



# Environmental Sustainability Metrics

# Learning Objectives

- Understand how agricultural supply chain groups are driving development and adoption of sustainability metrics
- Summarize eight metrics of environmental sustainability that are measured using common frameworks.

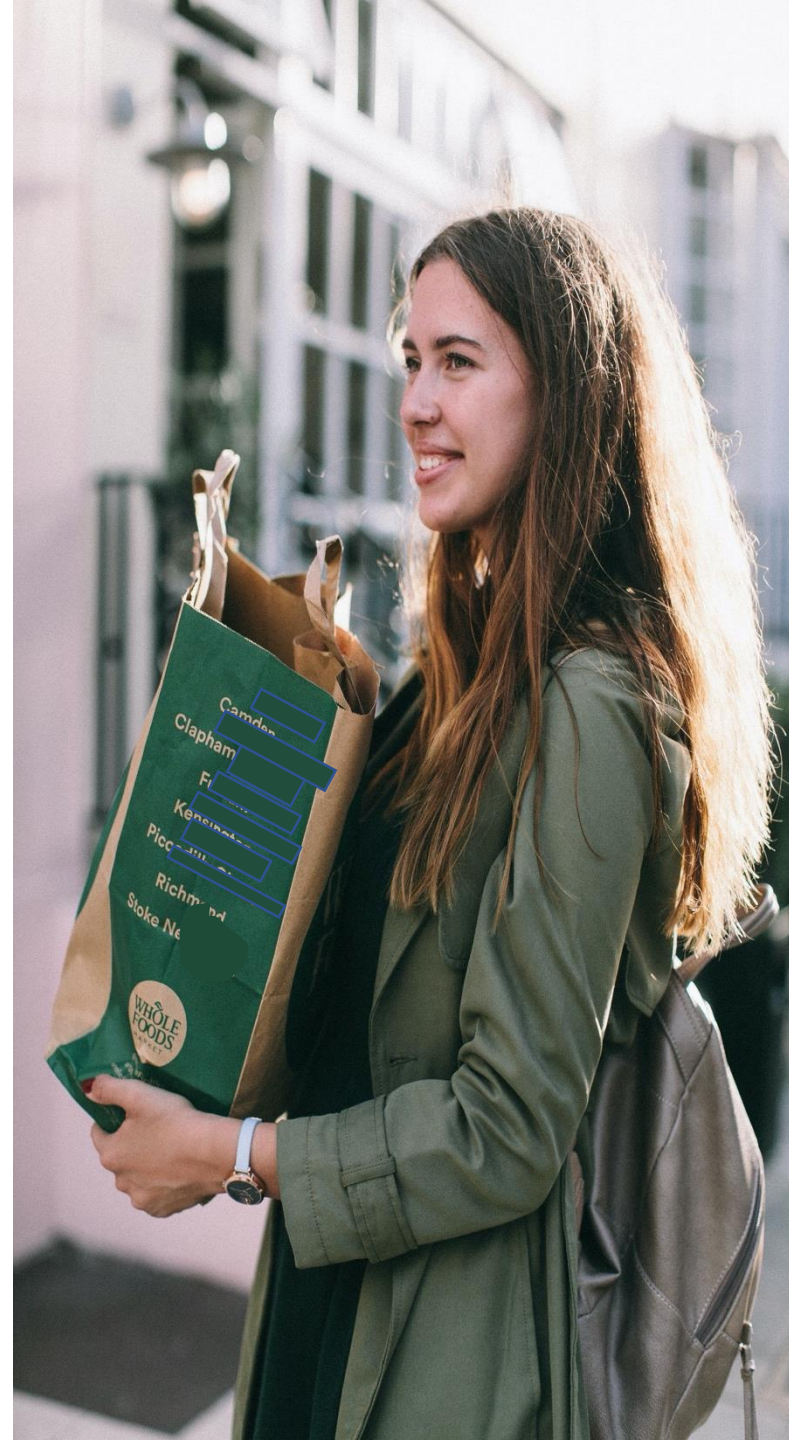


# Interpreting Market Signals

Chapter 1

# Consumers are Driving the Sustainability Movement

- Disconnected from farm
- Bombarded by information
- Concerned about agriculture's impacts on the environment
- Need for transparency, accountability and action
- Supply chain is listening



# Agricultural Supply Chain



Ag Input  
Providers

Growers

Ingredient  
Processors

Consumer  
Brands and  
Retail

# Field to Market: The Alliance for Sustainable Agriculture

- Field to Market uniquely brings together stakeholders from across the agricultural supply chain and creates unparalleled opportunities for collaboration.
- **Credibility**  
Leading universities and conservation groups are actively engaged in Field to Market's science-based approach to identify opportunities to improve the environmental performance of U.S. food, feed, fiber and fuel production.
- **Harmonization**  
Utilizing a multi-stakeholder approach to build consensus, Field to Market creates clear agreed upon terms and definitions and develops metrics and benchmarks that can be universally adopted by all stakeholders.
- **Efficiency**  
By providing a common framework to measure the sustainability of U.S. commodity crop production, Field to Market minimizes duplication of efforts and reduces the supplier burden of responding to a proliferation of supply chain surveys.





# Company Examples

**MIDWEST  
ROW CROP**  
COLLABORATIVE



- Working with 15 suppliers to reduce fertilizer loss and improve yields on 76 million acres by 2025
- Project Gigaton: establish nutrient management goals that reduce greenhouse gases at farm level
- Founder-member of Midwest Row Crop Collaborative -support projects that improve soil health and water quality
  - Cover crops
  - Conservation tillage
  - Science-based nutrient management

<https://www.walmartsustainabilityhub.com/>



# Company Examples

**MIDWEST  
ROW CROP**  
COLLABORATIVE



- Reducing greenhouse gas emission
- Conserving water
- Member of Midwest Row Crop Collaborative
- Tackling row crop impacts on hypoxic dead zone in Gulf of Mexico

<https://corporate.mcdonalds.com/corpmcd/scale-for-good/our-planet.html>

# Company Examples

**MIDWEST  
ROW CROP**  
COLLABORATIVE

The Kellogg's logo is written in a red, cursive script font.

- Conserving natural resources
- Reducing energy use
- Reducing water use
- Lowering greenhouse gas emissions
- Member of Midwest Row Crop Collaborative
- Ground-water quality in Upper Mississippi River Basin

[https://www.kelloggs.com/en\\_US/who-we-are/environmental-initiatives.html](https://www.kelloggs.com/en_US/who-we-are/environmental-initiatives.html)

# Company Examples

**MIDWEST  
ROW CROP**  
COLLABORATIVE



.....  
**GENERAL MILLS**

- Tracking and reducing greenhouse gas emissions and water use in supply chain
  - Water stewardship program
  - Ecosystem commitments
  - Sustainable sourcing
- Working with local agronomists and farmers to:
  - Boost soil health
  - Sequester carbon
  - Reduce greenhouse gas emissions
- Founder-member of Midwest Row Crop Collaborative

<https://www.generalmills.com/en/Responsibility/Overview>

# Company Examples

**MIDWEST  
ROW CROP**  
COLLABORATIVE

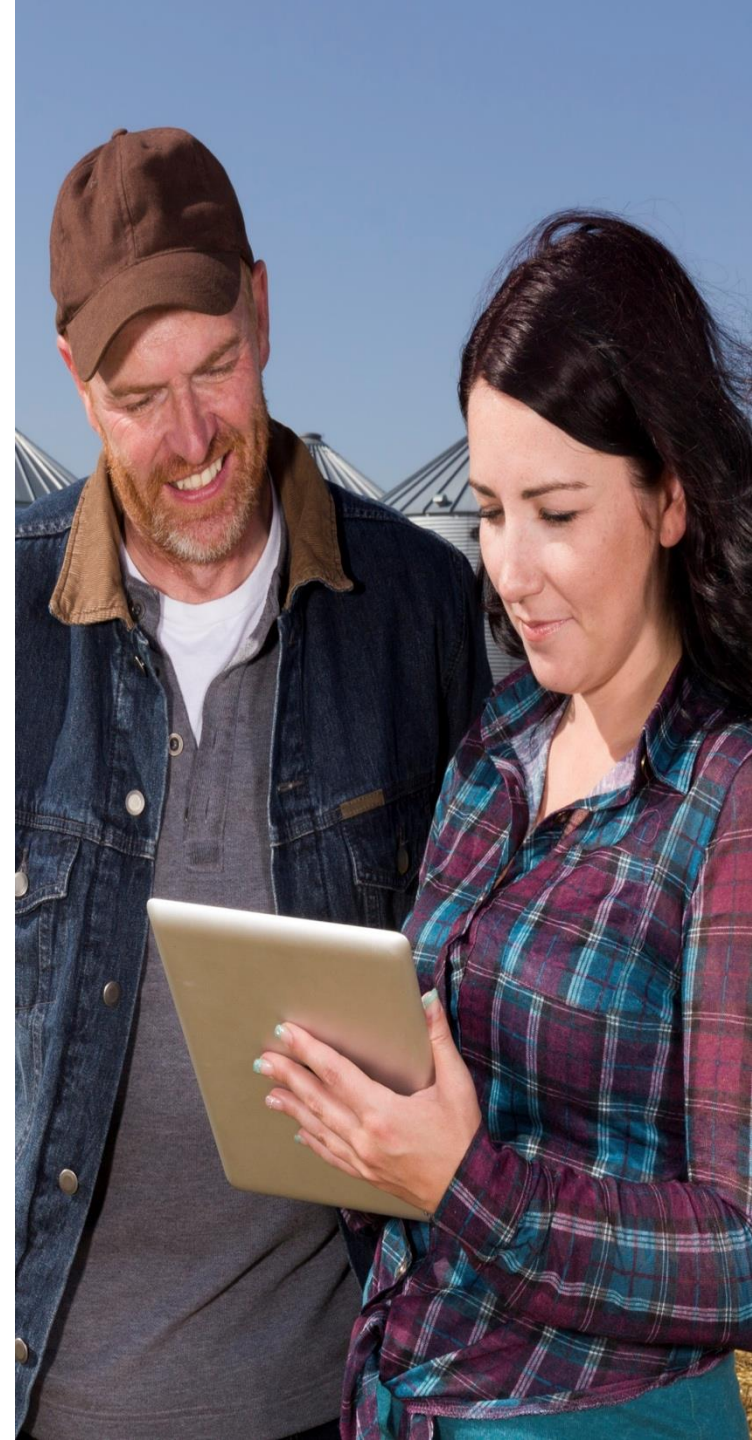


- Reduce supply chain impacts:
  - Improve water use efficiency by 15% by 2025
  - Reduce greenhouse gas emission by 20% by 2030
- Sustainable Farming Initiative - sustainably source
  - Direct ag raw materials by 2020
  - Non-direct ag raw materials by 2025
- Member of Midwest Row Crop Collaborative

<https://www.pepsico.com/sustainability/performance-with-purpose/planet>

# Connect to supply chain sustainability projects

- Expand business for yourself and growers
- Conserve natural resources for future generations
- Offer sustainability insights to growers
  - Determine baseline values
  - Recommend and implement changes
  - Measure and document
  - Make continuous improvement



# Discussion

# Metrics

## Chapter 2

# Eight Environmental Indicators



Biodiversity



Energy Use



Greenhouse  
Gases



Irrigation Water  
Use



Land Use



Soil Carbon



Soil Conservation



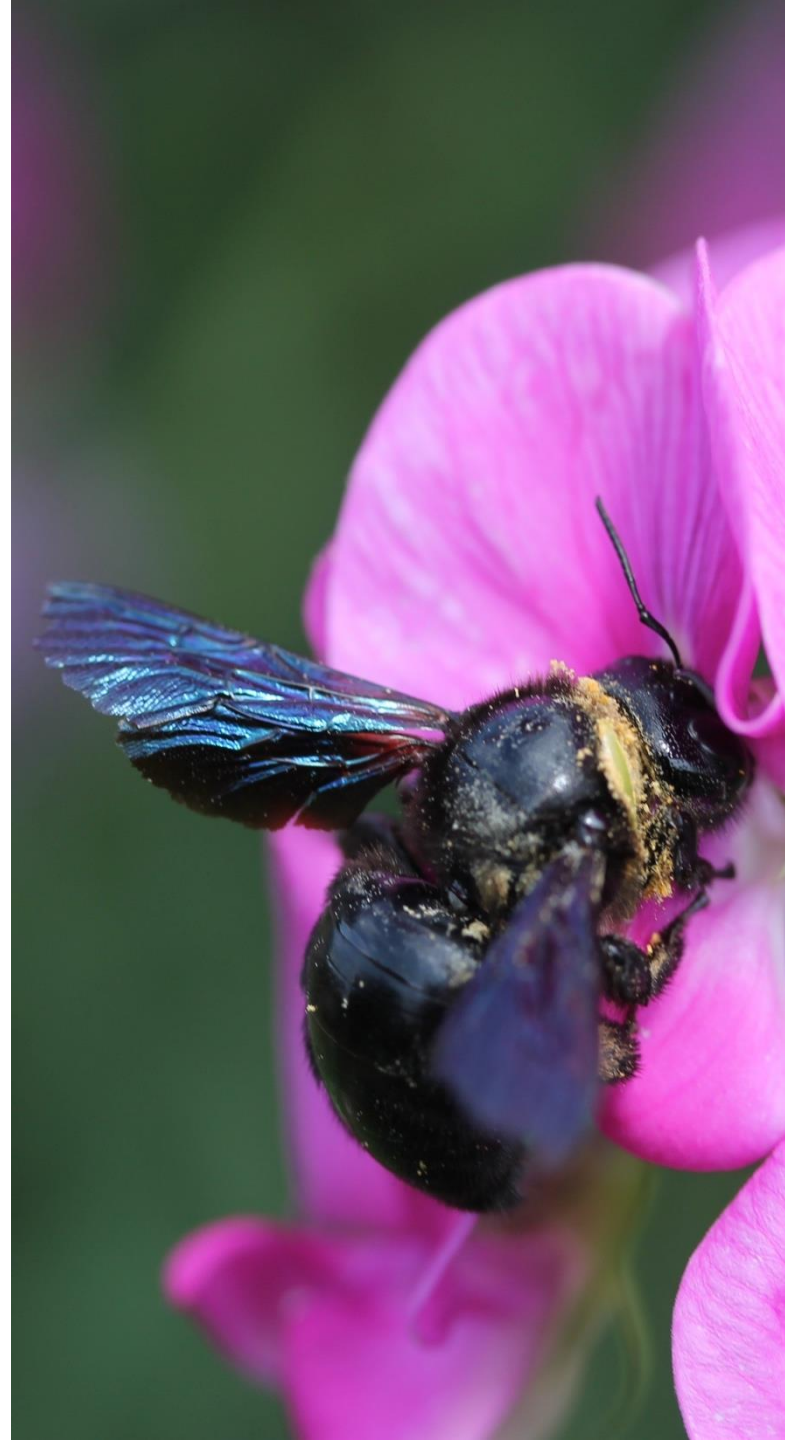
Water Quality

[www.calculator.fieldtomarket.org](http://www.calculator.fieldtomarket.org)



# Biodiversity

- Cultivated fields and non-productive areas of the farm all contribute.
- Conserve healthy ecosystems
- Protect pollinators and pest predators
- Preserve wildlife habitat for foraging and nesting



# Energy Use

- Variable cost of farming- affected by diesel and electricity prices
- Combustion of fossil fuels releases greenhouse gas CO<sub>2</sub>
- Direct energy - operating equipment, pumping irrigation water, grain drying and transport
- Embedded energy - required to produce crop inputs (seeds, fertilizers, crop protectants)



# Greenhouse Gases

- Hold heat inside the Earth's atmosphere
- Cause the atmosphere to warm
- Weather patterns become more volatile
- Attributed to ag:
  - Carbon Dioxide (CO<sub>2</sub>)
  - Nitrous Oxide (N<sub>2</sub>O)
  - Methane (CH<sub>4</sub>)



# Irrigation Water Use

- Finite supply of fresh water
- United States agriculture accounts for 80% of fresh water consumed
- Can be expensive



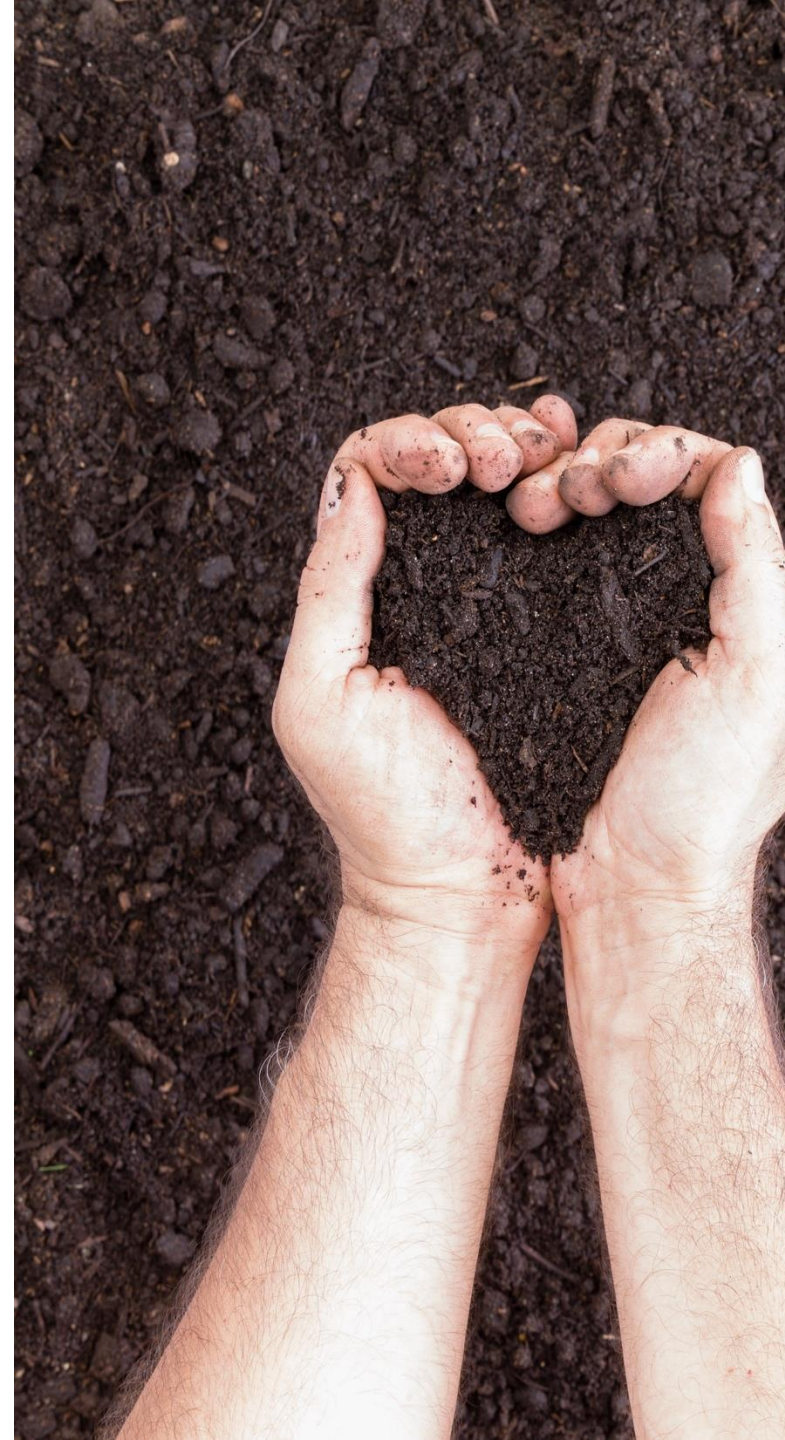
# Land Use

- Efficient use of agricultural land is necessary for farm financial stability
- Best land for agricultural use is already under cultivation in the U.S
- Balance yield with input optimization



# Soil Carbon

- From organic matter
- indicator of soil health
- reservoir for plant nutrients and water
- Causes aggregate formation
- Enhancing soil carbon removes carbon dioxide from the atmosphere



# Soil Conservation – Preventing Erosion

Erosion is expensive

- lost soil takes inputs with it
- harms productivity

Sedimentation in waterways

- reduces transportation efficiency
- harms water quality

Soil suspended in air causes

- traffic hazards
- respiratory ailments



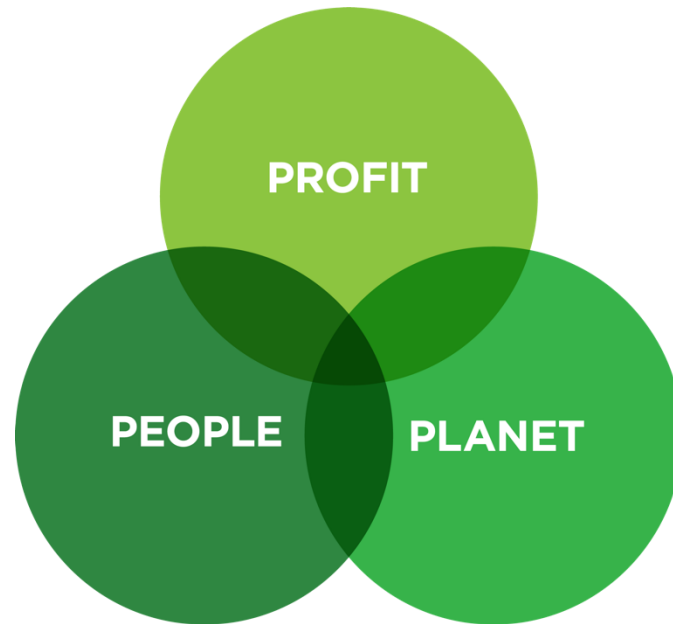
# Water Quality

- Soil sediment, nutrients and crop protectants leave field and enter water through
  - runoff directly into surface waters
  - leach through the soil profile
    - enter tile lines that discharge to surface water
    - leach into groundwater
- Structural and edge of field practices – last line of defense
- Protect freedom to operate





# Social and economic considerations



All three pillars are equally important.

# Discussion

# Review

- Consumer demand for sustainable products
- Company response to demand
- 8 environmental metrics have been widely agreed upon
- Intersection of environment, economy, and community



# Thank you!

## Sustainability Programming for Ag Retailers and CCAs (SPARC)

A COLLABORATIVE INITIATIVE  
BROUGHT TO YOU BY



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