



Earth Impact Soil Protocol (EISP)

EISP is a new standard for measuring, tracking, and validating soil based ecosystem outcomes in regenerative agriculture. Using EISP, supply chains can participate in a critical initiative to preserve Earth's soil and sustainability. Soil is a vital component of our ecosystem and is directly responsible for providing ecosystem outcomes and human nutrition sufficiency. By clearly defining and aligning a standard for achieving transparent soil measurement and verification of impact, EISP aims to better define what positive climate impact means to the food and agriculture industry.

WHAT IS BLOCKCHAIN? HOW DOES IT IMPACT EISP?

Simply put, blockchain does not enhance transparency - it enhances the validity and integrity of transparency data by de-centralizing data storage and removing the likelihood of creating data silos - a situation where data is buried in a mess of other ag data and generates little to know value within the supply chain. For the EISP, blockchain is used to ensure the origin and validity of soil outcome data, ensuring that stakeholders have access to high integrity, accurate information about the products they purchase or produce.

WHO IS MERGE IMPACT?

As the first and only blockchain-powered agricultural measurement and data solution, Merge Impact connects brands to fully verified regenerative and organic supply chains while providing regenerative and organic farmers with comprehensive field-level measurement and ecosystem services. Merge Impact's tools to measure, validate, and monetize climate initiatives and sustainability goals are well within reach. Here at Merge Impact, we're excited to go on this journey with you. Whether you're a farmer, a brand, or a consumer, supply chain transparency and trust are the future of food.

WHO IS EARTHOPTICS?

EarthOptics is a soil data measurement and mapping company creating accurate, real-time data maps including compaction, carbon, moisture, nutrients, and more that help growers and ranchers make better decisions about land management, sustainably improving operations and carbon storage.

About EISP

BACKGROUND AND DESCRIPTION

Merge and EarthOptics see an opportunity to advance regenerative agriculture impacts by developing a standard soil measurement and mapping protocol to be used by farmers, producers, retailers, government agencies, certifiers, and consumers in the pursuit of regenerative claim verification.

SCOPE

Merge Impact and EarthOptics have developed four protocols:

- ✓ Grassland Verification
- ✓ Basic Row/Field Crop Verification
- ✓ Specialty Row/Field Crop Verification
- ✓ Permanent Crop Verification

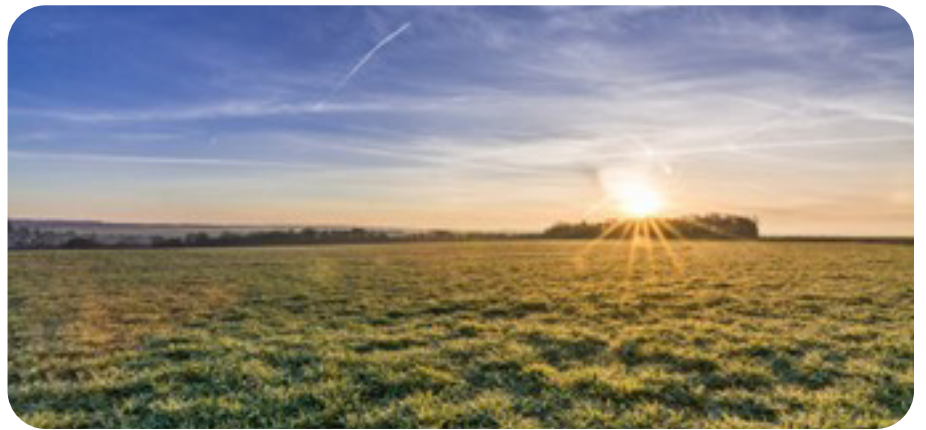
By utilizing specific verification protocols, stakeholders can step away from generalized production standards and into a verified soil measurement standard for achieving positive climate outcomes.

FIELD-LEVEL USES

Farmers, ranchers, producers, & certifiers can utilize the data from EISP to better understand field-level measurements and their impact on production, production's impact on soil quality/health, and the potential impact of changes they would incorporate.

POST-FARM USES

Carbon claim verification, ECO credit insetting, and compliance to emissions commitments are all possible with one data set from the EISP. Brands, retailers, agencies, and consumers alike are provided with a comprehensive and basic soil standard that ensures credibility of soil carbon outcomes and any additionally requested ecosystems needs.



Common Terms

DCP - EO STANDARD

Digital Cone Penetrometer is a tool used to determine compaction of soil at depth. EarthOptics uses this method as the standard soil compaction measurement.

EMI - EO STANDARD

Electromagnetic Induction, a.k.a. Electrical Conductivity, is a method of testing soil for soil salinity and soil water content. Additionally, this technique indicates variations in soil texture, compaction, organic matter content, and pH.

MINERALIZATION

Conversion of soil carbon to Carbon Dioxide (CO₂).

BULK DENSITY

A measure of soil compaction and a factor in determining soil organic carbon (SOC).

AGGREGATE STABILITY

An indication of a soil's ability to move and store water.

Verification Standards

GRASSLAND PROTOCOL

SUMMARY

Permanent grasslands and/or pastures used for animal protein production. This protocol provides access to comprehensive data about animal impact on permanent grassland soil systems. This protocol may be used in unison with Permanent Crop Verification on farms/ranches utilizing agroforestry.

SAMPLING GUIDELINES

1. Carbon samples (EO Standard - Carbon Sequestration):
 - a. 7/8" x 12" probe
 - b. Single-core collected and bagged in one sample
 - c. Lab test: TC, Organic Carbon, Inorganic Carbon
 - d. Sampling plan: per VM00021
2. Mineralization - CO₂ soil respiration test; 1 per 10 carbon samples
3. Bulk density (EO Standard):
 - a. 2" x 12" probe
 - b. Single-core collected and bagged in one sample
 - c. Lab test: Bulk density
 - d. Sampling plan: grid-based, 1 per 10 samples; co-locate samples with carbon samples
4. Aggregate Stability: preferred method is the Soil Health Institute's in-field test.



BASIC ROW/FIELD CROP PROTOCOL

SUMMARY

Annual cropping of grains, oilseeds, legumes, fiber, forages for feeding livestock or processing for human consumption or industrial systems. This protocol provides access to comprehensive data regarding the impact of annual crop production activities on soil systems. This protocol may be combined with or adapted to *Permanent Crop Verification* on farms/ ranches utilizing agroforestry. *Includes DCP & EMI.



TIER 1: LOW SAMPLE DENSITY SAMPLING GUIDELINES

1. Carbon samples (EO Standard - Carbon Sequestration):
 - a. 7/8" x 12" probe
 - b. Single-core collected and bagged in one sample
 - c. Lab test: TC, Organic Carbon, Inorganic Carbon (should include TIC to address ESMC requirements)
 - d. Sampling plan: per grid-based, 1 per 20 acres
2. Soil Nutrient (EO Standard):
 - a. 7/8" x 12" probe
 - b. Multiple cores (3-5) collected with a 5-ft radius and bagged as one sample (enough to fill small whirl pak bag)
 - c. Sampling plan: grid-based, 1 per 20 acres; co-locate this w/ the Carbon; every 10th sample is SHA
3. Bulk density (EO Standard):
 - a. 2" x 12" probe
 - b. Single-core collected and bagged in one sample
 - c. Lab test: Bulk density
 - d. Sampling plan: grid-based, 1 per 50 acres; co-locate samples with carbon samples
4. Soil Health Assessment:
 - a. 7/8" x 12" probe
 - b. Multiple cores (3-5) collected with a 10-ft radius and bagged as one sample
 - c. Lab test: [Soil Health Assessment](#)
 - d. Sampling plan: grid-based, 1 per 50 acres; co-locate this w/ the Bulk Density.

TIER 2: HIGH SAMPLE DENSITY SAMPLING GUIDELINES

1. Carbon samples (EO Standard - Carbon Sequestration):
 - a. 7/8" x 12" probe
 - b. Single-core collected and bagged in one sample
 - c. Lab test: TC, Organic Carbon, Inorganic Carbon (should include TIC to address ESMC requirements)
 - d. Sampling plan: per grid-based, 1 per 5 acres
2. Soil Nutrient (EO Standard):
 - a. 7/8" x 12" probe
 - b. Multiple cores (3-5) collected with a 5-ft radius and bagged as one sample (enough to fill small whirl pak bag)
 - c. Sampling plan: grid-based, 1 per 5 acres; co-locate this w/ the Carbon; every 10th sample is SHA
3. Bulk density (EO Standard):
 - a. 2" x 12" probe
 - b. Single-core collected and bagged in one sample
 - c. Lab test: Bulk density
 - d. Sampling plan: grid-based, 1 per 25 acres; co-locate samples with carbon samples
4. Soil Health Assessment:
 - a. 7/8" x 12" probe
 - b. Multiple cores (3-5) collected with a 10-ft radius and bagged as one sample
 - c. Lab test: [Soil Health Assessment](#)
 - d. Sampling plan: grid-based, 1 per 50 acres; co-locate this w/ the Bulk Density.

SPECIALTY ROW/FIELD CROP PROTOCOL

SUMMARY

Annual cropping of specialty production for human consumption. Example crops include annual vegetable and fruit crops in which plants are terminated or desiccate annually after harvest. This protocol provides access to comprehensive data regarding the impact of annual specialty crop production activities on soil systems. This protocol may be combined with or adapted to *Permanent Crop Verification* on farms/ranches utilizing agroforestry. *Includes DCP & EMI. **Additional measurement requests can be submitted to satisfy specific crop requirements.



TIER 1: LOW SAMPLE DENSITY SAMPLING GUIDELINES

1. Carbon samples (EO Standard - Carbon Sequestration):
 - a. 7/8" x 12" probe
 - b. Single-core collected and bagged in one sample
 - c. Lab test: TC, Organic Carbon, Inorganic Carbon (should include TIC to address ESMC requirements)
 - d. Sampling plan: per grid-based, 1 per 20 acres
2. Soil Nutrient (EO Standard):
 - a. 7/8" x 12" probe
 - b. Multiple cores (3-5) collected with a 5-ft radius and bagged as one sample (enough to fill small whirl pak bag)
 - c. Sampling plan: grid-based, 1 per 20 acres; co-locate this w/ the Carbon; every 10th sample is SHA
3. Bulk density (EO Standard):
 - a. 2" x 12" probe
 - b. Single-core collected and bagged in one sample
 - c. Lab test: Bulk density
 - d. Sampling plan: grid-based, 1 per 50 acres; co-locate samples with carbon samples
4. Soil Health Assessment:
 - a. 7/8" x 12" probe
 - b. Multiple cores (3-5) collected with a 10-ft radius and bagged as one sample
 - c. Lab test: [Soil Health Assessment](#)
 - d. Sampling plan: grid-based, 1 per 50 acres; co-locate this w/ the Bulk Density.

TIER 2: HIGH SAMPLE DENSITY SAMPLING GUIDELINES

1. Carbon samples (EO Standard - Carbon Sequestration):
 - a. 7/8" x 12" probe
 - b. Single-core collected and bagged in one sample
 - c. Lab test: TC, Organic Carbon, Inorganic Carbon (should include TIC to address ESMC requirements)
 - d. Sampling plan: per grid-based, 1 per 5 acres
2. Soil Nutrient (EO Standard):
 - a. 7/8" x 12" probe
 - b. Multiple cores (3-5) collected with a 5-ft radius and bagged as one sample (enough to fill small whirl pak bag)
 - c. Sampling plan: grid-based, 1 per 5 acres; co-locate this w/ the Carbon; every 10th sample is SHA
3. Bulk density (EO Standard):
 - a. 2" x 12" probe
 - b. Single-core collected and bagged in one sample
 - c. Lab test: Bulk density
 - d. Sampling plan: grid-based, 1 per 25 acres; co-locate samples with carbon samples
4. Soil Health Assessment:
 - a. 7/8" x 12" probe
 - b. Multiple cores (3-5) collected with a 10-ft radius and bagged as one sample
 - c. Lab test: [Soil Health Assessment](#)
 - d. Sampling plan: grid-based, 1 per 50 acres; co-locate this w/ the Bulk Density.

PERMANENT CROP PROTOCOL

SUMMARY

Orchards, groves, fruiting shrubs, agroforestry systems, and other ligneous perennial crops with multiple years of harvest after established are considered permanent crops. The permanent crop protocol is to be used in conjunction with the protocol that best defines the system in the alley (between rows/loci of permanent crop units). For example, an orchard may have animals foraging on annually interseeded, multi-species alleyways. Merge would use a *Basic Row/Field Crop Protocol* with additional verification of the permanent crop system. Data would be provided on soil impact in tree rows (if room to measure) plus include comprehensive impact data from alleyway measurements using the *Basic Row/Field Crop Protocol*.



ADDITIONAL NOTES

Ligneous crops are high carbon, woody crops. Additional assumptions of below ground biomass may be formulated using appropriate Merge Service Providers to properly estimate, measure, and report tree biomass accumulation for carbon opportunities.