ESMC Program Transparency Documentation

Principles for Transparency - Agricultural Climate Markets Collaborative[1]

ESMC's Eco-Harvest ecosystem services market program is science-based, outcomes-based, and creates Scope 3 (supply chain) outcomes from agricultural farming and ranching operations. ESMC is the only fully validated and verified agricultural supply chain program in North America, and the only non-profit market program.

Prior to sale and purchase by corporations to help meet their annual scope 3 accounting and reporting requirements, on-farm greenhouse gas (GHG) reductions and removals generated by ESMC's Eco-Harvest program are fully validated and verified through global 3rd party SustainCERT. SustainCERT, like all independent third-party carbon and ecosystem services market program registries, requires program transparency of the validation and verification of our program and outcomes. All public-facing protocols and documents are posted as required on SustainCERT's website.

Additionally, see ESMC's protocol summary available on our website.

Principles for Transparency

Farm and entity eligibility for programs

Producer eligibility information can be found under the Producer Eligibility heading on the FAQ page. Producers must meet the following criteria to participate in the Eco-Harvest Program:

- Agricultural producers are interested in adopting soil health systems and conservation practices that benefit their agricultural operations while improving environmental impacts.
- Enrolled land must be within an approved ESMC Program Region and have an ESMC approved production system practice change.
- Producers must provide proof of ownership rights for their outcomes.
- Producers must voluntarily implement new eligible practices in each field following enrollment:
    - Practice changes planned for the project enrollment year must not have been implemented on the field in the last 10 years, although fields that have included such practices on a trial basis in the past may still be eligible.
- Agricultural practices that are legally required are not eligible.
- Enrolled land must not have been deforested or in natural grassland in the past 10 years.
- Enrolled land must not be a wetland or other protected area.

[1] More on the Agricultural Climate Markets Collaborative can be found here: https://www.keystone.org/agclimatemarkets/

Contract obligations for program participants

ESMC issues producer payments annually based on set prices (these set prices are based on carbon offset markets). Producers participating in the Eco-Harvest market program enroll for a 5-year contract. Producer payments are made after outcomes are quantified, verified, and sold, generally a year after a crop season begins. For example, growers who enroll in 2023 will receive their first payments in early 2024, following the conclusion of the growing season.

Producers participating in Eco-Harvest have the option of rolling their enrolled fields into a market project at the end of a 1 – 2-year pilot, after any research questions have been answered and market readiness criteria for the pilot project are achieved.

- Fields enrolled in Eco-Harvest projects cannot be enrolled in another ecosystem service program that generates credits, offsets, or claims related to soil carbon sequestration and/or changes in GHG emissions.
- However, co-claiming by corporates in scope 3 supply chain programs is allowed under certain circumstances (as detailed in the Ownership section of this guide).
- If enrolled land changes ownership or a producer gets a new property owner mid-contract, the producer will need to provide an updated agreement of landowner acknowledgement to demonstrate that they still have the land use rights necessary to generate and sell outcomes.

Asset types generated by a program

The ESMC Eco-Harvest Program issues quantified and verified outcomes for increased soil carbon ("removals") and reduced GHG emissions ("reductions"), water quality improvements, and reduced water use. The program has distinct pathways for agricultural producers to generate these outcomes. Outcomes are generated annually for corporate reporting of supply chain (Scope 3) emissions, and for water quality and water quantity corporate sustainability reporting. Producer program enrollment contracts are in five-year increments, with annual reporting and annual payments, and are renewable for a maximum enrollment of 30 years.

Outcome Type	GHG (Carbon Equivalents)	Water Quality	Water Quantity	Biodiversity
Corporate Supply Chain / ESG Reporting	• Scope 3 Soil organic carbon removals • Scope 3 GHG emission reductions	• Tons sediment reduced • Pounds nitrogen reduced • Pounds phosphorus reduced	Irrigation efficiency	In development

Standards used by the program developer

Corporates seeking to make voluntary commitments to reduce their GHG emissions and improve their environmental impact can do so using ESMC's science-based, standards-based protocols. To ensure credibility and accuracy, ESMC's protocols are designed to align with internationally recognized third party accounting standards and target setting programs, including the GHG Protocol Corporate

Accounting and Reporting Standard, Gold Standard's Scope 3 Value Chain Intervention (VCI) program, the Science Based Targets Initiative (SBTi), and Science Based Targets Network (SBTN) target setting programs.

- ESMC protocol and program requirements related to the monitoring and storage length of sequestered carbon will continue to align with the forthcoming GHG Protocol (GHGP) Land Sector Guidance (expected 2024).
- Verified outcomes are third-party validated and verified to SustainCERT's Value Chain Intervention program.

Data required from program participants

Producer data requirements vary by production system, practice change, ecological impact, and other factors. Data are typically required on a field basis for both current and past years for the following:

- Field attributes including location, size, presence of tile drainage
- Crop type(s) and associated yield
- Planting and harvesting activities
- Tillage
- Cover crops
- Fertilizer and pesticides
- Irrigation
- Grazing and herd management
- Electricity and fuel

A quality assurance and quality control process is conducted for all producer data entered into the ESMC measurement, monitoring, reporting, and verification (MMRV) platform. In some cases, ESMC provides select secondary data (i.e., proxy data) via public data sources or remote sensing.

The following table highlights outcomes that can be generated by eligible agricultural management practices. Practices that have been pilot tested and validated are eligible for Eco-Harvest market program enrollment, while others remain at the pilot stage for further refinement, as the following table illustrates.

Agricultural Management Practice	Greenhouse Gas		Water Quality		Water Quantity	
	Pilot	Market	Pilot	Market	Pilot	Market
Residue and tillage management, reduced tillage		X		X	X	
Cover crop		X		X	X	
Nutrient management:						
Injection		X		X		
Incorporation		X		X		
Reduced fertilizer application rate		X		X		
Timing (no winter application)		X		X		
Split application		X		X		
Change in source		X		X		
Composting and organic amendments		X		X	X	
Cropland grazing	X		X		X	
Prescribed grazing	X		X		X	
Conversion of cropland to grassland [a]	X		X		X	
Conservation crop rotation	Case by Case		Case by Case		Case by Case	
Whole orchard recycling	Case by Case		Case by Case		Case by Case	
Irrigation water management	Case by Case		Case by Case		Case by Case	
Drainage water management						
Drainage Water Management Structure				X		
Bioreactor				X	X	
Surface water management						
Saturated buffer				X	X	
Sediment basin/pond				X	X	
Constructed Wetland				X	X	
Grassed waterway				X		

a. Refer to ESMC Program Region Map for Crops and Regions Eligible for Eco-Harvest Market and Pilot Programs
b. < 25% of the cropland within a Project Area can be converted to grassland and the converted cropland must be contiguous to the Project Area

Models used to generate outcomes

Outcomes are quantified by comparing a baseline scenario (i.e., environmental outcomes on an enrolled field in the absence of new management practice implementation) to a project scenario (i.e., environmental outcome following implementation of a new eligible practice). The baseline and project scenarios are represented by primary producer data that may be completed with secondary ESMC proxy data when applicable. The following table outlines the quantification approach used for different outcome types.

Outcome Type	Sources, Sinks, and Reservoirs (SSRs)	Quantification Approach
GHG (Emissions Reductions, Soil Organic Carbon-Removals, Avoided Emissions)	Soil Organic Carbon (CO_2)	Soil Sampling *and* DeNitrification-DeComposition (DNDC) modeling
	Enteric Fermentation (CH_4)	Emission factors
	Decomposition of Manure (CH_4, N_2O)	DNDC modeling for land application of manure
	Direct N_2O Emissions (N_2O)	DNDC modeling and emission factors
	Indirect N_2O Emissions (N_2O)	DNDC modeling and emission factors
	Fossil Fuel Emissions from Combustion and Electrical Consumption (CO_2, CH_4, N_2O)	Emission factors
	Pesticide Emissions (CO_2, N_2O)	Emission factors
	Soil CH_4 Emissions	DNDC modeling
	Burning (CH_4, N_2O)	Emission factors
	Irrigation (N_2O)	DNDC modeling
Water Quality	All SSRs (see Water Quality Protocol Module)	ESMC Water Quality Calculator, derived from STEPL
Water Quantity	All SSRs (see Water Quantity Protocol Module)	ESMC Water Quantity Calculator (in development)
Water Quantity (Irrigation Efficiency)	All SSRs (see Water Quantity Protocol Module)	Measured reduction in irrigation volume

Ownership and transferability of the credits generated

ESMC generates verified Scope 3 outcomes and has the ability to track them to support appropriate co-claiming but prevents inappropriate double-counting. Therefore, buyers from across the value chain can share intervention costs and co-claim outcomes that are appropriately tracked and co-claimed to document annual reporting claims of changes to their Scope 3 emissions. This allows buyers to collaboratively scale impact, increase the value of their investments, and utilize ESMC's programmatic investment platform for outcome generation, verification, and tracking that is credible and transparent.

How does this work in practice with Eco-Harvest projects? A producer enrolls in an Eco-Harvest project and undertakes approved practice changes. As an example, Company A sources corn from a specific supply shed and uses that corn as a primary ingredient in their cereal product. Company B also sources corn from the same supply shed in their products. Since the corn is included in each company's production system, both company A and company B can co-invest in practice changes and cost share the Scope 3 outcomes; ESMC tracks volumetric outcomes to buyer use of the commodity, and with SustainCERT, tracks the volume of commodities from projects as they are bought and sold by co-investing companies. ESMC's co-investment model and MMRV enables collaborative action and shared investments to scale impacts credibly and transparently.

Corporate Reporting of Scope 3 Carbon Outcomes (Emission Factors)

- Carbon outcomes are generated and quantified in accordance with the VCI standard to generate Scope 3 emission factors for use in corporate inventory accounting methods.
- ESMC generates carbon outcomes to meet GHG Protocol (GHGP) Land Sector and Removals Guidance (LSRG) for inventory accounting and SBTi Forest, Land, and Agriculture (FLAG) guidance.
- Scope 3 GHG emission factors from supply chain interventions are generated annually to be reported within a corporate GHG inventory by ESMC corporate buyers.
- Co-Claiming Carbon Emissions Factors. Verified emission factors generated from ESMC outcomes can be co-claimed by multiple entities at different stages of the same value chain, provided collective investments are made, and no double counting occurs along the value chain per VCI guidance.

Program participant financial obligations and payments

Eco-Harvest project outcomes are quantified, verified, and reported annually. Buyers pay for outcomes annually, and producers are paid annually for their outcomes. ESMC has increased the rate for buyers to $20 per metric tonne CO_2e for 2023, ensuring competitive compensation for our producers. Note that this rate is subject to market fluctuations, and a 5% administrative fee is applied to support Eco-Harvest program operations.

ESMC imposes no producer enrollment fees and requires no purchase of any agricultural products or services to participate in our program.

Conservation practices that result in ecosystem service outcomes typically come with operational costs to the producer. These may include the cost of cover crop seed, new planting or cultivation equipment, different labor requirements, etc. Some of the expense of implementing different conservation practices may be eligible for federal or state cost-share programs. Producers are encouraged to consider such programs to help offset costs of these conservation practices. Improvements in soil health provide benefits to producers, such as increased resilience to extreme weather events, increased soil fertility and productivity, improved water holding capacity, and reduced need for purchased inputs, all of which can reduce operating costs and increase profits.

ESMC incurs the cost of soil sampling and analysis, monitoring, reporting, and verification, which are covered as cost-of-services charges to buyers. As a non-profit, ESMC does not charge more than is required to cover the expenses associated with generating credible ecosystem service outcomes for producers (sellers) and corporates (buyers).

Data ownership and privacy

ESMC takes data privacy and producer information seriously. As stated in the ESMC Producer Privacy Policy, producers' individual personal information, e-mail address, field and management data, and modeling results are kept secure and confidential unless a producer provides explicit written permission for that information to be shared. ESMC staff and contractors are bound by a Data Usage Agreement and are only allowed access to information necessary for their role in generating outcomes. ESMC does not

share or sell any producer information with any third party unless producers specifically agree in writing to a data-sharing option. All producer data is owned by the producer, not ESMC.

Contractual implications of noncompliance and acts of God

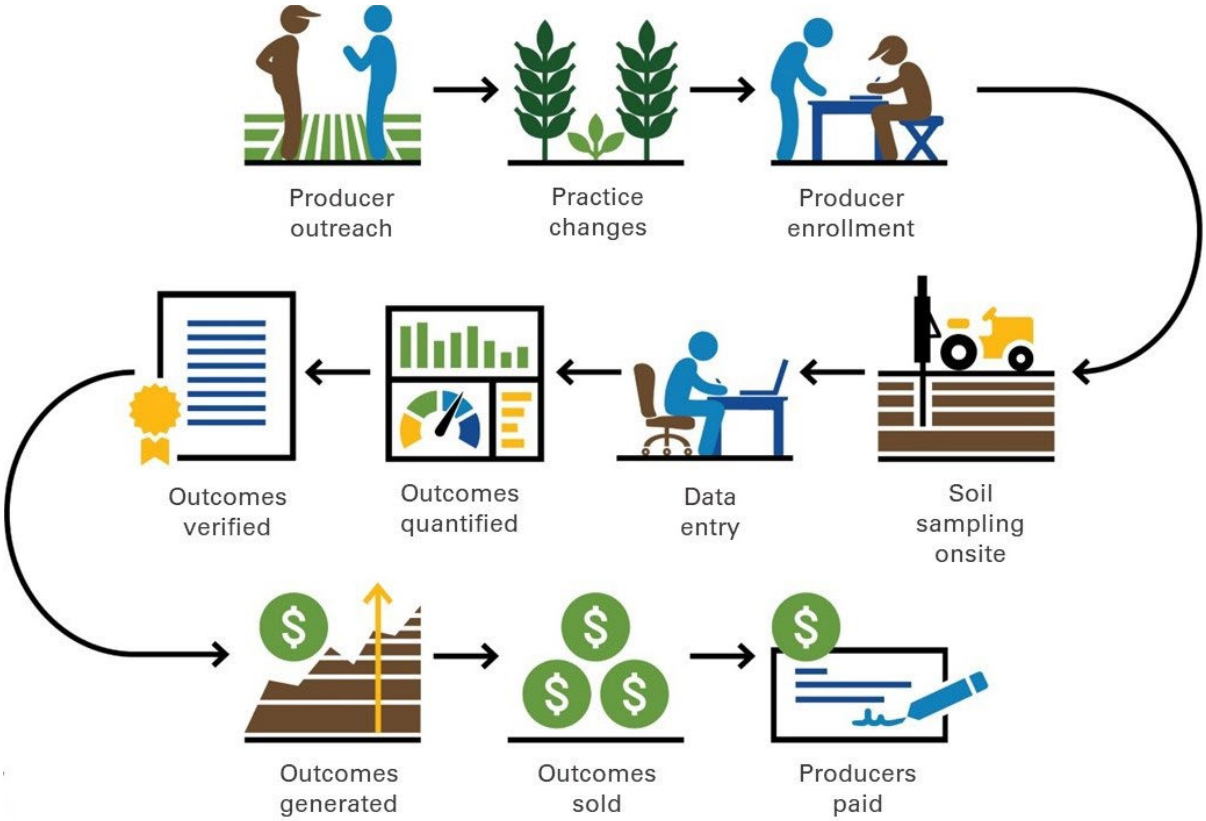
Eco-Harvest projects generate measurable outcomes only. If a farmer fails to plant cover crops as planned during one year of the program, they may remain in the program. The beneficial environmental outcomes from that practice are simply not realized for that year. Other outcomes generated in that year, based on other practice adoption, are still quantified, verified, and sold.

Producers are held accountable for intentional reversals of previously generated soil organic carbon gains made in Eco-Harvest. If producers have received payments for soil carbon sequestered and then intentionally release the stored carbon, they will not receive further soil carbon removal payments until that carbon is restored in their soils. Payments can resume when carbon storage above prior levels is achieved. Unintentional reversals due to natural causes are not a producer liability.

Required relationship between program developer and participant

ESMC's non-profit structure means we minimize costs and maximize stakeholder value for farmers and ranchers, as well as those who invest in the ecosystem services outcomes. ESMC's 60+ members include players across the entire agriculture supply and value chain, including corporate, non-profit, foundation, industry association, academic, and government partners.

The producer enrollment and participation process is highlighted in the following graphic.



Most producers enroll in Eco-Harvest projects through member or partner organizations. ESMC does not have field staff but maintains a network of trained ESMC Enrollment Specialists to guide producer participation. Producers enroll through ESMC's online Producer Portal, where they create a secure account and identify fields for project enrollment. ESMC-approved soil samplers then collect soil samples and send them to an accredited laboratory for analysis of soil organic carbon, bulk density, pH, and phosphorus (following ESMC's soil sampling protocols).

Required producer data can be imported from other 3rd party platforms or entered directly by the producer or an assigned advisor. Producers may be selected for on-site verification of agricultural stewardship practices by 3rd party verifiers.

ESMC manages the ledger and execution of market program transactions. ESMC arranges the sale of producer's outcomes. Buyers purchase the outcomes through Eco-Harvest, including a cost-recovery fee for ESMC services to generate and verify the outcomes. Farmers and ranchers are paid for producing these ecosystem services via their agricultural stewardship practices.