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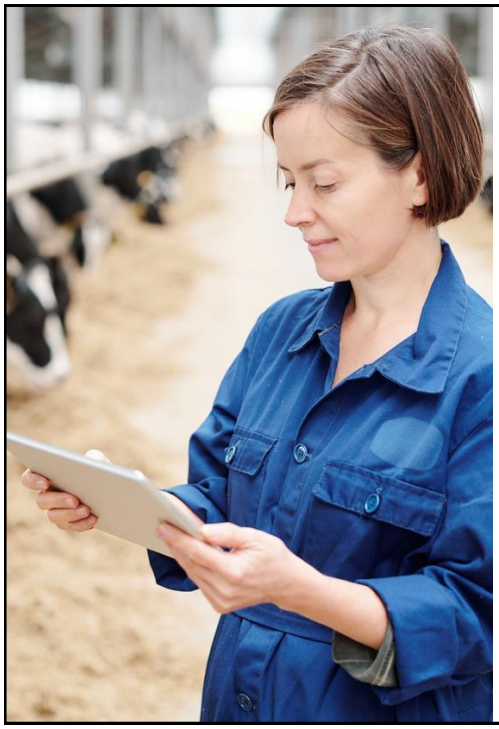


What We'll Cover:

- Overview of CARAT Project and Climate Smart Team Grants
- Process for Applying and Qualifying into Program
- Climate-Smart Plan Development Process
- Example of Climate-Smart Plan
- Type of Projects That Will Be Funded
- Priorities for Implementation Strategies
- Ranking Process for Implementation Strategies
- Process for Submitting Plans
- Process for Submitting Invoices for TSP Work

2

CARAT – Climate-smart agriculture that is profitable, regenerative, actionable, and trustworthy (CARAT)

FUNDED THROUGH USDA CLIMATE-SMART COMMODITIES PARTNERSHIPS GRANT

3

CARAT Project

- Focuses on dairy production in Pennsylvania: ***What goes in and comes out of a cow***
- Involves Climate-Smart Teams being implemented on 69 dairy farms across Pennsylvania
- Farms will be representative of the various scales and types of dairies
- Dairy farms will be accepted on a rolling basis to go through the pre-qualification process to work with a technical service provider to develop climate-smart plans, which will be used to select which farms will move to implementation stage
- Penn State will monitor impact of implementation stages directly on 12 pilot farms and indirectly on 69 farms

4

Climate Smart Teams: Producer Involvement Goals

- Develop Climate-Smart Plans for up to 150 farms, based on budget
- Establish climate-smart team grants to fund practices on 69 farms
  - 20 small dairies (35-199 cows)
  - 29 medium dairies (200-499 cows)
  - 20 large dairies (500+ cows)
- Conduct monitoring and measurements of GHG reductions on 12 farms

5

CARAT: Implementation Funding Amounts

Farm Categories	Amount of Total Funds	% Funds for TA	% Funds for Implementation
Farms with 35-199 cows	Up to $75,000	10%	90%
Farms with 200-499 cows	Up to $141,000	10%	90%
Farms with 500+ cows	Up to $250,000	10%	90%

6

What Climate Smart Team Funding Could Support:

7

CARAT Implementation Process: Three Phases

Pre-Qualification

- Apply for and receive pre-qualification to enroll in program

Climate-Smart Planning

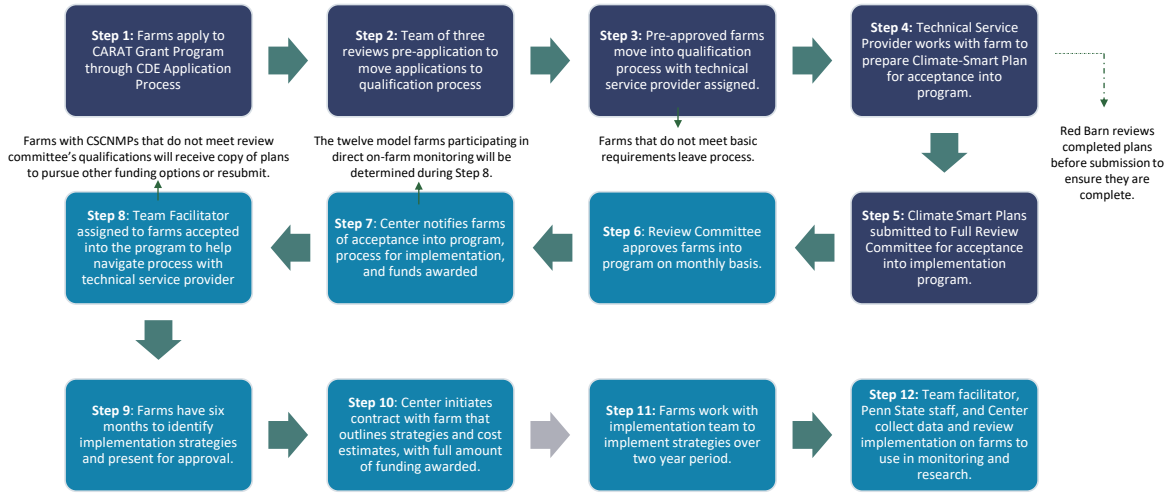
- Work with technical service provider to develop climate-smart plan

Implementation of Climate-Smart Practices

- Utilizing funding from the CARAT grant, implement climate-smart practices

8

CARAT PROJECT PROCESS FLOW



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PROJECT ROLE DEFINITIONS

Farm Implementation Team – Once qualified to receive funding, each farm will have an implementation team comprised of the farm's owner or designated manager, any advisors the farm wishes to participate, the TSP that wrote the Climate Smart Plan to qualify the farm, and a Team Facilitator. Each team must have an initial meeting and a final meeting, but do not need to meet regularly through the project so long as the project is moving forward.

Team Facilitator – A facilitator, most likely from PSU Extension, will be assigned to the farm by the CDE upon acceptance as a qualifying farm. This facilitator is responsible for conducting the initial meeting to document the goals and timeline for the projects, facilitating the agreement between team members on the project, and reporting to CARAT regarding the team's progress. They will also make regular check-in calls to ensure the project is moving forward.

Team Project Manager – The selected TSP will serve as the Project Manager for each implementation team. That Project Manager will work with farm owner and vendors to design project, review project plans, review vendor invoices, and work with the farm to submit invoices to CDE for reimbursement. How involved this person gets in the general contracting of the project is up to the farm itself.

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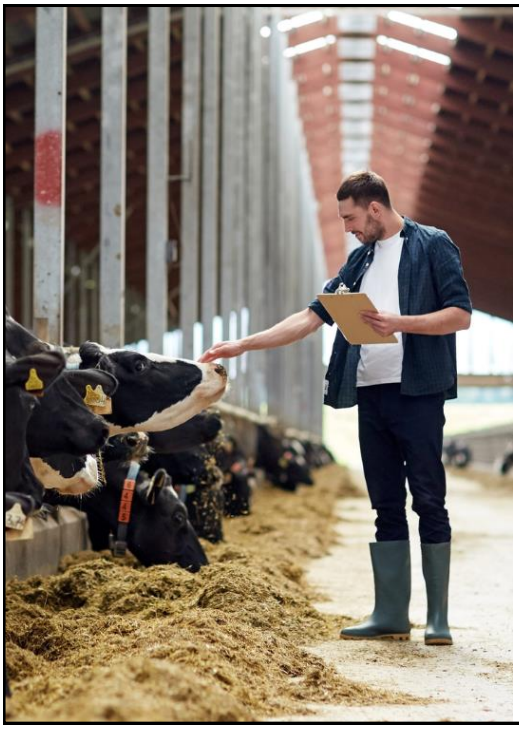

TSP's Role in Project

Phase Two: Work with Farm to Develop Climate Smart Plan

- This will require ensuring the farm is in compliance with all required plans and completing those for farms who are not.
- This will mean developing plan that build on required documents to identify climate-smart strategies

Phase Three: Serve as Project Manager on Climate Smart Team

- Work with Farm to lead implementation of strategies identified by farm.
- Provide information as requested to CARAT Project Team for monitoring and reporting.
- Up to 10 percent in farm funding budgeted for TSP Assistance throughout Project.

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CLIMATE-SMART AGRICULTURE

CARAT

PROFITABLE
REGENERATIVE
ACTIONABLE
TRUSTWORTHY

Climate Smart Plan Example

CLIMATE SMART PRACTICES CAN BE ADDED TO EXISTING REQUIRED PLANS.

PRACTICES MUST NOT BE CURRENTLY IN PRACTICE TO QUALIFY FOR IMPLEMENTATION FUNDS

12

Baseline Information Needed From Each Dairy Farm Farmstead Headquarters Inventory

- Number of dairy cows and replacements on the farm (animal groups).
  - Type and size of housing for each dairy animal group.
  - Type of ventilation for each animal group if applicable.
  - Type of manure transfer if applicable.
  - Type of manure treatment / solid separation if applicable.
  - Type and size of manure storage for each animal group.
  - Type of feeding practices / strategies if applicable.
  - This type of information will also be shown in a schematic site plan drawing of the production area.

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Climate Smart Plan

A climate-smart plan is a whole-farm conservation plan that when implemented will enhance soil health, increase carbon sequestration, and reduce greenhouse gas (GHG) emissions. The planner and client develop the carbon plan by addressing resource concerns with a focus on opportunities for carbon sequestration of the entire operation. Resource concerns on the farm are thus addressed through the application of targeted, site-specific conservation practices with known and / or quantifiable greenhouse gas benefits. A carbon plan can include supporting conservation practices that do not necessarily have a direct benefit to soil health, carbon, or greenhouse gas, but are essential to the function of the plan.

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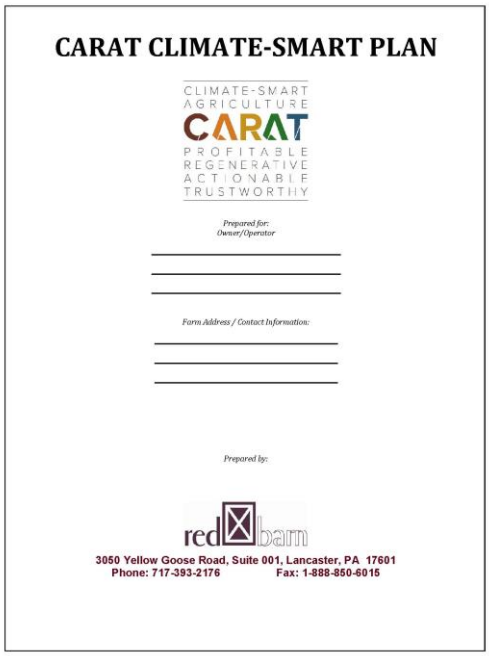
Example Climate Smart Plan



CARAT CLIMATE-SMART PLAN

CLIMATE-SMART AGRICULTURE
CARAT
PROFITABLE REGENERATIVE ACTIONABLE TRUSTWORTHY

Prepared for:
Owner/Operator

Farm Address / Contact Information:

Prepared by:

red barn
3050 Yellow Goose Road, Suite 001, Lancaster, PA 17601
Phone: 717-393-2176 Fax: 1-888-850-6015

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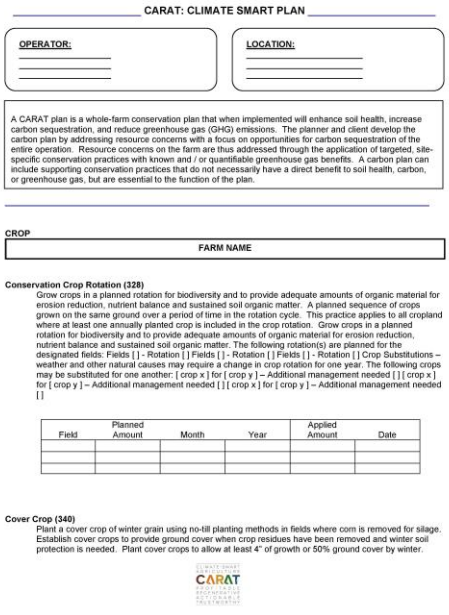
Example Climate Smart Plan



CARAT: CLIMATE SMART PLAN

OPERATOR:

LOCATION:

A CARAT plan is a whole-farm conservation plan that when implemented will enhance soil health, increase carbon sequestration, and reduce greenhouse gas (GHG) emissions. The planner and client develop the carbon plan by addressing resource concerns with a focus on opportunities for carbon sequestration of the entire operation. Resource concerns on the farm are thus addressed through the application of targeted, site-specific conservation practices with known and / or quantifiable greenhouse gas benefits. A carbon plan can include supporting conservation practices that do not necessarily have a direct benefit to soil health, carbon, or greenhouse gas, but are essential to the function of the plan.

CROP

FARM NAME

Conservation Crop Rotation (328)

Grow crops in a planned rotation for biodiversity and to provide adequate amounts of organic material for erosion reduction, nutrient balance and sustained soil organic matter. A planned sequence of crops grown on the same ground over a period of time in the rotation cycle. This practice applies to all cropland where at least one annually planted crop is included in the crop rotation. Grow crops in a planned rotation for biodiversity and to provide adequate amounts of organic material for erosion reduction, nutrient balance and sustained soil organic matter. The following rotation(s) are planned for the designated fields: Fields [ ] - Rotation [ ] Fields [ ] - Rotation [ ] Fields [ ] - Rotation [ ] Crop Substitutions – weather and other natural causes may require a change in crop rotation for one year. The following crops may be substituted for one another: [crop x] for [crop y] – Additional management needed [ ] [crop x] for [crop y] – Additional management needed [ ] [crop x] for [crop y] – Additional management needed [ ]

Field	Planned Amount	Month	Year	Applied Amount	Date

Cover Crop (340)

Plant a cover crop of winter grain using no-till planting methods in fields where corn is removed for silage. Establish cover crops to provide ground cover when crop residues have been removed and winter soil protection is needed. Plant cover crops to allow at least 4" of growth or 50% ground cover by winter.

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Example Climate Smart CNMP

Refer to planting dates and seeding rates in the PSU Agronomy Guide or NRCS recommendations. A cover crop of [ ] will be established following the [ ] crop. Seedbed Preparation: [ ] Seed [ ] @ [ ] Lbs./ac during the period of [ ] dates, or... Seed [ ] @ [ ] Lbs./ac, or .... Seed [ ] @ [ ] Lbs./ac The cover crop will be killed by [ ] on or about [dates].

Field	Planned Amount	Month	Year	Applied Amount	Date

Nutrient Management (590)

Precisely managing the amount, source, timing, placement, and form of nutrient and soil amendments to ensure ample nitrogen availability and avoid excess nitrogen application reduces N20 emissions to the atmosphere. Manage the amount, source, placement, form, and timing of the application of nutrients and soil amendments to minimize agricultural non-point source pollution to surface and ground water resources. Lime and fertilize all fields to soil tests, considering the nutrient value of manure and leguminous crops when figuring the amount of fertilizer to be applied. Nitrogen and phosphorous should be managed to meet crop nutrient needs, as well as to prevent excess nutrient loading in the soil.

Field	Planned Amount	Month	Year	Applied Amount	Date

Residue Management, No-Till/Strip Till/Direct Seed (329)

Limiting soil-disturbing activities improves soil carbon retention and minimizes carbon emissions from soils. Use no-till planting methods for planting all crops. Crops will be planted directly into prior crop residues or into a cover crop. Manage organic residue so maximum amounts are left on the soil surface on a year-round basis.

Field	Planned Amount	Month	Year	Applied Amount	Date

PASTURE

Farm Name

Prescribed Grazing 528

Grazing will be managed according to a schedule that meets the needs of the soil, water, air, plant and animal resources and the objectives of the resource manager. Manage grazing or browsing animals in order to maintain or improve the health and vigor of the desired forage plants. Maintain or improve livestock health and productivity, reduce accelerated soil erosion, maintain or improve soil condition, and water quality, quantity, and availability through proper management of the forage stands. Promote

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Example Climate Smart Plan

economic stability through proper grazing use and land sustainability. Follow the attached grazing plan for stocking rates, size of animals, acres to be grazed and other details in order to achieve the landowner objectives and to protect the natural resources. Refer to the conservation plan map for field location of the Prescribed Grazing System. Further information including the Operation and Maintenance Plan is found on the Job Sheet for Prescribed Grazing.

Field	Planned Amount	Month	Year	Applied Amount	Date

BUFFERS

Farm Name

Contour Buffer Strips 332, 393

Permanent herbaceous vegetative cover increases biomass carbon sequestration and increases soil carbon stocks. Establish narrow strips of permanent, herbaceous vegetative cover across the slope and alternated down the slope with parallel, wider cropped strips. Request technical assistance to establish the baselines and layout for the contour buffer strips. Establish the contour buffer strip perennial vegetative cover using the following species and seeding rates. Seed [ ] @ [ ] Lbs./ac during the period of [specify seeding period] dates, Plus Seed [ ] @ [ ] Lbs./ac, Plus Seed [ ] @ [ ] Lbs./ac Fertilizer Application: Apply [ ] Lbs of Nitrogen/Acre, plus [ ] Lbs of Phosphorus (P2O5)/Acre, plus [ ] Lbs of Potash (K2O)/Acre. Or, apply [ ] Lbs per acre of the analysis [ ]. Seedbed Preparation: [ ]

Field	Planned Amount	Month	Year	Applied Amount	Date

Riparian Forest Buffer (391)

Plant a buffer which is predominantly trees and/or shrubs located adjacent to and up-gradient from watercourses or water bodies. Increase carbon storage in plant biomass and soils. The riparian forest buffer shall be positioned appropriately and designed to achieve sufficient width, length, vertical structure/density and connectivity to accomplish the intended purpose(s).This will reduce excess amounts of sediment, organic material, nutrients and pesticides in surface runoff and reduce excess nutrients and other chemicals in shallow ground water flow. The riparian forest buffer shall be positioned appropriately and designed to achieve sufficient width, length, vertical structure/density and connectivity to accomplish the intended purpose(s).

Field	Planned Amount	Month	Year	Applied Amount	Date

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Example Climate Smart Plan

HEADQUARTERS

Farm Name

Feed Management 592

Diets and feed management strategies can be prescribed to minimize enteric CH4 emissions from ruminants; it may come in the form of supplements and inhibitors as well as prescriptive management. Managing the quantity of available nutrients fed to livestock and poultry for their intended purpose. A feed management plan will be provided which will document the quantities and sources of nitrogen and phosphorus that will be fed, the type feeding practices used on the operation, and feed analyses and ration formulation information prior to and after implementation of feed management on the operation. Operation and maintenance: Periodically review feed management plan to determine if adjustments or modifications are needed. Maintain records to document plan implementation. Routinely analyze feed to document the rates at which nitrogen and phosphorus were fed. Maintain records of any manure analysis that is done after the feeding strategy was implemented to determine manure nutrient content.

Location	Planned Amount	Month	Year	Applied Amount	Date

Waste Facility Covers 367

Capture of biogas from waste management facilities reduces CH4 emissions to the atmosphere and captures biogas that can be flared. CH4 management reduces direct greenhouse gas emissions. A fabricated rigid, semi-rigid, or flexible membrane over a waste treatment or storage facility. Install a fabricated rigid, semirigid, or flexible membrane over a waste treatment or storage facility. An engineering plan with construction specifications will be provided for the installation of the waste facility cover. Operation, Maintenance, and Warranty: At each operation or use, inspect the facility to note any maintenance needs or indicators of operation problems. The cover manufacturer and/or installer shall warrant the cover for the intended use and design life, provide maintenance instructions, and certify that the cover is properly installed.

Location	Planned Amount	Month	Year	Applied Amount	Date

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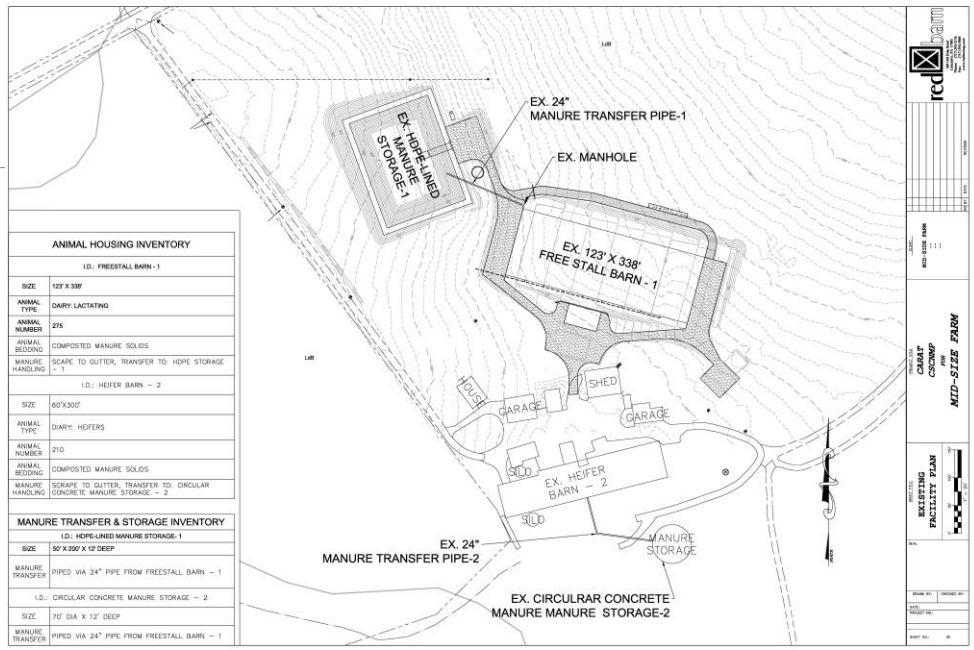

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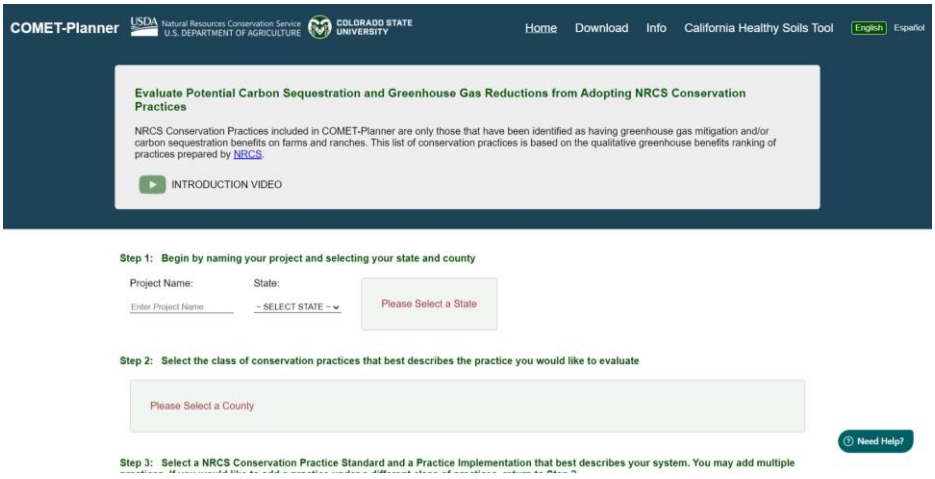
Run Proposed BMP's through Comet Planner www.comet-planner.com



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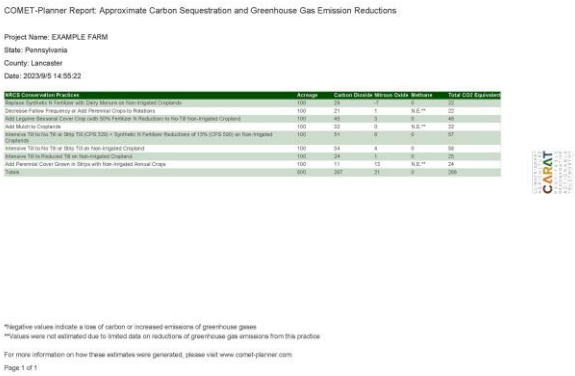

COMET-Planner Report: Approximate Carbon Sequestration and Greenhouse Gas Emission Reductions

Project Name: EXAMPLE FARM
State: Pennsylvania
County: Lancaster
Date: 2023/9/5 14:55:22

NRCS Conservation Practices	Acreage	Carbon Dioxide	Nitrous Oxide	Methane	Total CO2 Equivalent
Replace Synthetic N Fertilizer with Dairy Manure on Non-Irrigated Cropland	100	23	1	0	23
Decrease Fallow Frequency or Add Perennial Crops to Rotations	100	21	1	N.E.**	22
Add Legume Seasonal Cover Crop (with 50% Fertilizer N Reduction) to No-Till Non-Irrigated Cropland	100	45	3	0	48
Add Mulch to Croplands	100	32	0	N.E.**	32
Intensive Till to No Till or Strip Till (CPS 329) + Synthetic N Fertilizer Reductions of 15% (CPS 590) on Non-Irrigated Croplands	100	51	6	0	57
Intensive Till to No Till or Strip Till on Non-Irrigated Cropland	100	94	4	0	98
Intensive Till to Reduced Till on Non-Irrigated Cropland	100	24	1	0	25
Add Perennial Cover Grown in Strips with Non-Irrigated Annual Crops	100	11	13	N.E.**	24
Totals	600	287	21	0	308

*Negative values indicate a loss of carbon or increased emissions of greenhouse gases
**Values were not estimated due to limited data on reductions of greenhouse gas emissions from this practice

For more information on how these estimates were generated, please visit www.comet-planner.com

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Implementation of Climate-Smart Practices

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Types of Practices Funded

- Any practice that:
  - Suppresses methane emissions
  - Suppresses nitrous oxide emissions
  - Stores carbon
  - Reduces fuel consumption
  - Reduces any input with an associated carbon footprint
- Focus on what goes in and what comes out of the cow

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NRCS Practice Codes	Climate-Smart Practice Examples	Benefits
592	Feed supplements (CH_4 inhibitors, seaweed, etc.)	Reduce enteric CH_4
592	Prescriptive feed management	Reduce enteric CH_4
313, 367, 371, 372	Lagoon cover and methane flaring	Reduce lagoon CH_4
317	Aerobic composting of bedded-pack manure	Reduce CH_4 from solids
313, 318	Covered manure storages and runoff controls	Reduce CH_4

Practice Examples: Methane Suppression

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NRCS Practice Codes	Climate-Smart Practice Examples	Benefits
590	Precision / Split N management	Reduce N fertilizer; Reduce N_2O
590	Addition of nitrification inhibitor	Reduce N fertilizer; Reduce N_2O
590	Pre-application manure analysis	Reduce N fertilizer; Reduce N_2O
590	Redistribution of manure (application rate)	Reduce N fertilizer; Reduce N_2O
590	Synchronize N supply and demand via manure side dressing/injection	Reduce N fertilizer; Reduce N_2O
590	Interseeding and other cover crop establishment methods	Reduce N fertilizer; Reduce N_2O

Practice Examples: Nitrous Oxide Suppression

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NRCS Practice Codes	Climate-Smart Practice Examples	Benefits
329	Tillage to no-till, reduced till, or strip till	Increase SOC; Reduce fuel consumption
328	Add perennial pastures	Increase SOC
512	Legume interseeding in pastures	Increase SOC
528	Prescribed grazing	Increase SOC
332, 391, 392, 393	Expand buffer strips	Increase SOC; Increase C in wood; Reduce N_2O
379	Tree planting/afforestation	Increase SOC; Increase C in wood; Reduce N_2O

Practice Examples: Carbon Storage and Multiple Benefits

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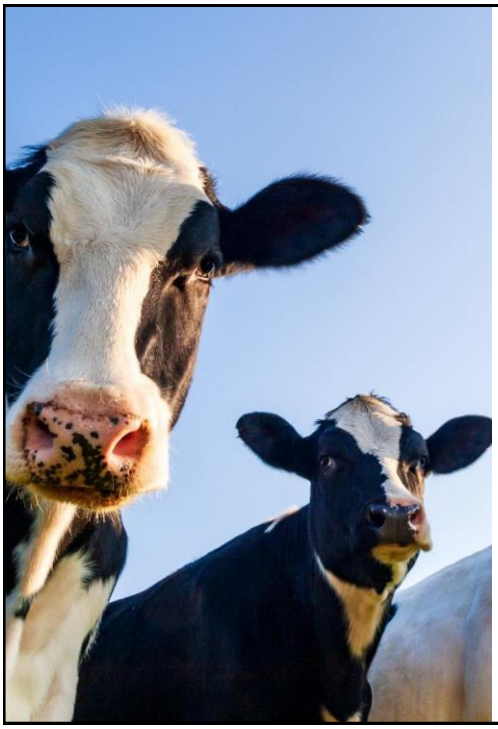

Our Priority Practices

Practices to Reduce Enteric MH_4 Emissions

- Feed supplements (592)
- Prescriptive feed management (592).

Lagoon Covers and Methane Flaring

- Combination of practice codes (313, 367, 371, 372)
- May be coupled with manure storage (313)

Practices to Reduce N_2O Emissions from Cropland

- A variety of advanced manure/N management and cover cropping techniques (590)

PRACTICES FOCUS ON WHAT GOES IN AND WHAT COMES OUT OF THE COW AND ALIGN WITH EMISSIONS MONITORING ACTIVITIES

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Implementation Funding Review and Selection Process

- Completed Climate Smart Plans are submitted to CARAT review committee
- Rolling applications, with reviews conducted monthly
- All projects ranked, using criteria based on CARAT project goals and USDA program priorities
- Selections made within 45 days of plan submission
- We will waitlist projects not selected if producer desires
- Facilitator/Implementation Team will help producer explore leveraged funding if needed to fully implement planned practices

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Implementation Ranking Criteria

Criteria	Ranking Rationale
Carbon-smart benefit	Based on total CO_2 Equivalent, as determined using COMET-Planner. More benefit ranks higher.
Cost efficiency	Total cost per CO_2 Equivalent. More cost-efficient ranks higher.
Demonstrated environmental stewardship	Producers who have already implemented climate-smart practices score higher. Highest score if project results in operation achieving net zero.
Demonstrated business stability	Demonstrated by having a current business plan.
Priority practices	Projects seeking to implement the CARAT project's priority practices will rank higher
Willingness to host monitoring	As will those willing to host monitoring

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Criteria	Ranking Rationale
Farm category diversity	Based on meeting farm category diversity goals
Underserved producer	Underserved producers rank higher. (women or minority owned; new/beginning farmers; Plain Sect; western or northern PA; small dairies (35-70 cows)
Willingness to serve as a demonstration project	Such as through hosting Extension/CDE/PDMP events, field days, workshops.

Implementation Ranking Criteria (cont.)

RANKING CRITERIA WILL BE USED TO GUIDE SELECTION DECISIONS. WHAT PLANS ARE SELECTED FOR IMPLEMENTATION MAY DEPEND ON WHEN PLANS ARE SUBMITTED AND WHAT PROJECT GOALS AND OBJECTIVES NEED TO BE MET AT THE TIME PLANS ARE REVIEWED.

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Additional Planning May Be Required Prior to Implementation

- Depending upon the practice to be implemented and what baseline plans the producer has, additional plans may be needed
  - 590 Plans for nitrous oxide suppression practices
  - 528 Plans for precision grazing
  - NRCS Conservation Plans, CPA-52 Forms for lagoon covers and methane flaring, aerobic composting of bedded-pack manure, covered manure storages and runoff controls, legume interseeding in pastures, expanded buffer strips, or tree planting/afforestation.
- Inventory & Evaluation Reports (I&Es) and accompanying cost estimates may be needed for certain structural practices, as determined on a case-by-case basis

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Process and Logistical Details

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In Pre-Qualification Stage

- Farms can request a TSP in the pre-qualification application
- If they do not request a TSP, the Center will help them identify one
- TSPs who want to make sure they are included in CDE's list should email Melissa Anderson at manderson@centerfordairyexcellence.org
- TSP identified for each farm will be included in email from Melissa letting farm know they have been accepted into pre-qualification stage and can complete Climate-Smart Plan

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In Qualification Stage

- TSP will be responsible for working with the farm to develop the Climate-Smart Plan and ensuring other required documents are on file
- Climate-Smart Plans can be submitted on rolling basis
- Red Barn will review submitted plans just to make sure they are complete and cover what's needed
- Review Committee reviews and accepts plans and farms into implementation stage once a month
- Farms receive plans regardless of whether accepted into implementation stage or not, have for other funding opportunities
- Plans can be resubmitted for consideration if desired

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In Implementation Stage

- TSP will work with farm to identify which strategies to pursue
- TSP will work with farm to do an Inventory & Evaluation Report to outline strategies and associated costs if an I&E is required
- Contract between Center and Farm will be based on those strategies identified
- Farm will work with TSP and other vendors to implement strategies over two-year period
- Implementation funding has up to 10 percent budgeted for design and permitting costs associated with project
- Grant is provided as reimbursement for work completed
- Farm is paid by Center to reimburse TSP and other contractors for work
- Payment on reimbursements is dependent of CDE contract with Penn State, could take up to six weeks to be reimbursed

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Invoicing Process for TSPs

- Center will pay TSPs directly to do the Climate Smart Plan
- Rates budgeted through grant:
  - $100 per hour for work budgeted
  - Estimated 25 – 60 hours per plan, depending on size and what's involved
- Upon completion and submission of plan to review committee, send invoice to:
  - Melissa Anderson, Center for Dairy Excellence
    manderson@centerfordairyexcellence.org or
    2301 North Cameron Street, Harrisburg, PA 17110
    Call: 717-346-0849 with questions
- Work during implementation stage is billed to farm and submitted by farmer as reimbursement request to Center for Dairy Excellence

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Thank You!

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