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Ecosystem Services Market Consortium

Carbon and Ecosystem Services Markets for Agriculture: An Overview

Debbie Reed; June 12, 2024




Today's Presentation

- Overview of ESMC & Eco-Harvest
- Agriculture, Greenhouse Gases and Climate Change
- Agricultural Carbon and Ecosystem Services Market Programs
  - Overview & History
  - Differences between offset and inset markets
  - Buyers and Sellers
  - Types of Programs
  - Commonalities and Eligibility Requirements
- Eco-Harvest Example

ESMC Eco-Harvest

Ecosystem Services Market Consortium (ESMC) pays farmers and ranchers to improve the environment through their agricultural practices.

Eco-Harvest market program reduces GHG, improves water quality, and increases other ecosystem services to benefit society.

eco-harvest by ESMC

ESMC is a non-profit collaborative program dedicated to scaling quantified and verified sustainable ecosystem services from agriculture.

ESMC was conceived and designed....

... *for agriculture*

... *to overcome past market challenges*

... *and to recognize & reward farmers & ranchers for their impacts*

ESMC: Member-based Public Private Partnership

We are public private partnership of over 60 organizations representing the agricultural supply chain and value chain – including USDA, USEPA, and US DOE, and:

- Agricultural producer groups and co-ops
- Major corporate food and beverage companies
- Agribusiness
- Conservation and environmental NGO's
- Ag tech companies
- Land grant universities

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ESMC/ESMRC Funders

FFAR
The Nature Conservancy — Protecting nature. Preserving life.
USDA NRCS — United States Department of Agriculture, Natural Resources Conservation Service
USDA
General Mills
United Soybean Board
The Ida and Robert Gordon Family Foundation
McKnight Foundation
Walton Family Foundation
arpa·e — Changing What's Possible
Noble Research Institute
FarmJournal Foundation
National Association of Conservation Districts
Conservation Innovation Fund

Founding Circle Members

Nestlé
The Nature Conservancy — Protecting nature. Preserving life.
General Mills
Corteva agriscience
Cargill — Helping the world thrive
Nutrien Ag Solutions
ADM
Innovation Center for U.S. Dairy — Healthy People • Healthy Products • Healthy Planet
syngenta
National Fish and Wildlife Foundation
NFWF
National Indian Carbon Coalition

Legacy Partner Members

California Almonds — Almond Board of California
Farmers Business Network
P·O·R·T — Partnership of Rangeland Trusts
Missouri Soybeans
Sustainable Northwest
AgSpire
Pheasants Forever — The Habitat Organization
Quail Forever — The Habitat Organization
Trace Genomics
NCBA — National Cattlemen's Beef Association
MissouriCorn Merchandising Council
Benson Hill — Nourishing Innovation
MFA Incorporated
LOGIAG
The Campbell Foundation
Farm Foundation
Cornell Atkinson Center for Sustainability
IL Corn — ilcorn.org
K·COE ISOM
Trust in Food — A Farm Journal Initiative
OpenTEAM
Arizona State University
JOYN BIC
American Sugarbeet Growers Association
Kimberly-Clark
SLM
Danone North America
Field to Market
Tyson
Heartland Science and Technology
Soil Health Institute — Enriching Soil, Enhancing Life
National Association of Conservation Districts
Forum for the Future
regrow
Mars
Manulife Investment Management
CTIC
The Fertilizer Institute
American Society of Agronomy
Crop Science Society of America
Growmark
native — A Public Benefit Corporation
Sorghum Checkoff
Farmobile
Earth Optics
Stewardship Index for Specialty Crops
WWF
Soil Science Society of America
Newtrient
American Farmland Trust — Saving the Land that Sustains Us
Conservation Innovation Fund
Pattern
TAD Consulting Group

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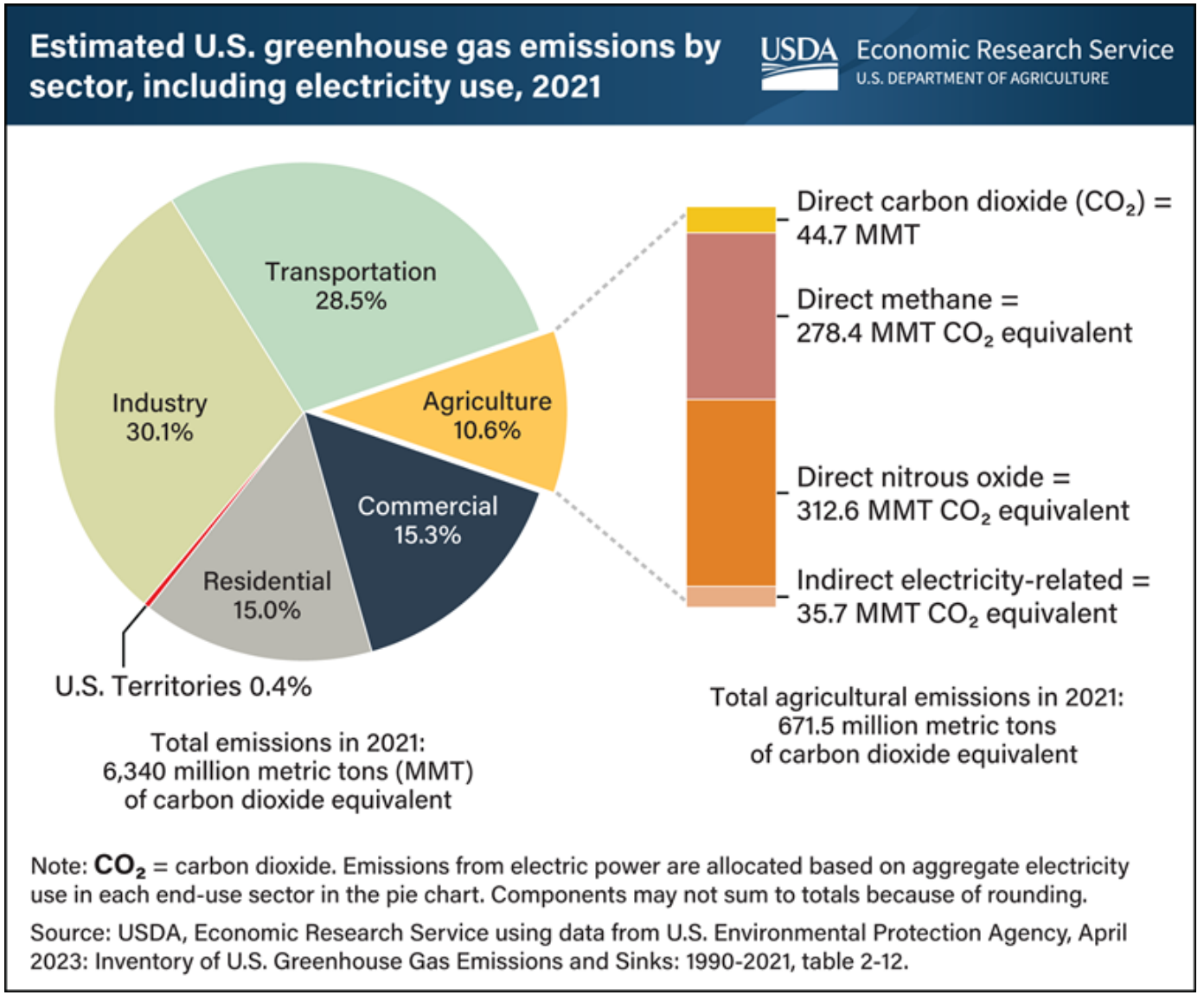
Agriculture and GHG Emissions

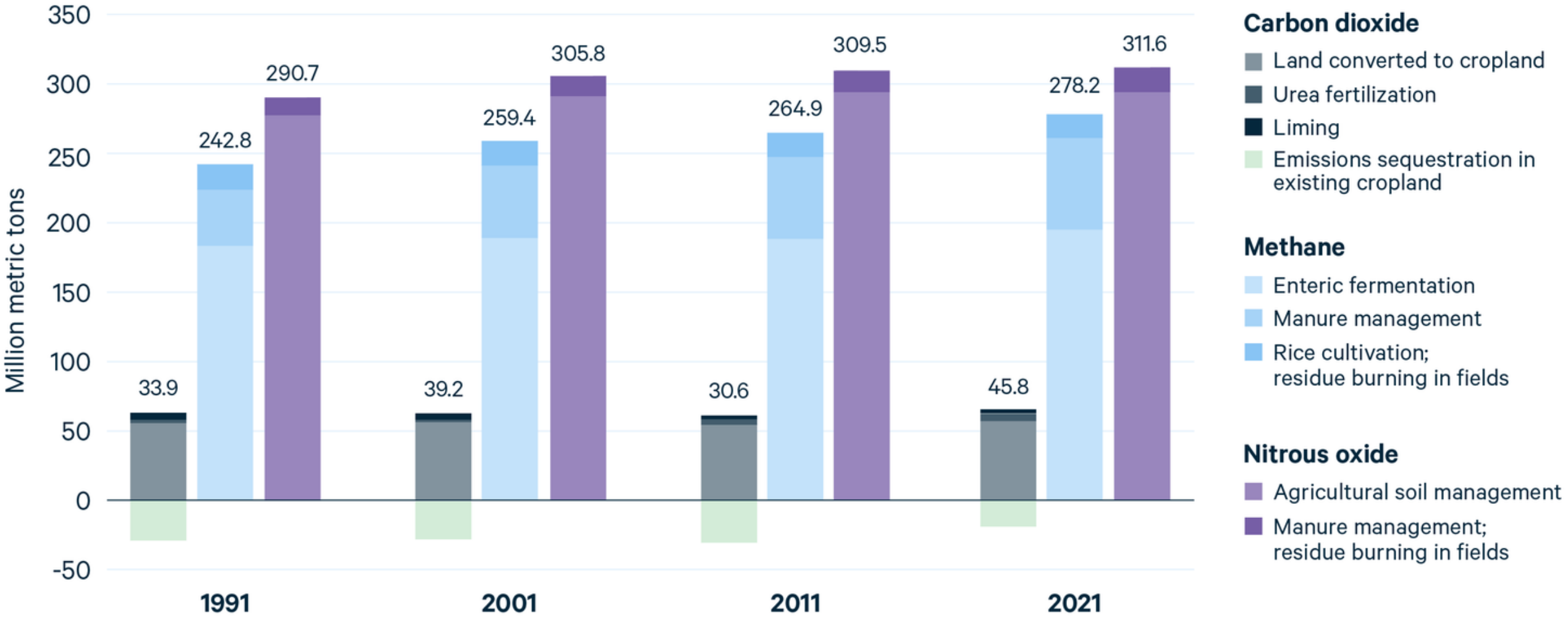



Agriculture & Greenhouse Gases

Agriculture accounts for approximately 10.5% of the total GHG emissions in the United States

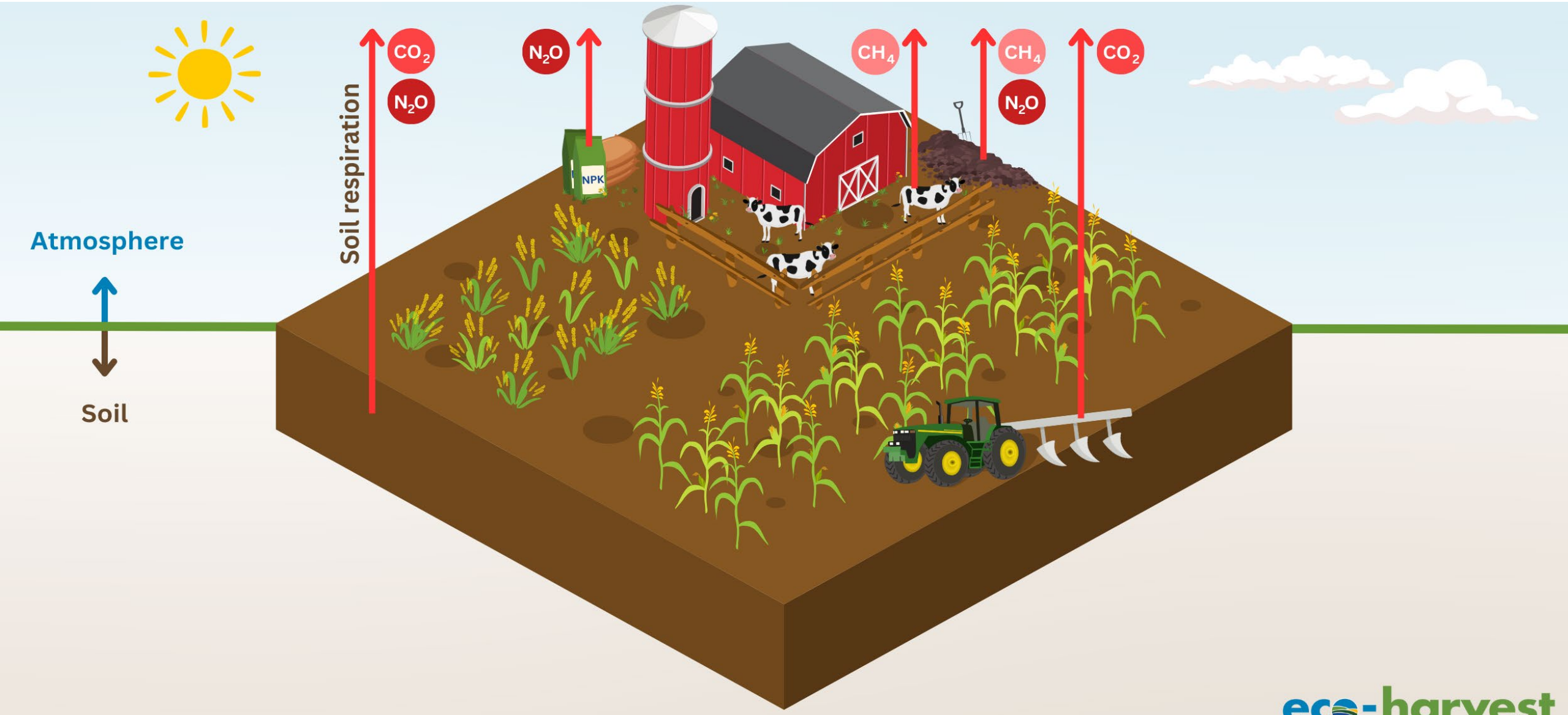
The primary GHG emissions from agriculture include carbon dioxide, methane, and nitrous oxide





EPA Greenhouse Gas Inventory Data Explorer. Courtesy of Resources for the Future
https://www.rff.org/publications/explainers/agricultural-greenhouse-gas-emissions-101

Three Major GHGs from Field Activities in Agriculture



eco-harvest by ESMC

Opportunities for Agriculture

- Agriculture is a major source of GHG emissions: can reduce those emissions
- Agriculture is a climate change solution: reduced and avoided emissions as well as *carbon sequestration*
- Practices that fall under the umbrellas of “climate-smart agriculture”, “regenerative agriculture”, “conservation agriculture” can reduce GHGs - but
  also make ag systems more resilient to climate change

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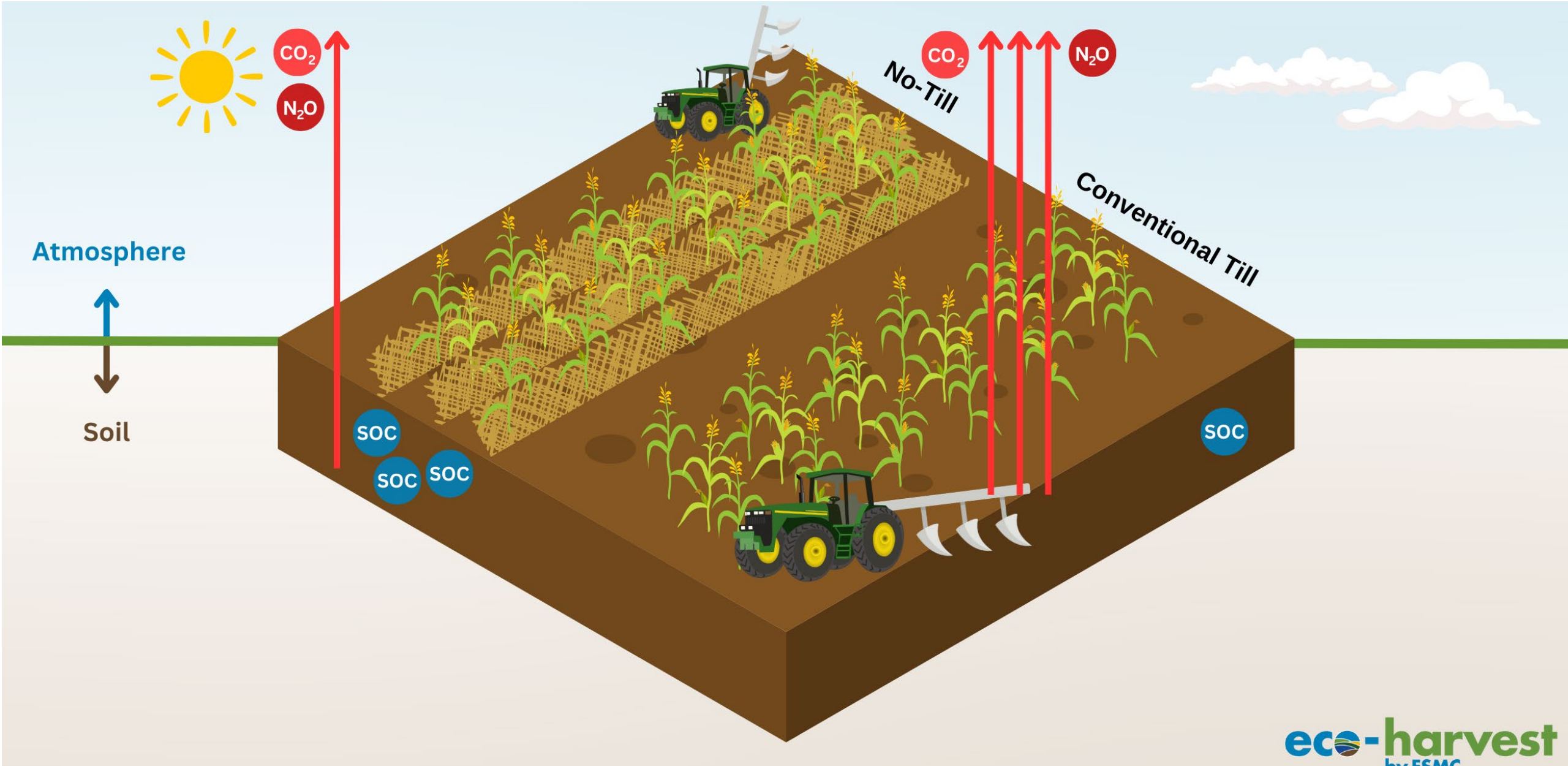
How Can Practice Changes Reduce GHG Emissions?

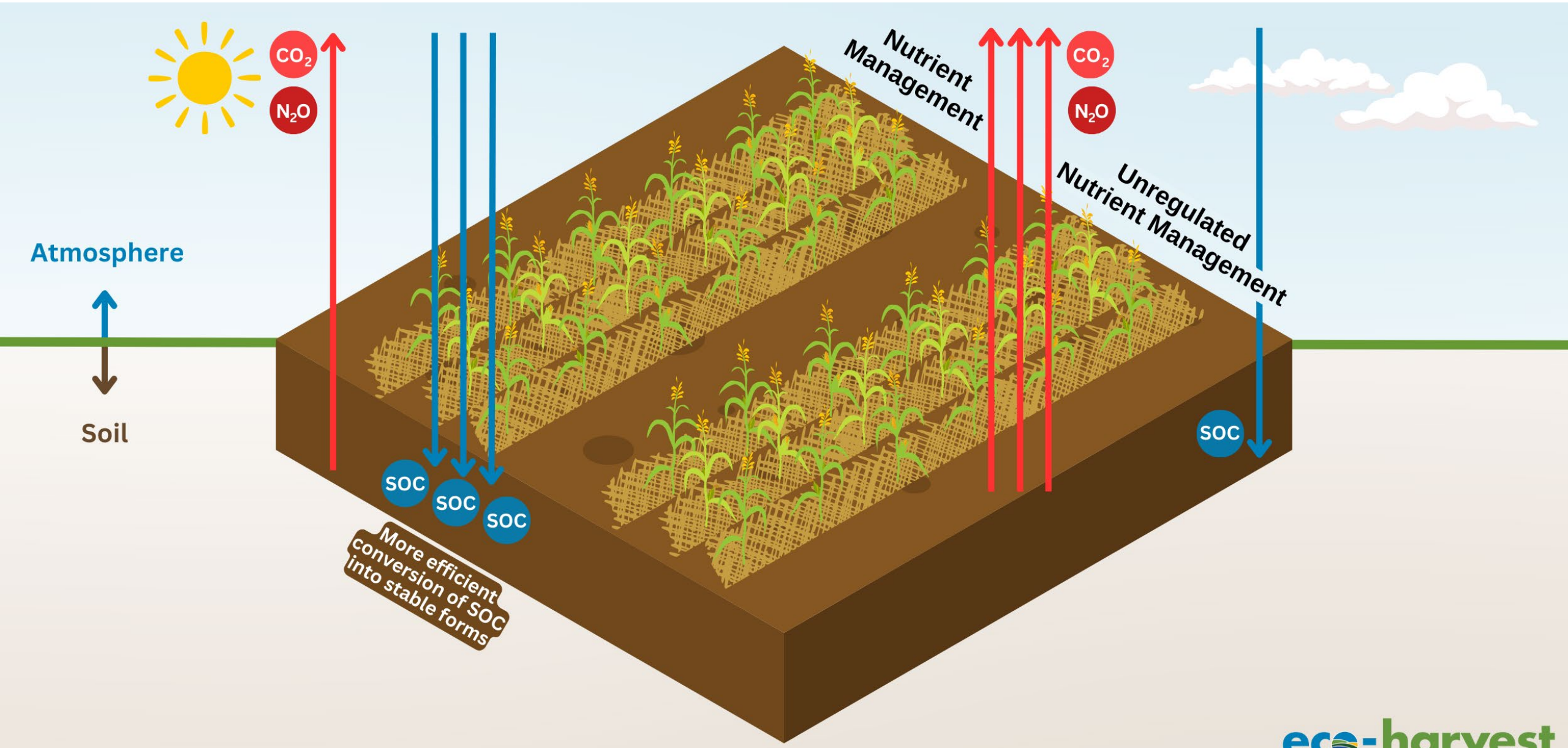
- tillage reduction/no till,
- nutrient management, and
- cover cropping

reduce GHGs from agricultural operations and remove carbon from atmosphere through soil carbon sequestration

Reduced Tillage: Impacts on GHG Emissions

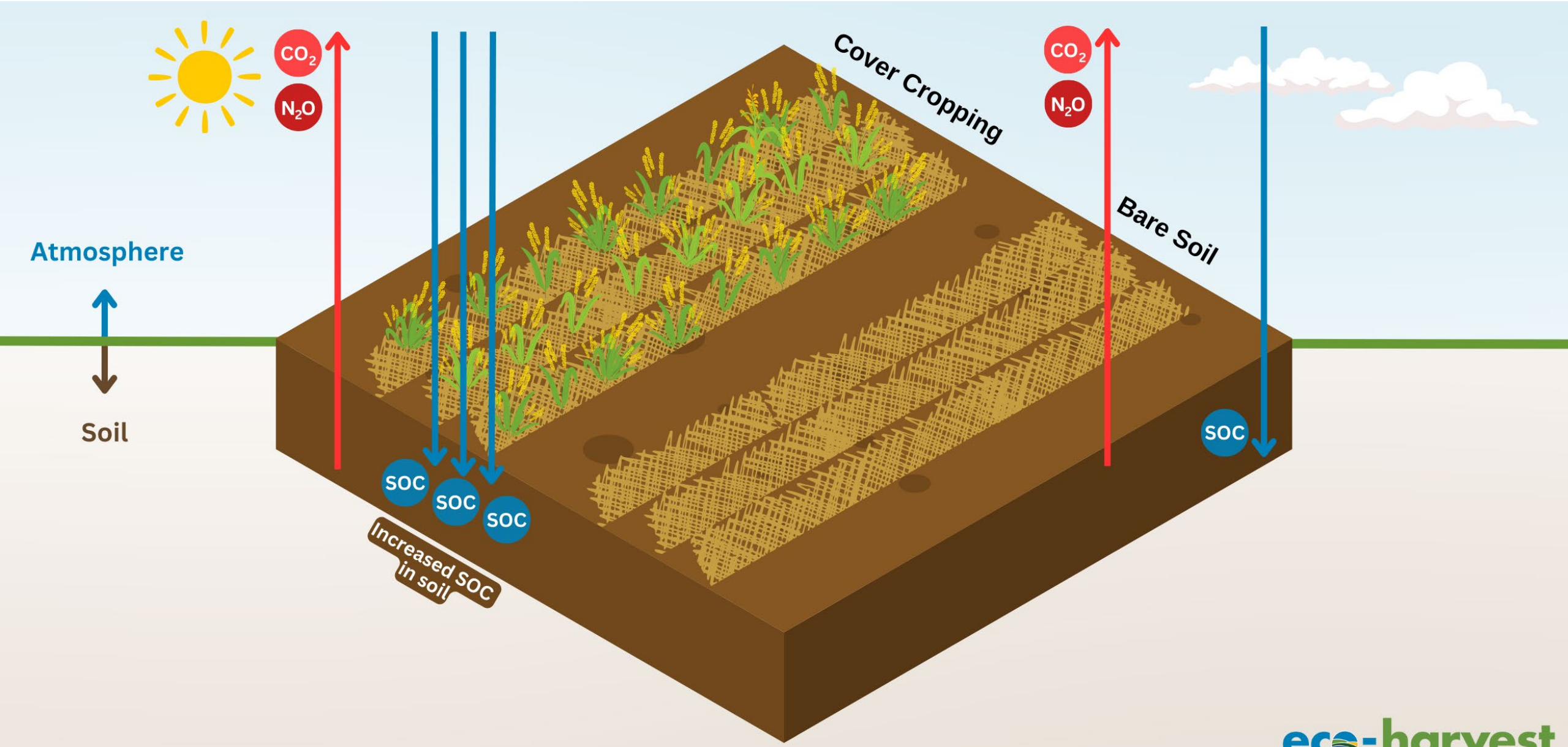


Nutrient Management: Impacts on GHG Emissions



eco-harvest by ESMC

Cover Cropping: Impacts on GHG Emissions



eco-harvest by ESMC

Benefits Beyond GHG Mitigation: Increased Soil Health and Resiliency from Regenerative Ag Practices

- Improved soil water holding capacity – reduces soil erosion, makes soils more resistant to drought
- Improved plant health and productivity fertility – increased soil health and soil structure
- Enhanced nutrient uptake by crops and reduced nutrient losses in surface and ground water can reduce input costs and improve water quality
- Increased soil and farm resiliency to the impacts of extreme weather (floods, droughts, high wind events, high temps)

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Agricultural Carbon and Ecosystem Service Market Development




Agricultural Carbon and Ecosystem Services Markets Impacts

- Ecosystem benefits and resiliency accrue at multiple scales
  - Field, farm, local, regional, global
  - People (producers and communities) and planet
  - These services have traditionally not been recognized or rewarded
  - Producer income *and* local and global food security depend on agricultural resiliency

Market Impacts

- Voluntary market programs can be a powerful tool to help scale conservation
- Incentivize farmers under pressure from buyers, society
- Can prevent regulatory pressures
- Cost-share practice adoption & provide technical support
- Meet corporate supply chain, value chain, societal demands
- Generate financial value, reduce risks for farmers, corporations, society, planet

Markets: Some Key Facts

Goals of most markets: Natural resource conservation, preservation, restoration & environmental impact mitigation

Market Econ 101: Demand (#1) Supply (#2)

C/GHG markets: Public, private sector demand, consumer, shareholder and client pressure

Market Rules Highly Variable: Different markets have different purposes; market's rules are determined by *purpose*

- e.g. Carbon offset markets v supply chain GHG mitigation

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Genesis of Carbon Markets

- **United Nations: 1992 “Sister” Rio Conventions**
  - UN Biodiversity Convention (UNBDC)
  - UN Convention to Combat Desertification (UNCCD)
  - UN Framework Convention on Climate Change (UNFCCC)
    - Countries to create GHG inventories, and report reductions annually
    - Spawned accounting, target-setting, reporting & enabling bodies
    - 2015: CORPORATIONS under pressure began creating GHG inventories and committing to report reductions annually
- ***The UNFCCC is the genesis of global carbon markets***
- *Other environmental markets have multiple drivers, some global, some regional or local (some convergence occurring)*

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Ensuring Integrity and Credibility

Actors: Global Standards & Enabling Bodies

- Accounting Standards
- Target Setting Standards
- Reporting Standards
- Registries
- Integrity & Oversight Bodies
- Enabling Bodies

GHG Commitments: Scopes 1, 2, 3

- Many companies have pledged commitments to reduce their GHG inventories as part of their corporate social responsibility goals
- Each inventory is categorized into three scopes

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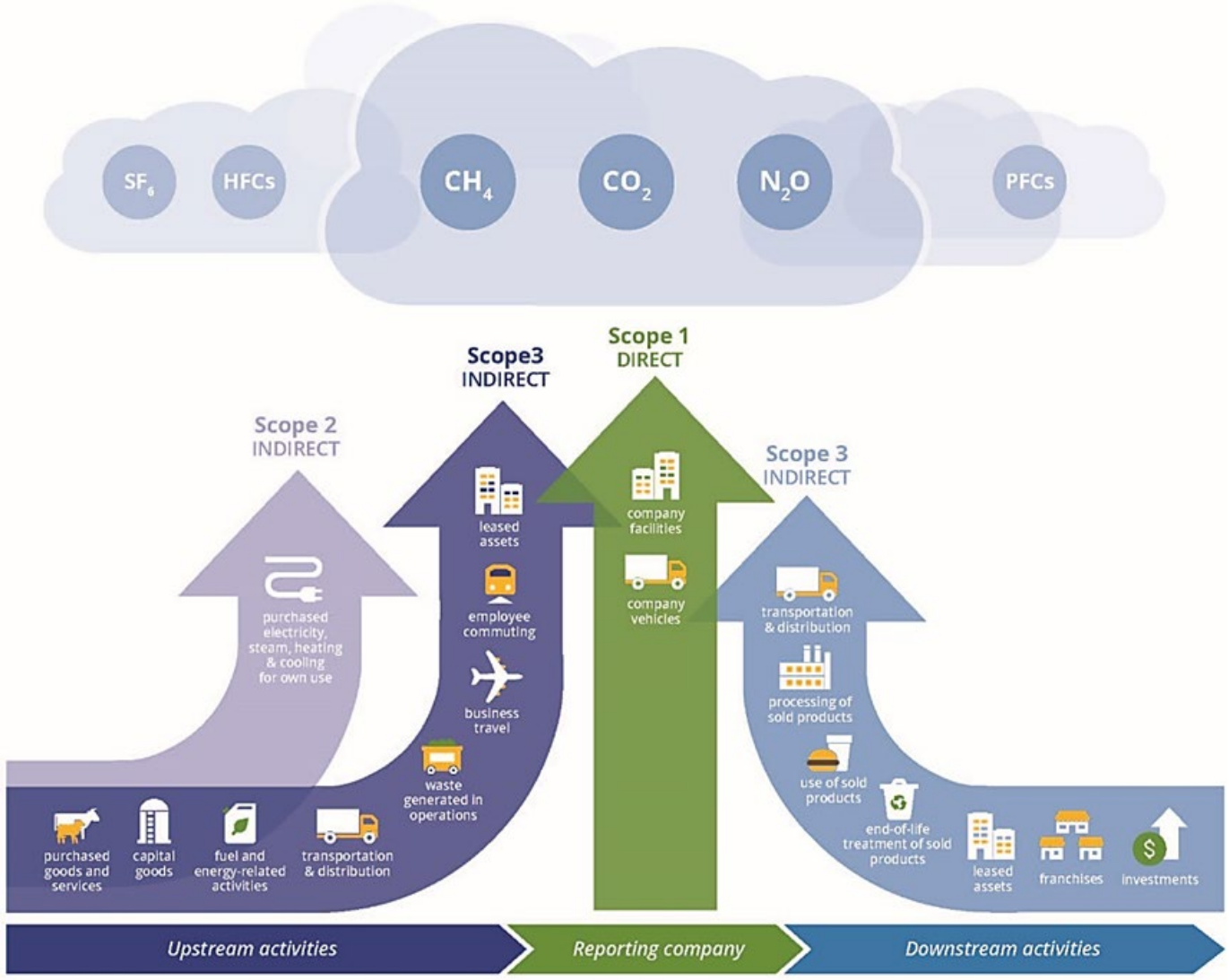
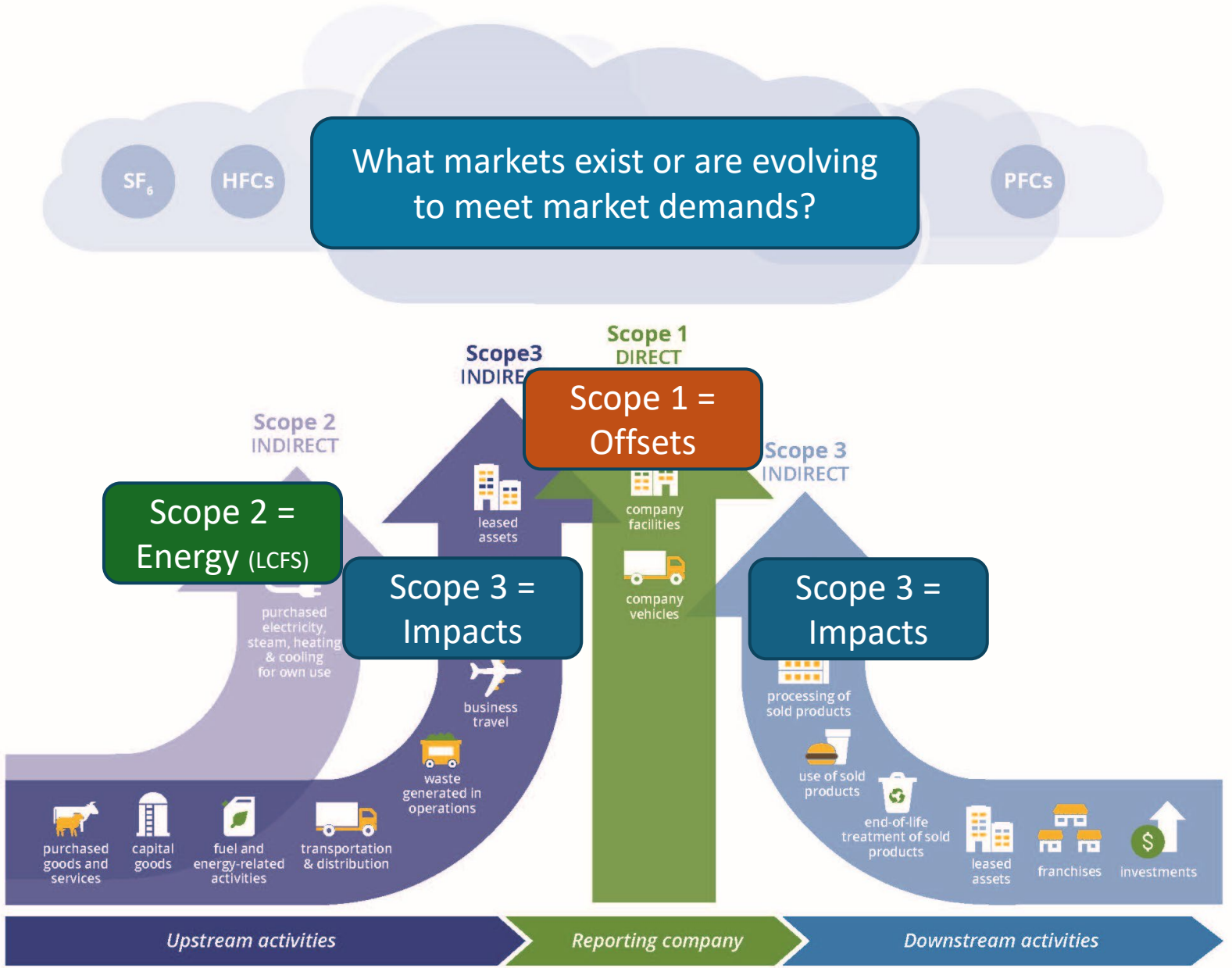
Scope 1 & Scope 3 Emissions

- **Scope 1** emissions include GHG directly emitted by an organization's facilities or operations.
- **Scope 2:** Scope 2 emissions come from power generation
- **Scope 3:** Scope 3 emissions are those a company causes indirectly via its supply chain. These are from activities not owned or controlled by the company.



Market Demand Drivers: Scopes 1 & 3



Scope 1 Offsets v Scope 3 Impact Units

Scope 1 Offsets

- **Allow GHG emission increases elsewhere**
- **Cross jurisdictional boundaries** (e.g., credits generated in Africa can be sold to US buyers)
- **Cross sectoral boundaries**
- WILL NOT GET US TO NET ZERO

Scope 3 Impact Units

- **Emissions reductions are absolute**: *no* increases elsewhere
- **Do *not* cross jurisdictional boundaries** (credits account for commodities in supply shed of origin)
- **Do *not* cross sectoral boundaries** (e.g. can only be used by actors in supply chain, and emissions reductions/increased sequestration count towards ag sector)

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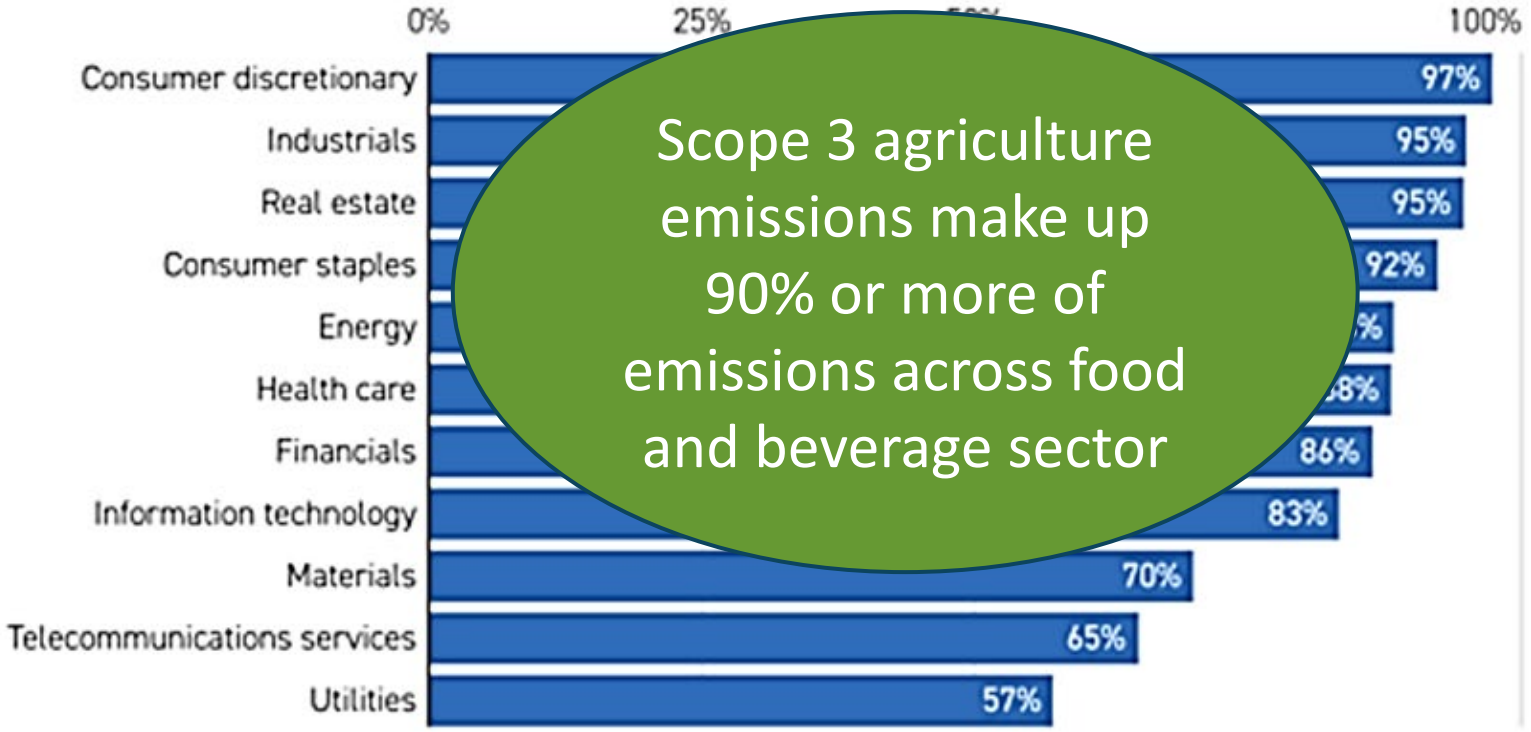
BY JORDAN WOLMAN

THE BIG PICTURE

Scope 3 makes up 87 percent of emissions across all industries

Scope 3 emissions as a percentage of total reported pollution, by industry



Scope 3 agriculture emissions make up 90% or more of emissions across food and beverage sector

Source: Morningstar Sustainalytics
Jordan Wolman/POLITICO

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Buyers and Sellers




Market Types

- Markets exist for
  - GHG Reductions
  - GHG Removals/Carbon Sequestration
  - Energy
  - Water Quality
  - Water Quantity/Water Use
  - Biodiversity

Who Buys, Who Sells?

BUYERS = companies with carbon & GHG mitigation commitments: voluntary or regulatory

- Carbon Offsets: just looking for reductions, typically from anywhere
- Scope 3 (aka "Insets"): buyers looking to reduce their indirect supply chain emissions via Impact Units *(also called Impacts, Insets, Outcomes)*

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Who Buys, Who Sells?

SELLERS = farmers & ranchers enrolled in market programs

- Protocols establish producer **eligibility** criteria, practice changes, requirements to generate impacts
- Protocols dictated by market (offset, inset, energy)

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Agricultural Carbon and Ecosystem Services Market Programs: Types and Considerations




General Eligibility Considerations

- Land ownership vs ownership of outcomes: markets require proof that sold asset has right to be sold (like a land title, for outcomes)
- New practice change adoption
- Practice changes can vary by program – most common in row crops are nutrient management, cover crops, tillage
- Geography – some are national, some only pertain to specific regions, states, or production systems
- Focus on specific Production systems – many focus on corn/soy row crops, other programs include other commodities

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General Eligibility Considerations, Cont.

- Acreage – Some programs have minimum acreage requirements
- Agricultural land conversion – land enrolled in many programs cannot have been converted to agricultural land (i.e., from grasslands or forested land) in the past 10 years
- The same acreage cannot be enrolled in more than 1 market program, cannot be subject of regulatory requirements
- Many programs now allow enrollment in public conservation or incentive programs and market programs (recent market advance)

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Other Considerations for Decisions

- Costs – some programs require producers to pay for sampling, verification, or subscribe to something; others include no participation costs
- What % of payment is returned to the producer? What % goes to the program?
- Credit/Impact Unit focus – some programs only include carbon (GHG reduction and/or GHG removal); others include water quality, water quantity, biodiversity in 'credit stacking'
- Scope 1 (offsets), scope 2 (energy), scope 3 (supply chains/insets)
- Compensation type:
  - Payments for practice changes, quantified outcomes
  - Price per ton, or price per acre

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Other Considerations for Decisions, Cont.

- Credibility – are outcomes/credits verified by third party? Is program transparent? Are protocols validated?
- Contract length – highly variable: range from 1 to 5- or even 10-year contracts
- Data ownership – does the producer continue to own their data or does the program take ownership?
- Data security and privacy -- can producer data be sold? Used for other purposes?

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Program Example: Eco-Harvest

eco-harvest
by ESMC




Example of our Program: Eco-Harvest

- ESMC was launched in 2019
- Eco-Harvest was launched in 2022 after 3 years of pilots and program development and refinement on smaller scales
- **Type:** Scope 3 agricultural supply chain programming only
- **Crops:** We support ~30 cropping systems: 4 primary crops (corn, soy, wheat, oats) and many "secondary" crops. A full list of these is available in our Producer Guide:
- https://ecosystemservicesmarket.org/eco-harvest/eco-harvest-resources

eco-harvest by ESMC

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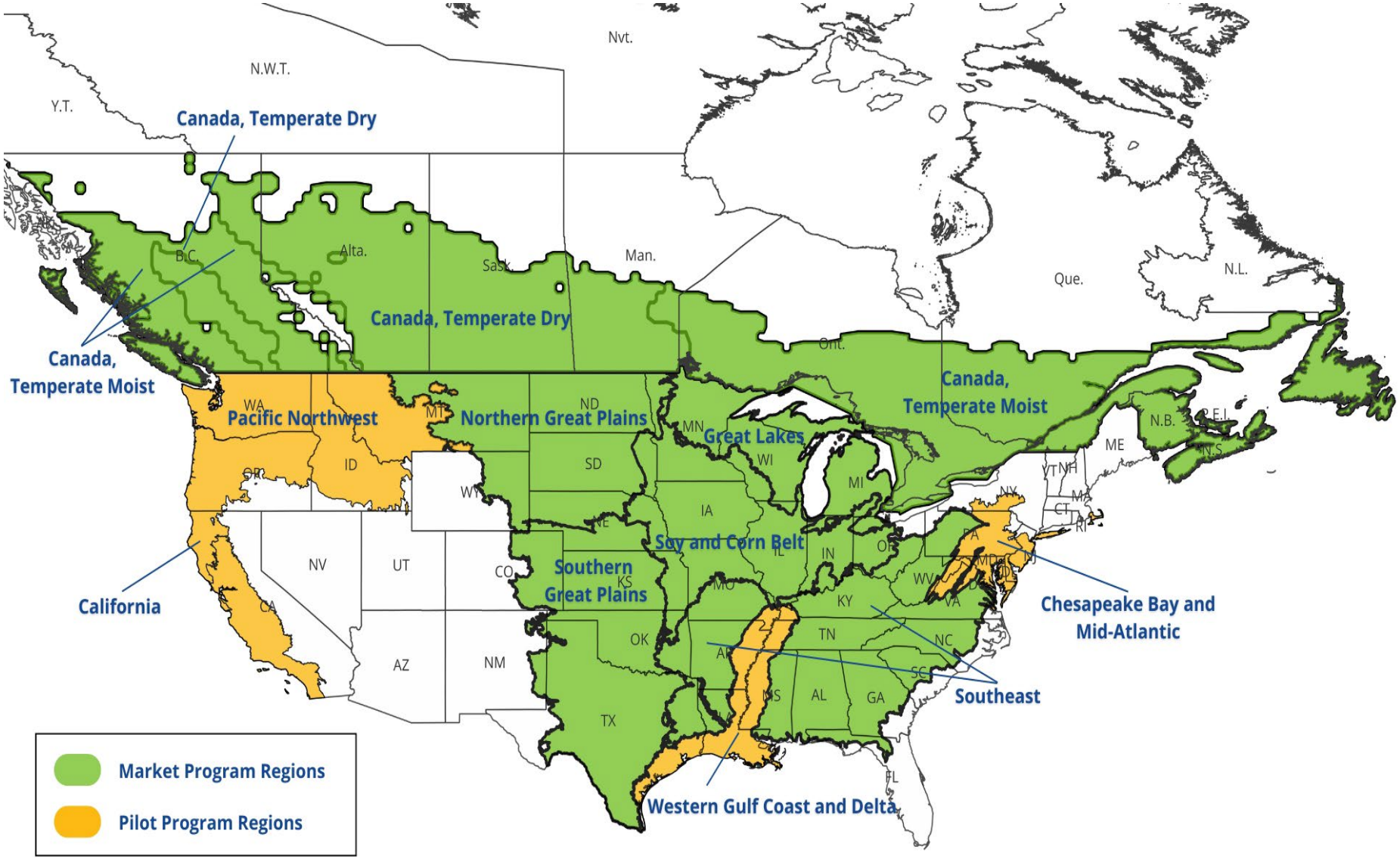
Eco-Harvest Market Program Regions



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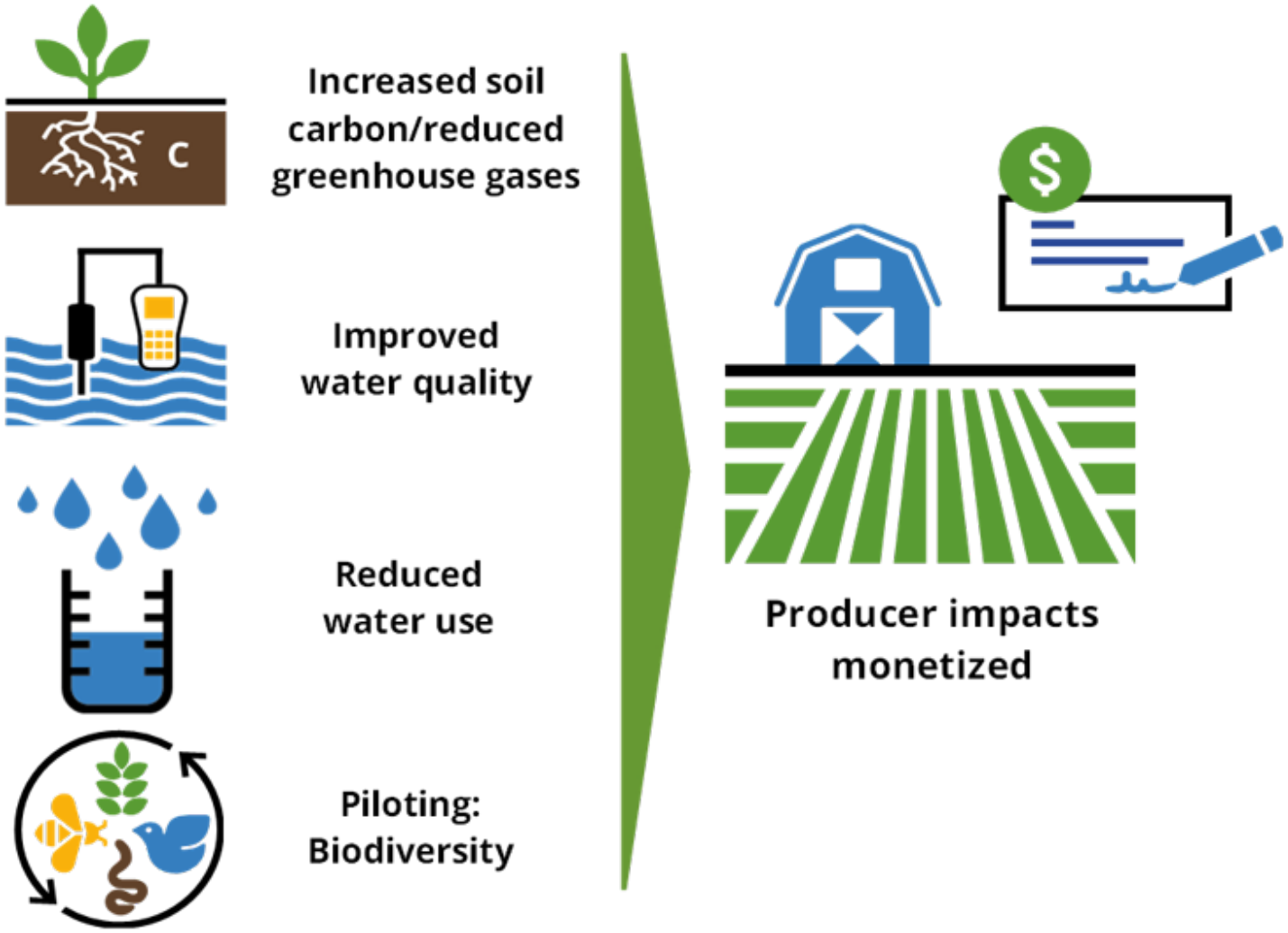
Eco-Harvest: “Stacked” Outcomes



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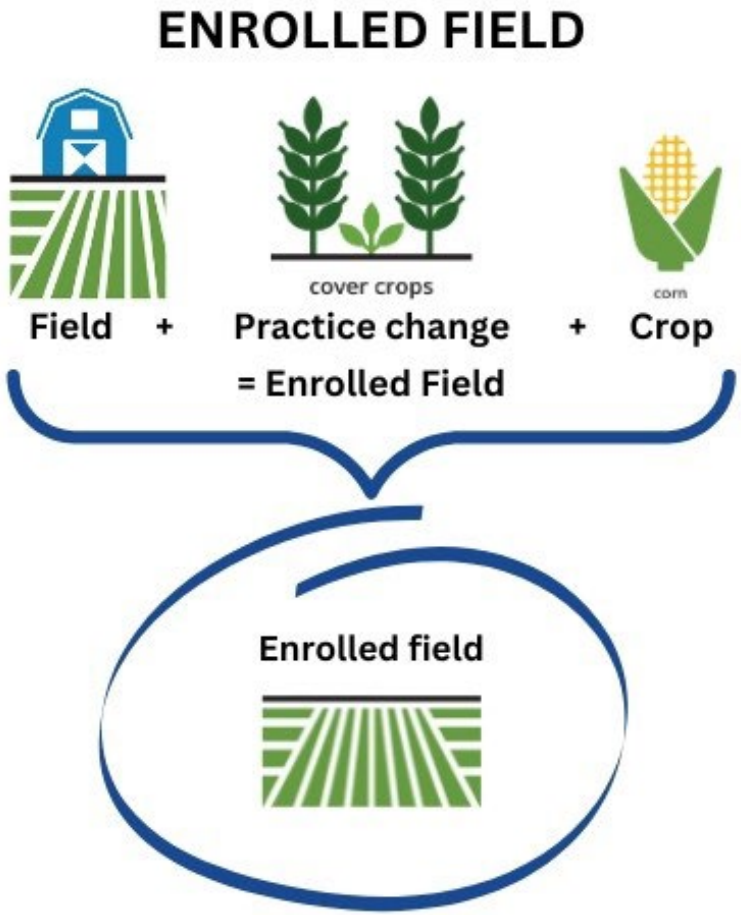
Practice Changes

- Cover Cropping
- Tillage Reduction
- Nutrient Management
- MUST BE “ADDITIONAL”/New to field



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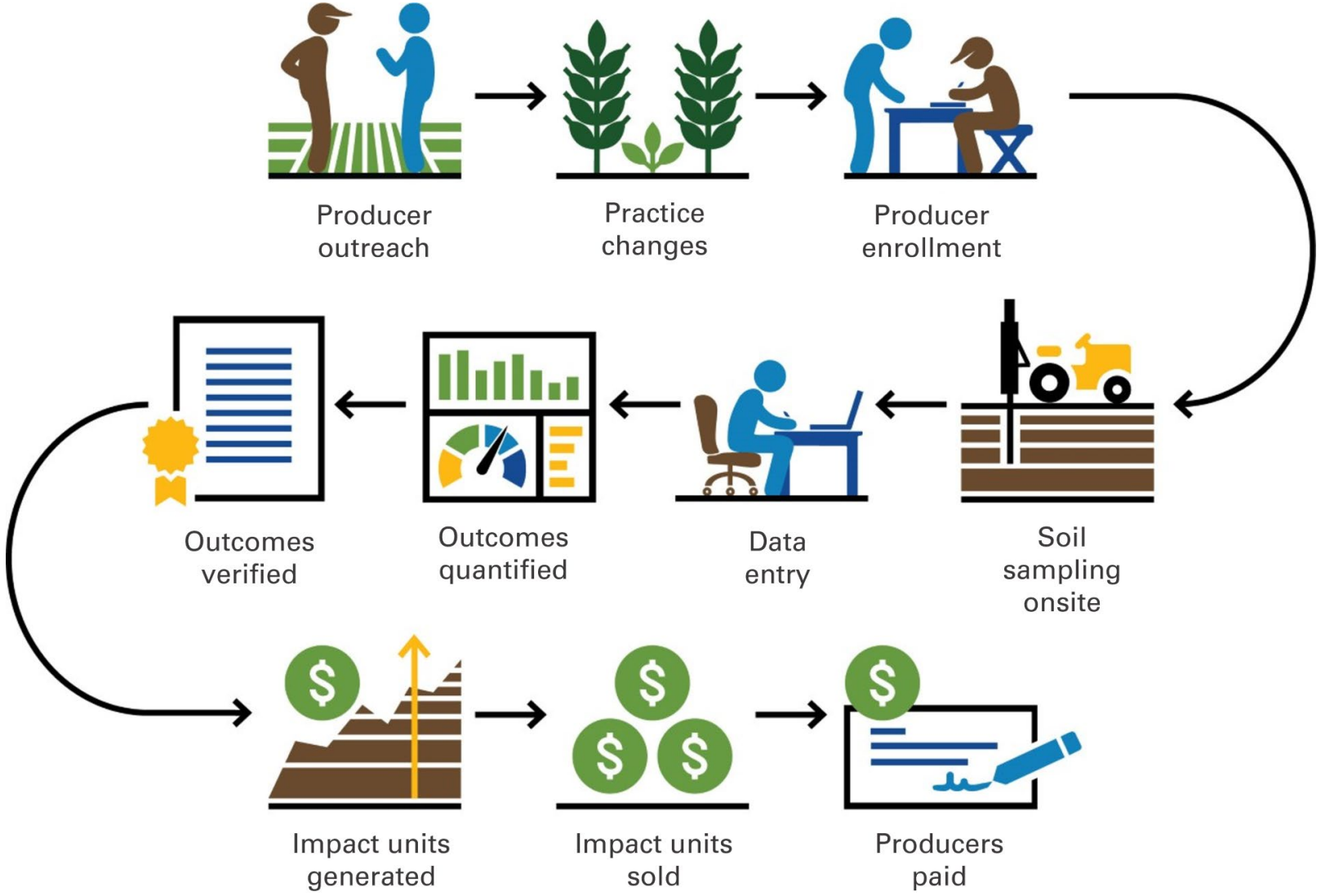
Eco-Harvest Program Participation and Flow



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Program Infrastructure

- Eco-Harvest program operations are delivered via an **end-to-end digital platform and program infrastructure**
  - Protocols, training programs, producer education and outreach materials
  - Measurement, Monitoring, Reporting and Verification (MMRV) platform for data entry, secure storage, and management to generate and sell Scope 3 Impact Units
  - Verification and Certification – work with SustainCERT to assure credibility, quality of Impact Units

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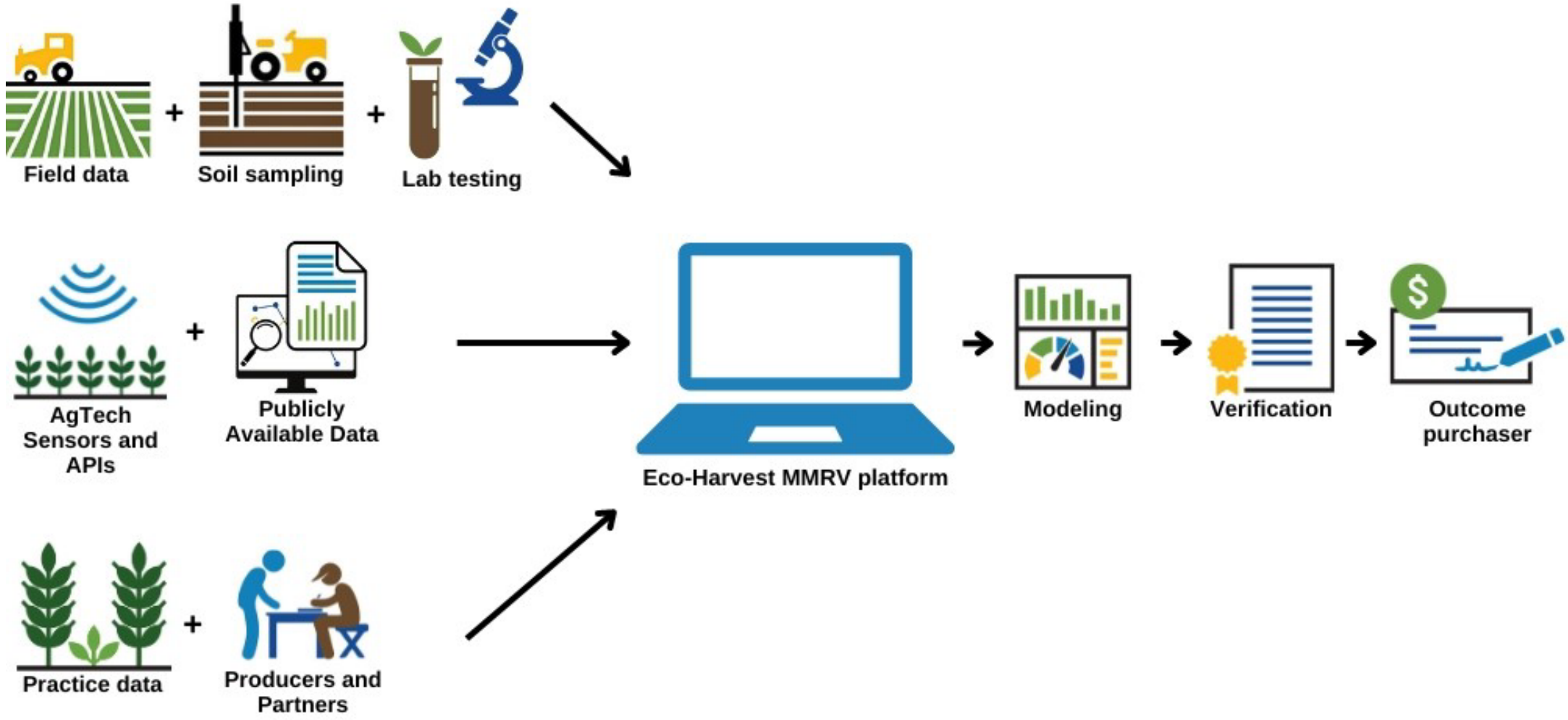
Example of Data Flow



Other Considerations

- Producers own their data: it is licensed to buyers for sole purpose of showing improvements
- Producers are paid for Impact Units – measured outcomes from practice changes
- No costs for producers to participate
- As non-profit, outcome payments go to the producer; ESMC takes a small percentage to cover operations
- Technical support to producers provided by expert project partners on the ground
- Our members are buyers of Impact Units

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Upcoming Presentations

- Focus on what questions to ask and information to consider prior to signing up for a program
- Deep dive into technologies: MMRV technologies and data needs
- In-depth discussion on lessons learned from 4 years of project implementation

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In Conclusion

- Thank you!
- Put any questions in the chat.
- Send comments/feedback, requests for additional trainings, or additional material requests to our team.
- A recording of this presentation, plus handouts and other materials are available on our website: https://ecosystemservicesmarket.org/trainings

Other questions, need information? Contact me Thayer Tomlinson, ttomlinson@ecosystemservicesmarket.org

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