil types possible over the course of the grant.

| Monitoring of ecosystem scale CO₂ emissions

To verify our soil-based CDR efforts in the same sites used for N₂O fluxes, we will measure net CO₂ emissions at the ecosystem scale using the eddy covariance method. Towers will be equipped with open-path infrared gas analyzers (IRGA, LI-7500 Li-COR Inc., Lincoln, NE) and a sonic anemometer (CSAT3, Campbell Scientific Inc., Logan, UT) that measures sonic temperature and 3-dimensional wind speed. Data will be logged at 20 Hz and raw flux data will be processed with EddyPro software, which includes corrections for density fluctuations and high-frequency spectral loss (Guenet et al., 2021). We will establish a pair of towers within a site to compare the basalt deployment plot to a control plot. The height of the towers holding the gas analyzers will be dependent on the crop and the size of the deployment plots (following standard practices). To evaluate the effects of basalt addition at the ecosystem scale we will decompose fluxes of NEE_{CO2} to gross ecosystem exchange (GEE) and ecosystem respiration (R_{eco}). When ecosystem fluxes are combined with the soil sampling-based means of CDR attribution we will determine the effects of enhanced basalt weathering on primary productivity and ecosystem respiration rates. Resolving any offset between the methods will be addressed in monthly meetings. This research will be led by collaborator Professor Sparkle Malone of the Malone Disturbance Ecology Laboratory at Florida International University.

| Monitoring of trace metals

Transition metal accumulation is, arguably, the largest risk associated with silicate mineral addition to agricultural soils. These concerns, however, are greatly decreased when using a

standard basalt as mineral feedstock, as compared to olivine, a more efficiently dissolving silicate mineral. Olivine can capture roughly one ton of CO₂ per ton of material applied compared to three tons required for basalt, but it commonly has 5 times the trace metal content of basalt, in addition to having much lower availability with only one remaining commercial U.S. operation. To ensure zero potential health risks and more rapid deployment at cost, we will focus on waste basalt products. Despite low risk with basalt dust, the group will monitor trace metals (e.g., As, Cr, Ni, Pb, Cu) in the soils and in crops to ensure that any ingrowth of metals meets EPA guidelines and our model predictions.

Approach to monitoring of practice implementation

Given the goal of better constraining the economic, agronomic, and carbon cycle effects of ERW, relative to standard agricultural practices especially in settings with small and underserved producers, we will have control and basalt deployment plots at all farms participating in the program. Where possible, all deployments will have 3-5 replicates within a field row system (a spatial ABAB experimental design). The size of the plots will, by necessity, be dependent on individual farm sizes. In farms that have enough acreage, plots will be constant with either 20 or 50 acres. Although there will be experimental plots on each enrolled field, methods will be consistently tailored to not impede a grower's normal workflow. Furthermore, full producer privacy will be maintained—it only be returned to the grower and published in aggregate in peer-reviewed literature. In total, 78 farms and 1161 acres will be reached through project activities.

| Yield Data

Measuring yield data will serve as a crucial indicator of the results of basalt application on farmland. We will collect yield data (in replicate plots and controls) from all participating farmers to provide growers with reliable measurements of production associated with specific basalt application rates, in addition to producing data to verify co-benefits of basalt application on our crops of interest. For all crops, yield measurements will be taken from five representative plots of a known area with consistent basalt application, with a minimum of three replicates if five is not possible. Plots will be sized to allow for at least a 6 m buffer zone on each side. Weigh wagons will be provided for growers without access. Yield will be adjusted to a standardized moisture content, with moisture content measured from a random sample. Farmers will be given detailed instructions and technical support if necessary, and they will receive payments for their effort towards collection of yield data, given the extra work relative to typical harvesting. To promote farmer enrollment and being cognizant of conditions during harvest in working farms we will have a clause in the deployment agreement that farmers can get reduce the number of replicates or simply harvest controls and test plot together if there is a weather induced constraint (e.g., excess fall moisture severely constraining soy harvesting time).

| Soil Sampling

From soil sampling, measurements will be taken of pH, soil buffer pH, nutrient levels, and major and trace element concentrations. Soil testing allows farmers to make informed land-management decisions and is an important part of any CSC project. In addition to meeting our research needs and contributing to rigorous verification of carbon capture, providing soil testing for participating farmers will increase confident decision-making and create an open knowledge base from which farmers can operate. Soil samples will be taken by Yale researchers, farmers, or private soil sampling companies, based on farmer preference. Samples will be taken to 0-10cm (depending on

crop and tillage practice). Standard soil sampling practices employed by local extensions will be employed as a default as appropriate.

Approach to reporting and tracking of GHG benefits

| Life Cycle Assessment and Techno-Economic Analysis of Basalt Applications to Agricultural Lands

Assessing the GHG emissions through the full life cycle of a negative emission technology is essential to properly estimate true extents of CDR. Although it is clear that ERW will be a carbon-negative process (Beerling et al., 2018), there has not been a detailed look at the GHG emissions of this process in US croplands. We, led by Yale School of the Environment Assistant Professor Yuan Yao will conduct a techno-economic analysis (TEA) for basalt applications and Life Assessment to different agricultural commodities—including peanuts, grains, mixed vegetables, and cattle. The goal is to quantify the costs of carbon removal (\$/metric ton of CO₂ removed) across different regions and land types. Prior studies have mostly used out-of-date cost data from homologous literature and failed to consider significant cost variations for different supply chain activities. In this project, we will develop process-based TEA models combined with Geospatial Information Systems (GIS) and supply chain optimization, allowing for site-specific, realistic, and scale-dependent quantification of the carbon removal costs of ERW. The TEA model will consist of two parts, (1) a process-based cost model for all supply chain activities, including mining, grinding, transportation, and spreading of basalts; (2) GIS analysis for least-cost path identification

The process-based cost model will be based on the real-world cost data for mineral feedstocks from waste sources, fuels, labor, grinding equipment with different capacities, freight rates for road, rail, and barge transportation, and farming machinery for spreading and commodity distribution. The cost data will also be analyzed to derive the scaling factors, enabling customized estimation of capital and operational costs at different scales. Expected data sources will include industrial vendors, market analysis, and government databases. Transportation costs vary by modes; to optimize the total logistic cost, we need to pre-optimize the transportation costs by performing geospatial analysis using GIS. This project will use ArcGIS software that can analyze real-world roads, railways, waterways, and combinations of different transportation modes.

Using conservative estimates, farms will experience 1.5 t CO₂ capture/acre, which will be stored permanently. By the end of the grant period, the cost of this capture will be \$176/ton. However, this cost will continue to decrease at scale.

Approach to verification of GHG benefits

To ensure a robust estimate of the actual amount of CO₂ removed from the atmosphere, the empirically estimated CO₂ will be used in the SCEPTER model and another global biogeochemical model (CGENIE) to link initial CO₂ capture to longer term CO₂ removal from the soil system (and removal over a specific time frame) (Kanzaki et al., 2022). As a long-term goal, as these (and other similar) models improve over time, the community can transition to a more cost-effective, widely agreed means of measuring CDR by relying on modeling.

This project is focused on ERW and does not require that farmers adopt any other CSAF practices. Farmers may choose to implement other CSAF practices without impacting the ability of this project to quantify carbon capture due specifically to ERW.

Other CSAF practices also lead to carbon capture and farmers enrolled in this project may use COMET-planner for other climate-smart practices though carbon capture from these practices will not be reported in this project. The proposed work includes the first steps to using ERW modeling in conjunction with COMET-planner as COMET-planner does not yet have a way of measuring geochemical carbon capture. Over time ERW could be incorporated into the COMET-planner.

This work will also provide clear empirical constraints on the effects of ERW on N₂O emissions—an essential step towards establishing that this process can be used to create verifiable CSCs. This work is required to ensure that small producers are at the forefront of the CSC market, offering high quality and CSCs to consumers.

Agreement to participate in Partnerships Network

We agree to fully participate in the USDA Partnerships for Climate-Smart Commodities Learning Network. Noah Planavsky will be designated as the representative for this project.

III. A Plan to Develop and Expand Markets for CSCs

Our carbon capture and attribution plan is extremely well-positioned to lead into a robust CSC market, with high confidence in attributed carbon capture (see above), strong potential for continued growth and viability after the project period, and a straightforward and recognizable definition of a CSC. Here we define a CSC as one that has been grown through a verified process which includes 1) permanence, 2) additionality, and 3) attributable carbon sequestration amounts.

Partnerships designed to market resulting climate-smart commodities

The marketing of CSCs will happen through a partnership between Yale, Georgia Tech, enrolled growers, producer co-ops or associations. Yale and Georgia Tech will provide monitoring and verification of carbon capture associated with growing practices. Producer co-ops and associations will oversee marketing of CSC to next-stage buyers, include the Farm Foundation, the Land Connection, Zumwalt Acres and Switchgrass Spirits.

Plan to track climate-smart commodities through the supply chain

To market a CSC as carbon neutral or negative, it is essential to track the product through the supply chain. This will be achieved in small scale producers through direct accounting from direct marketing (or a very limited distribution network). This accounts for all products from ZA & BOC. Products such as vegetables and beef will be directly marketed to restaurants, distributors and grocers that prioritize quality sourcing and have established channels for marketing and communications direct to consumers. Transport accounting—of the soil amendments and all product distribution to the location of final sale to the consumer—will be feed into an LCA for all commodity sales.

We will work directly with manufacturers of products that source produce from farms that produce CSCs in order to promote climate smart commodities. Switchgrass Spirits is a distillery in St. Louis, MO that sources grains directly from farmers in the region. Switchgrass has committed to working to enroll their grain suppliers in basalt trials, in order to create a carbon negative whiskey. By aggregating climate smart commodities from growers throughout the region, the distillery can support the production and marketing of corn, barley, and rye CSCs. The distillery will collaborate with the research team to develop a climate smart label highlighting the CSCs to generate premium pricing. This relationship can provide a model for small scale collaborations with producers who aggregate CSCs from local farms, incentivizing

enrollment for small growers by providing a premium market and marketing support for climate smart commodities.

We will work directly with growers and distributors to develop and provide labeling with QR codes linking to information about CSCs to expand marketing and branding potential of CSCs.

Estimated economic benefits for participating producers including market returns

The carbon attribution will begin at the farm level, where farmers will have access to independently verified carbon capture assessments. A significant benefit is that farmer enrollment can last as long as they are willing, with basalt application continuing yearly or at a rate based on our modeling system. There is no requirement for a long-term contract due to the nature of carbon capture through ERW—sequestered carbon is non-reversible and contributes additionality in relation to all other existing conservation practices. Furthermore, carbon capture benefits are achieved after each application, and farmers may begin confidently marketing their products as carbon-sinking after their first year. These characteristics minimize uncertainties or challenges from other more familiar carbon cropping systems, such as no-till and cover cropping.

Before products arrive on shelves, farmers will receive compensation during the enrollment period and throughout the basalt application process. At the production level, this offsets start-up costs for farmers. One of the outcomes of this project will be to lower start-up costs, because of the establishment of CDR technology and supply chain paths that will decrease the need for new infrastructural investment and the cost of obtaining feedstock.

As farmers sell their commodities, they will have the ability to engage in value-added marketing using the definition of a CSC. This label will not confer any attributable credits and will leave options open for farmers to register carbon offsets. This label benefits growers' marketability to brands, allowing them to offer a portion (or all) of their commodity as carbon smart. From there, brands can decide to adopt a similar marketing approach or rearrange the strategy to fit their product—this primarily depends on the type of commodity, with peanuts being difficult to track from field to shelf. However, this can be solved by allowing producer associations or co-ops to market a portion of their commodity as a CSC, corresponding to the amount of carbon capture modeled, instead of linking it directly to the physical land.

In addition to this label, which is only used for value-added marketing, farmers have options for registering with one form of attributable carbon credit, minted through Agoro Carbon-Lithos Partnership, either to be traded on a market with consumers independently of the commodity or as a verified, carbon-negative commodity. These options include: 1) Farmers register independently, in which case once the product enters the supply chain, it will no longer be eligible for the creation of a new carbon credit, and farmers will receive their payment for the associated credit. 2) Growers' cooperatives/associations can hold carbon offsets if they market their product to other brands, or brands that market directly from farmers can hold carbon insets, allowing them to have a full accounting for the amount of carbon captured through the growing process that goes towards their net emissions. In this "inset" scenario, these carbon credits could not be transferred. 3) Individual producers or cooperatives can pair their commodity with quantifiable carbon offsets through an integrated life-cycle assessment, clearly demarcating that the carbon credits are transferred with the commodity itself. This option is only possible for products that are traceable to a consumer end point and not processed or combined, such as corn, soy, and beef. We will determine the structure of this market in collaboration with farmers to ensure maximum compatibility and satisfaction on the producer side. Some of these options are mutually exclusive,

while others can be combined to increase value directly for farmers. All relevant combinations will be proposed to farmers, and their feedback will directly inform a novel CSC market that meets the requirements of the CSAF call and strengthens the US agricultural economy.

Using organic labeling as a benchmark, we estimate that the value of CSC labeling will increase by 5%/year over the five year period of the study, as label recognition grows. According to FINBIN data from 2016-2020, organic certification increased the profitability of corn acreage by \$370/acre, and soy acreage by \$115/acre. Consumer willingness to pay depends heavily on successful education and marketing. In the long term, we expect CSC labeling could command similar increases in consumer willingness to pay premium prices for ecological responsible products. Furthermore, in the case of ERW technology, we do not expect the yield decreases that are observed in organic production.

Table 3 shows estimates of the value of CSC labeling for farmers enrolled in these trials, based upon increasing value of CSC products over the five years of the study, as a percentage of the value of organic labeling. The table is based on a corn and soybean annual rotation system. The final column includes the direct incentive payments paid to farmers in addition to the increased value of due to marketing and sales of CSCs.

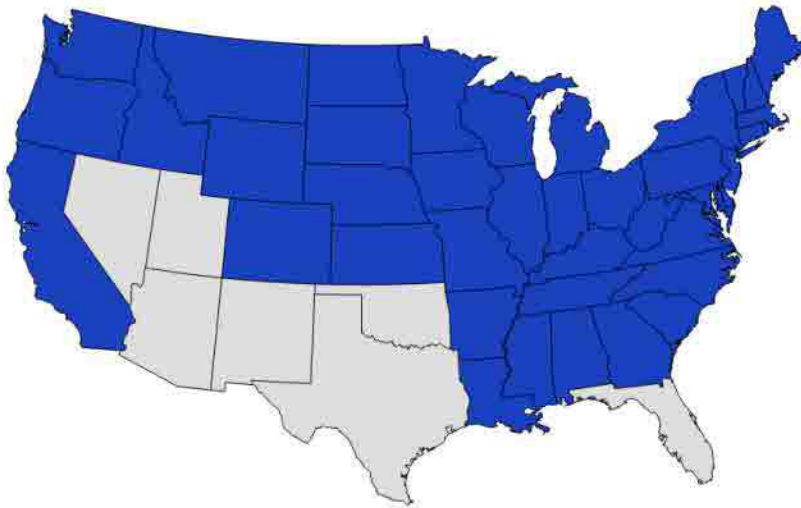
Farmer Economic Benefits	annual acreage	farmer incentives	organic label value/acre	added value of organic label	percent value of organic label	value of CSC label to farmer	total cash benefit to farmers
Year 1	89	\$16,000	242	\$	0	\$ -	\$16,000
Year 2	179	\$33,950	242	21,538	5%	1,077	\$35,027
Year 3	357	\$52,350	242	43,318	10%	4,332	\$56,682
Year 4	536	\$64,800	242	86,394	15%	12,959	\$77,759
Year 5			242	129,712	20%	25,942	\$25,942
TOTAL	1161	\$167,100	242	\$	-	\$44,310	\$211,410

Table 3: Estimated Economic Benefits for Farmers of incentives and CSC labeling

Post-project potential, ability to scale project activities, likelihood of long-term viability

Because carbon dioxide removal during basalt weathering will occur simultaneously with the commodity production, the farmer will be eligible for the sale of new credits at the end of each season, just as they would be with a traditional crop. As familiarity increases, our aim is that this will become self-sustaining with long-term viability beyond the project period. If the goals of the project are achieved, this model for the development of a CSC would serve as a template for future USDA actions. The proposed work has the potential to unlock a new and more robust means of generating CSCs.

Target regions for pilot studies using enhanced rock weathering to create climate smart commodities



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Climate-Smart Practices and Limitations

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

NRCS Practice Code (if applicable)	Practice Name
805	Amending Soil Properties with Lime (Soil Amendment for Climate-Smart Markets CSCG Project)

All practices applied under this grant will follow NRCS practice standard, Code 805 in accordance with the approved CPS 805 variance letter.

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. 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 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 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.



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

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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

Data element name	Description	Frequency
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 ₂ e) emission reductions	Quarterly
Cumulative carbon stock	Whole project estimate of total carbon sequestration	Quarterly
Cumulative CO ₂ benefit	Whole project estimate of total CO ₂ emission reductions	Quarterly
Cumulative CH ₄ benefit	Whole project estimate of total CH ₄ emission reductions	Quarterly
Cumulative N ₂ O benefit	Whole project estimate of total N ₂ 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

Data element name	Description	Frequency
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

Data element name	Description	Frequency
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

Data element name	Description	Frequency
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

Data element name	Description
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

Data element name	Description	Frequency
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

Data element name	Description	Frequency
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

Data element name	Description	Frequency
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

Data element name	Description	Frequency
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 ₂ reduction calculated	Calculation of total CO ₂ reduction	Annual
Total carbon stock change calculated	Calculation of change in carbon stock	Annual
Total CH ₄ reduction calculated	Calculation of total CH ₄ reduction	Annual
Total N ₂ O reduction calculated	Calculation of total N ₂ 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

Data element name	Description	Frequency
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

Data element name: Commodity type	Reporting question: What climate-smart commodity types are produced by this project?
Description: 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.	
Data type: List	Select multiple values: No
Measurement unit: Category	Allowed values: FSA commodity list
Logic: None – all respond	Required: Yes
Data collection level: Project	Data collection frequency: Quarterly

Commodity sales

Data element name: Commodity sales	Reporting question: Did project activities result in sales this quarter of the commodity(ies) produced by this project?
Description: 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.	
Data type: List	Select multiple values: No
Measurement unit: Category	Allowed values: <ul style="list-style-type: none"> • Yes • No
Logic: None – all respond	Required: Yes
Data collection level: Project	Data collection frequency: Quarterly

Farms enrolled

Data element name: Farms enrolled	Reporting question: Did the project enroll any producers or fields this quarter?
Description: 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.	
Data type: List	Select multiple values: No
Measurement unit: Category	Allowed values: <ul style="list-style-type: none"> • Yes • No
Logic: None – all respond	Required: Yes
Data collection level: Project	Data collection frequency: Quarterly

GHG calculation methods

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

GHG cumulative calculation

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

Cumulative GHG benefits

Data element name: Cumulative GHG benefits	Reporting question: What are the project's estimated total GHG emission reductions (CO ₂ eq) to date?
Description: 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.	
Data type: Decimal	Select multiple values: No
Measurement unit: Metric tons CO ₂ eq	Allowed values: 0-10,000,000
Logic: None – all respond	Required: Yes
Data collection level: Project	Data collection frequency: Quarterly

Cumulative carbon stock

Data element name: Cumulative carbon stock	Reporting question: How much carbon has the project sequestered to date?
Description: 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 ₂ eq.	
Data type: Decimal	Select multiple values: No
Measurement unit: Metric tons CO ₂ eq	Allowed values: 0-10,000,000
Logic: None – all respond	Required: Yes
Data collection level: Project	Data collection frequency: Quarterly

Cumulative CO₂ benefit

Data element name: Cumulative CO ₂ benefit	Reporting question: What are the project's estimated total cumulative CO ₂ emission reductions to date?
Description: 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.	
Data type: Decimal	Select multiple values: No
Measurement unit: Metric tons CO ₂	Allowed values: 0-10,000,000
Logic: None – all respond	Required: Yes
Data collection level: Project	Data collection frequency: Quarterly

Cumulative CH₄ benefit

Data element name: Cumulative CH ₄ benefit	Reporting question: What are the project's estimated total CH ₄ emission reductions to date?
Description: 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 ₄ = 25 tons of CO ₂ eq.	
Data type: Decimal	Select multiple values: No
Measurement unit: Metric tons CH ₄ reduced in CO ₂ eq	Allowed values: 0-10,000,000
Logic: None – all respond	Required: Yes
Data collection level: Project	Data collection frequency: Quarterly

Cumulative N2O benefit

Data element name: Cumulative N2O benefit	Reporting question: What are the project's estimated total N2O emission reductions to date?
Description: 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 ₂ O = 298 tons of CO ₂ eq.	
Data type: Decimal	Select multiple values: No
Measurement unit: Metric tons N2O reduced in CO ₂ eq	Allowed values: 0-10,000,000
Logic: None – all respond	Required: Yes
Data collection level: Project	Data collection frequency: Quarterly

Offsets produced

Data element name: Offsets produced	Reporting question: How many carbon offsets have been produced in the project?
Description: 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.	
Data type: Decimal	Select multiple values: No
Measurement unit: Metric tons CO ₂ eq	Allowed values: 0-10,000,000
Logic: None – all respond	Required: Yes
Data collection level: Project	Data collection frequency: Quarterly

Offsets sale

Data element name: Offsets sale	Reporting question: To what marketplace(s) were carbon offsets sold?
Description: 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.	
Data type: Text	Select multiple values: NA
Measurement unit: Name	Allowed values: Text
Logic: Respond if >0 to 'Offsets produced'	Required: Yes
Data collection level: Project	Data collection frequency: Quarterly

Offsets price

Data element name: Offsets price	Reporting question: What was the average price of carbon received for offsets?
Description: 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.	
Data type: Decimal	Select multiple values: No
Measurement unit: Dollars per metric ton	Allowed values: 0-500
Logic: Respond if >0 to 'Offsets produced'	Required: Yes
Data collection level: Project	Data collection frequency: Quarterly

Insets produced

Data element name: Insets produced	Reporting question: How many carbon insets have been produced in the project?
Description: 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.	
Data type: Decimal	Select multiple values: No
Measurement unit: Metric tons CO ₂ eq	Allowed values: 0-10,000,000
Logic: None – all respond	Required: Yes
Data collection level: Project	Data collection frequency: Quarterly

Cost of on-farm TA

Data element name: Cost of on-farm TA	Reporting question: What is the total amount that has been spent to provide on-farm TA?
Description: 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.	
Data type: Decimal	Select multiple values: No
Measurement unit: Dollars	Allowed values: \$0-\$50,000,000
Logic: None – all respond	Required: Yes
Data collection level: Project	Data collection frequency: Quarterly

MMRV cost

Data element name: MMRV cost	Reporting question: What is the total amount that has been spent on MMRV activities?
Description: 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.	
Data type: Decimal	Select multiple values: No
Measurement unit: Dollars	Allowed values: \$0-\$50,000,000
Logic: None – all respond	Required: Yes
Data collection level: Project	Data collection frequency: Quarterly

GHG monitoring method

Data element name: GHG monitoring 1-5	Reporting question: How did the project monitor GHG benefits?
Description: 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.	
Data type: List	Select multiple values: No
Measurement unit: Category	Allowed values: <ul style="list-style-type: none"> • Drones • Ground-level photos and videos • On-farm visit • Plot-based sampling • 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: Project	Data collection frequency: 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
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Partner name

Data element name: Name of partner organization **Reporting question:** What is the official name of the recipient or partner organization?

Description: Legal name of recipient or partner organization

Data type: Text

Select multiple values: NA

Measurement unit: NA

Allowed values: Text

Logic: None – all respond

Required: Yes

Data collection level: Partner

Data collection frequency: Partnership initiation

Partner type

Data element name: Type of partner organization **Reporting question:** What type of organization is this?

Description: Legal/financial structure of recipient or partner organization

Data type: List

Select multiple values: No

Measurement unit: Category

Allowed values:

- Commodity groups (501c5)
- For-profit
- Individual
- Nonprofit
- State or local agency
- Tribal agency
- University

Logic: None – all respond

Required: Yes

Data collection level: Partner

Data collection frequency: Partnership initiation

Partner POC

Data element name: Partner POC **Reporting question:** Who is the point of contact for this project at the recipient or partner organization?

Description: Name of a point of contact for the recipient or partner organization

Data type: Text

Select multiple values: NA

Measurement unit: NA

Allowed values: Text

Logic: None – all respond

Required: Yes

Data collection level: Partner

Data collection frequency: Partnership initiation; update as necessary

Partner POC email

Data element name: Partner POC email **Reporting question:** What is the point of contact's email address?

Description: Email of the point of contact for the recipient or partner organization

Data type: Text

Select multiple values: NA

Measurement unit: NA

Allowed values: Text

Logic: None – all respond

Required: Yes

Data collection level: Partner

Data collection frequency: Partnership initiation; update as necessary

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

Partnership start date

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

Partnership end date

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

New partnership

Data element name: New partnership	Reporting question: Is this a new partnership?
Description: 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.	
Data type: List	Select multiple values: No
Measurement unit: Category	Allowed values:
	<ul style="list-style-type: none"> • Yes • No • I don't know
Logic: No response for recipient	Required: Yes
Data collection level: Partner	Data collection frequency: Partnership initiation

Partner total requested

Data element name: Partner total requested	Reporting question: What is the total amount of funding the partner has requested to date from this project?
Description: 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.	
Data type: Decimal	Select multiple values: NA
Measurement unit: Dollars	Allowed values: \$0-\$100,000,000
Logic: No response for recipient	Required: Yes
Data collection level: Partner	Data collection frequency: 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

Data element name: Commodity type	Reporting question: What type of commodity is produced by the farmers enrolled in this project?
Description: 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.	
Data type: List	Select multiple values: No
Measurement unit: Category	Allowed values: FSA commodity list
Logic: None – all respond	Required: Yes
Data collection level: Project	Data collection frequency: Quarterly

Marketing channel type

Data element name: Marketing channel type	Reporting question: What type of marketing channel is used to sell this commodity?
Description: 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.	
Data type: List	Select multiple values: No
Measurement unit: Category	Allowed values: <ul style="list-style-type: none"> • Agricultural marketing board • Biorefinery • Commodity broker • Direct to consumer • Direct to institution • Direct to restaurant • Distributor (including grain elevators) • Food hub or cooperative • Food processor • Non-food byproducts processor • Retailer • USDA • Other (specify)
Logic: None – all respond	Required: Yes
Data collection level: Project	Data collection frequency: Quarterly

Number of buyers

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

Names of buyers

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

Marketing channel geography

Data element name: Marketing channel geography	Reporting question: What is the primary geography of the marketing channel?
Description: 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.	
Data type: List	Select multiple values: No
Measurement unit: Category	Allowed values: <ul style="list-style-type: none"> • Local • Regional • National • Global
Logic: None – all respond	Required: Yes
Data collection level: Project	Data collection frequency: Quarterly

Value sold

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

Volume sold

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

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

Producer start date

Data element name: Producer start date	Reporting question: When did the producer enroll in the project?
Description: Date that the producer enrolled in the project by signing their first contract.	
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: Producer	Data collection frequency: Initial enrollment

Producer name

Data element name: Producer name	Reporting question: What is the name of producer enrolled in the project?
Description: 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.	
Data type: Text	Select multiple values: NA
Measurement unit: NA	Allowed values: Text
Logic: None – all respond	Required: Yes
Data collection level: Producer	Data collection frequency: 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

Data element name: Practice type 1-7	Reporting question: What CSAF practice is being implemented in this field through the project?
Description: 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.	
Data type: List	Select multiple values: No
Measurement unit: Category	Allowed values: See list in Appendix A
Logic: None – all respond	Required: Yes
Data collection level: Field	Data collection frequency: Initial enrollment

Practice standard

Data element name: Practice standard 1-7	Reporting question: What standard does the CSAF practice follow?
Description: 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.	
Data type: List	Select multiple values: No
Measurement unit: Category	Allowed values: <ul style="list-style-type: none"> • NRCS • Other (specify)
Logic: None – all respond	Required: Yes
Data collection level: Field	Data collection frequency: Initial enrollment

Planned practice implementation year

Data element name: Practice 1-7 implementation year	Reporting question: What year is the CSAF practice planned to be implemented?
Description: 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.	
Data type: Integer	Select multiple values: No
Measurement unit: Year	Allowed values: 2022-2030
Logic: None – all respond	Required: Yes
Data collection level: Field	Data collection frequency: Initial enrollment

Practice extent

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

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

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 multiple columns with a drop-down list of the allowed values. Choose one value for each column. Leave unnecessary columns blank.	
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: Quarterly

Practice type

Data element name: Field practice type 1-7	Reporting question: What CSAF practice is being implemented in this field through the project?
Description: 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.	
Data type: List	Select multiple values: No
Measurement unit: Category	Allowed values: See list in Appendix A
Logic: None – all respond	Required: Yes
Data collection level: Field	Data collection frequency: Quarterly

Date practice complete

Data element name: Date practice complete	Reporting question: When did the project certify CSAF practice implementation as complete?
Description: 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.	
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: Yes
Data collection level: Field	Data collection frequency: Quarterly

Contract end date**Data element name:** Contract end date**Reporting question:** Contract end date**Description:** 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.**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:** Yes**Data collection level:** Field**Data collection frequency:** Quarterly**MMRV assistance provided****Data element name:** MMRV assistance provided**Reporting question:** Was MMRV assistance provided?**Description:** 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).**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**Marketing assistance provided****Data element name:** Marketing assistance provided**Reporting question:** Was marketing assistance provided?**Description:** 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.**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**Incentive per acre or head****Data element name:** Incentive per acre or head**Reporting question:** Is this field receiving a per-acre or per-head incentive?**Description:** 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?**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

Field commodity value

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

Field commodity volume

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

Field commodity volume unit

Data element name: Field commodity volume unit	Reporting question: What is the unit of volume?
Description: 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.	
Data type: List	Select multiple values: No
Measurement unit: Category	Allowed values: <ul style="list-style-type: none"> • Bushels • Carcass weight pounds • Gallons • Head • Linear feet • Liveweight pounds • Pounds • Tons • Other (specify)
Logic: None – all respond	Required: Yes
Data collection level: Field	Data collection frequency: Quarterly

Cost of implementation

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

Data element name: Field GHG calculations	Reporting question: What methods are used to calculate GHG benefits in this field?
Description: 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>).	
Data type: List	Select multiple values: No
Measurement unit: Category	Allowed values: <ul style="list-style-type: none"> • Models • Direct field measurements • Both
Logic: None – all respond	Required: Yes
Data collection level: Field	Data collection frequency: Quarterly

Field official GHG calculation

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

Field official GHG ER

Data element name: Field official GHG emission reductions	Reporting question: What are the estimated total GHG emission reductions (CO ₂ eq) in this field?
Description: 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.	
Data type: Decimal	Select multiple values: No
Measurement unit: Metric tons CO ₂ eq	Allowed values: 0-10,000,000
Logic: None – all respond	Required: Yes
Data collection level: Field	Data collection frequency: Quarterly

Field official carbon stock

Data element name: Field official carbon stock	Reporting question: How much carbon has been sequestered in this field?
Description: 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 ₂ eq.	
Data type: Decimal	Select multiple values: No
Measurement unit: Metric tons CO ₂ eq	Allowed values: 0-10,000,000
Logic: None – all respond	Required: Yes
Data collection level: Field	Data collection frequency: Quarterly

Field official CO2 ER

Data element name: Field official CO2 emission reductions	Reporting question: What are the estimated total CO2 emission reductions in this field?
Description: 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.	
Data type: Decimal	Select multiple values: No
Measurement unit: Metric tons CO ₂	Allowed values: 0-10,000,000
Logic: None – all respond	Required: Yes
Data collection level: Field	Data collection frequency: Quarterly

Field official CH4 ER

Data element name: Field official CH4 emission reductions	Reporting question: What are the estimated total CH4 emission reductions in this field?
Description: 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 ₄ = 25 tons of CO ₂ eq.	
Data type: Decimal	Select multiple values: No
Measurement unit: Metric tons CH4 reduced in CO ₂ eq	Allowed values: 0-10,000,000
Logic: None – all respond	Required: Yes
Data collection level: Field	Data collection frequency: Quarterly

Field official N2O ER

Data element name: Field official N2O emission reductions	Reporting question: What are the estimated total N2O emission reductions in this field?
Description: 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 ₂ O = 298 tons of CO ₂ eq.	
Data type: Decimal	Select multiple values: No
Measurement unit: Metric tons N2O reduced in CO ₂ eq	Allowed values: 0-10,000,000
Logic: None – all respond	Required: Yes
Data collection level: Field	Data collection frequency: Quarterly

Field offsets produced

Data element name: Field offsets produced	Reporting question: How many carbon offsets have been produced in this field?
Description: 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.	
Data type: Decimal	Select multiple values: No
Measurement unit: Metric tons CO ₂ eq	Allowed values: 0-10,000,000
Logic: None – all respond	Required: Yes
Data collection level: Field	Data collection frequency: 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 CO₂eq

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

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

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

Data element name: Commodity type 1-6	Reporting question: What type of commodity(ies) is produced from this field?
Description: 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	
Data type: List	Select multiple values: No
Measurement unit: Category	Allowed values: FSA commodity list
Logic: None – all respond	Required: If project calculates GHG benefits using multiple methods
Data collection level: Field	Data collection frequency: Annual

Practice type

Data element name: Practice type 1-7	Reporting question: What CSAF practice is being implemented by this project?
Description: 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.	
Data type: List	Select multiple values: No
Measurement unit: Category	Allowed values: See list in Appendix A
Logic: None – all respond	Required: If project calculates GHG benefits using multiple methods
Data collection level: Field	Data collection frequency: 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

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

Model end date

Data element name: Model end date	Reporting question: For what time period are the GHG benefits modeled (model end date)?
Description: Date that the model parameters end.	
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: If project calculates GHG benefits using multiple methods
Data collection level: Field	Data collection frequency: Annual

Total GHG benefits estimated

Data element name: Total GHG benefits estimated	Reporting question: What is the alternate estimate of the field's total GHG emission reductions?
Description: Total greenhouse gas emission reductions from practice implementation in the field estimated using an alternate model.	
Data type: Decimal	Select multiple values: No
Measurement unit: Metric tons CO ₂ 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 carbon stock estimated

Data element name: Total carbon stock estimated	Reporting question: What is the alternate estimate of how much carbon has the field has sequestered?
Description: 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 ₂ eq.	
Data type: Decimal	Select multiple values: No
Measurement unit: Metric tons CO ₂ 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 CO₂ estimated

Data element name: Total CO ₂ estimated	Reporting question: What is the alternate estimate of the field's total CO ₂ emission reductions?
Description: Total carbon dioxide emission reductions based on practice implementation in the field estimated using an alternate model.	
Data type: Decimal	Select multiple values: No
Measurement unit: Metric tons CO ₂	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 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 CH₄ = 25 tons of CO₂eq.

Data type: Decimal

Select multiple values: No

Measurement unit: Metric tons CH4 reduced in CO₂eq

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 N₂O = 298 tons of CO₂eq.

Data type: Decimal

Select multiple values: No

Measurement unit: Metric tons N2O reduced in CO₂eq

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

Select multiple values: No

Measurement unit: Category

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)

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

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 CO₂**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 CO₂eq.**Data type:** Decimal**Select multiple values:** No**Measurement unit:** Metric tons CO₂eq**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

Data element name: Total CH4 reduction calculated	Reporting question: What are the total measured CH4 emission reductions?
Description: Total annual methane emission reductions based on practice implementation in the field calculated from in-field measurements. Conversion rate is one ton of CH ₄ = 25 tons of CO ₂ eq.	
Data type: Decimal	Select multiple values: No
Measurement unit: Metric tons CH4 reduced in CO ₂ eq	Allowed values: 0-10,000,000
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 N2O reduction calculated

Data element name: Total N2O reduction calculated	Reporting question: What are the total measured N2O emission reductions?
Description: 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 ₂ O = 298 tons of CO ₂ eq.	
Data type: Decimal	Select multiple values: No
Measurement unit: Metric tons N2O reduced in CO ₂ eq	Allowed values: 0-10,000,000
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

Soil sample result

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

Data element name: Environmental benefits	Reporting question: Are environmental benefits other than GHGs being tracked in the field?
Description: 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.	
Data type: List	Select multiple values: No
Measurement unit: Category	Allowed values: <ul style="list-style-type: none"> • Yes • No • I don't know
Logic: None – all respond	Required: Yes
Data collection level: Field	Data collection frequency: Annual

Reduction in nitrogen loss

Data element name: Reduction in nitrogen loss	Reporting question: Are reductions in nitrogen losses being tracked in the field?
Description: 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.	
Data type: List	Select multiple values: No
Measurement unit: Category	Allowed values: <ul style="list-style-type: none"> • Yes • No • I don't know
Logic: Respond if yes to 'Environmental benefits'	Required: Yes
Data collection level: Field	Data collection frequency: Annual

Reduction in nitrogen loss amount

Data element name: Reduction in nitrogen loss amount	Reporting question: How much reduction in nitrogen losses have been measured in the field?
Description: Total amount of reduction in nitrogen losses that is measured and reported 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 'Reduction in nitrogen loss'	Required: Yes
Data collection level: Field	Data collection frequency: Annual

Reduction in nitrogen loss amount unit

Data element name: Reduction in nitrogen loss amount unit	Reporting question: What is the unit for how much reduction in nitrogen losses have been measured in the field?
Description: 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.	
Data type: List	Select multiple values: No
Measurement unit: Category	Allowed values:
	<ul style="list-style-type: none"> • Kilograms • Metric tons • Pounds • Other (specify)
Logic: Respond if yes to 'Reduction in nitrogen loss'	Required: Yes
Data collection level: Field	Data collection frequency: Annual

Reduction in nitrogen loss purpose

Data element name: Reduction in nitrogen loss purpose	Reporting question: What is the purpose of tracking reduction in nitrogen losses?
Description: 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.	
Data type: List	Select multiple values: No
Measurement unit: Category	Allowed values:
	<ul style="list-style-type: none"> • Commodity marketing • Producing insets • Producing offsets • I don't know • Other (specify)
Logic: Respond if yes to 'Reduction in nitrogen loss'	Required: Yes
Data collection level: Project	Data collection frequency: Annual

Reduction in phosphorus loss

Data element name: Reduction in phosphorus loss	Reporting question: Are reductions in phosphorus losses being tracked in the field?
Description: 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.	
Data type: List	Select multiple values: No
Measurement unit: Category	Allowed values:
	<ul style="list-style-type: none"> • Yes • No • I don't know
Logic: Respond if yes to 'Environmental benefits'	Required: Yes
Data collection level: Field	Data collection frequency: Annual

Reduction in phosphorus loss amount

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

Reduction in phosphorus loss amount unit

<p>Data element name: Reduction in phosphorus loss amount unit</p> <p>Description: 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>Data type: List</p> <p>Measurement unit: Category</p> <p>Logic: Respond if yes to ‘Reduction in phosphorus loss’</p> <p>Data collection level: Field</p>	<p>Reporting question: What is the unit for the reduction in phosphorus losses measured in the field?</p> <p>Select multiple values: No</p> <p>Allowed values:</p> <ul style="list-style-type: none"> • Kilograms • Metric tons • Pounds • Other (specify) <p>Required: Yes</p> <p>Data collection frequency: Annual</p>
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Reduction in phosphorus loss purpose

<p>Data element name: Reduction in phosphorus loss purpose</p> <p>Description: 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>Data type: List</p> <p>Measurement unit: Category</p> <p>Logic: Respond if yes to ‘Reduction in phosphorus loss’</p> <p>Data collection level: Field</p>	<p>Reporting question: What is the purpose of tracking reductions in phosphorus losses?</p> <p>Select multiple values: No</p> <p>Allowed values:</p> <ul style="list-style-type: none"> • Commodity marketing • Producing insets • Producing offsets • I don’t know • Other (specify) <p>Required: Yes</p> <p>Data collection frequency: Annual</p>
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Other water quality

<p>Data element name: Other water quality</p> <p>Description: 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>Data type: List</p> <p>Measurement unit: Category</p> <p>Logic: Respond if yes to ‘Environmental benefits’</p> <p>Data collection level: Field</p>	<p>Reporting question: Are other water quality metrics being tracked in the field?</p> <p>Select multiple values: No</p> <p>Allowed values:</p> <ul style="list-style-type: none"> • Yes • No • I don’t know <p>Required: Yes</p> <p>Data collection frequency: Annual</p>
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Other water quality type

Data element name: Other water quality type	Reporting question: What type of other water quality metric have been measured in the field?
Description: 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.	
Data type: List	Select multiple values: No
Measurement unit: Category	Allowed values: <ul style="list-style-type: none"> • Sediment load reduction • Temperature • Other (specify)
Logic: Respond if yes to ‘Other water quality’	Required: Yes
Data collection level: Field	Data collection frequency: Annual

Other water quality amount

Data element name: Other water quality amount	Reporting question: How much reduction in other water quality metrics have been measured in the field?
Description: Total amount of reduction in other water quality metrics 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 ‘Other water quality’	Required: Yes
Data collection level: Field	Data collection frequency: Annual

Other water quality amount unit

Data element name: Other water quality amount unit	Reporting question: What is the unit for the reduction in other water quality metrics measured in the field?
Description: 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.	
Data type: List	Select multiple values: No
Measurement unit: Category	Allowed values: <ul style="list-style-type: none"> • Degrees F • Kilograms • Kilograms per liter • Metric tons • Pounds • Other (specify)
Logic: Respond if yes to ‘Other water quality’	Required: Yes
Data collection level: Field	Data collection frequency: Annual

Other water quality purpose

<p>Data element name: Other water quality purpose</p> <p>Description: 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>Data type: List</p> <p>Measurement unit: Category</p> <p>Logic: Respond if yes to ‘Other water quality’</p> <p>Data collection level: Field</p>	<p>Reporting question: What is the purpose of tracking other water quality benefits?</p> <p>Select multiple values: No</p> <p>Allowed values:</p> <ul style="list-style-type: none"> • Commodity marketing • Producing insets • Producing offsets • I don’t know • Other (specify) <p>Required: Yes</p> <p>Data collection frequency: Annual</p>
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Water quantity

<p>Data element name: Water quantity</p> <p>Description: 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>Data type: List</p> <p>Measurement unit: Category</p> <p>Logic: Respond if yes to ‘Environmental benefits’</p> <p>Data collection level: Field</p>	<p>Reporting question: Is water conservation being tracked in the field?</p> <p>Select multiple values: No</p> <p>Allowed values:</p> <ul style="list-style-type: none"> • Yes • No • I don’t know <p>Required: Yes</p> <p>Data collection frequency: Annual</p>
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Water quantity amount

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

<p>Data element name: Water quantity amount unit</p> <p>Description: 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>Data type: List</p> <p>Measurement unit: Category</p> <p>Logic: Respond if yes to ‘Water quantity’</p> <p>Data collection level: Field</p>	<p>Reporting question: What is the unit for the amount of water conservation measured in the field?</p> <p>Select multiple values: No</p> <p>Allowed values:</p> <ul style="list-style-type: none"> • Acre-feet • Cubic feet • Other (specify) <p>Required: Yes</p> <p>Data collection frequency: Annual</p>
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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

Data element name: Avoided land conversion purpose

Description: 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.

Data type: List

Measurement unit: Category

Reporting question: What is the purpose of tracking avoided land conversion 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 ‘Avoided land conversion’

Required: Yes

Data collection level: Field

Data collection frequency: Annual

Improved wildlife habitat

Data element name: Improved wildlife habitat

Description: 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.

Data type: List

Measurement unit: Category

Reporting question: Are improvements to wildlife habitat being tracked in the field?

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

Improved wildlife habitat amount

Data element name: Improved wildlife habitat amount

Description: Total amount of improved wildlife habitat that is measured in and around the enrolled fields.

Data type: Decimal

Measurement unit: Amount

Reporting question: How much improved wildlife habitat has been measured in the field?

Select multiple values: No

Allowed values: 0-1,000,000

Logic: Respond if yes to ‘Improved wildlife habitat’

Required: Yes

Data collection level: Field

Data collection frequency: Annual

Improved wildlife habitat amount unit

Data element name: Improved wildlife habitat unit

Description: 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.

Data type: List

Measurement unit: Category

Reporting question: What is the unit for the amount of improved wildlife habitat measured in the field?

Select multiple values: No

Allowed values:

- Acres
- Linear feet
- Other (specify)

Logic: Respond if yes to ‘Improved wildlife habitat’

Required: Yes

Data collection level: Field

Data collection frequency: 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
Deep pit		
Dry lot		
Dry stacking/solid storage		
Pasture/range/paddock		
Poultry with bedding		
Poultry without bedding (e.g., high rise)		
Slurry tank/basin		
Digester type		Covered lagoon with energy generation
		Covered lagoon with flaring
		Covered lagoon (no energy generation or flaring)
		Complex mix with energy generation
		Plug flow with energy generation
Additional feedstock source (select most common if using more than one)		Other (specify)
		Food waste
		Straw or bedding
		Wastewater
		Other (specify)

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	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)
Combustion System Improvement (CPS 372)	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
Critical Area Planting (CPS 342)	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


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	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


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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


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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

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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	


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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		