

The Future of Sustainable CPG Must Include Digital Agriculture



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Analyst



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Research Director

Agenda

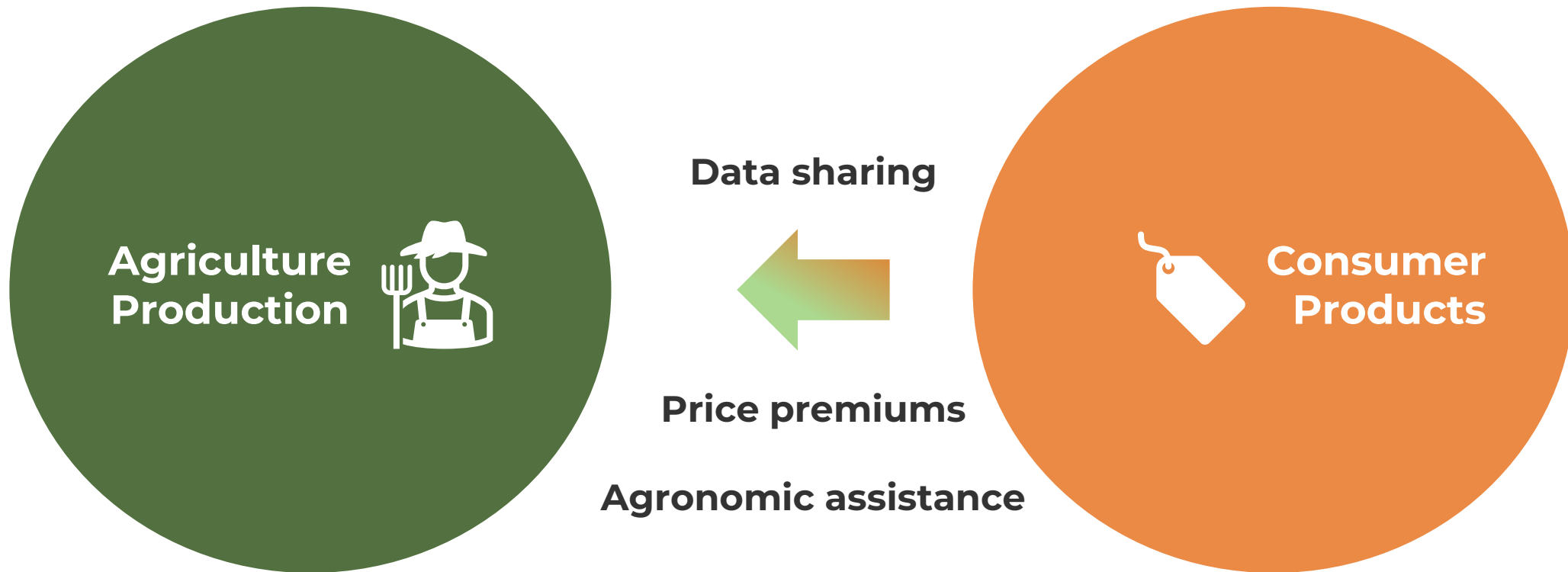
1 | **Challenges lead to opportunities for the CPG supply chain**

2 | Where digital agriculture can make a difference

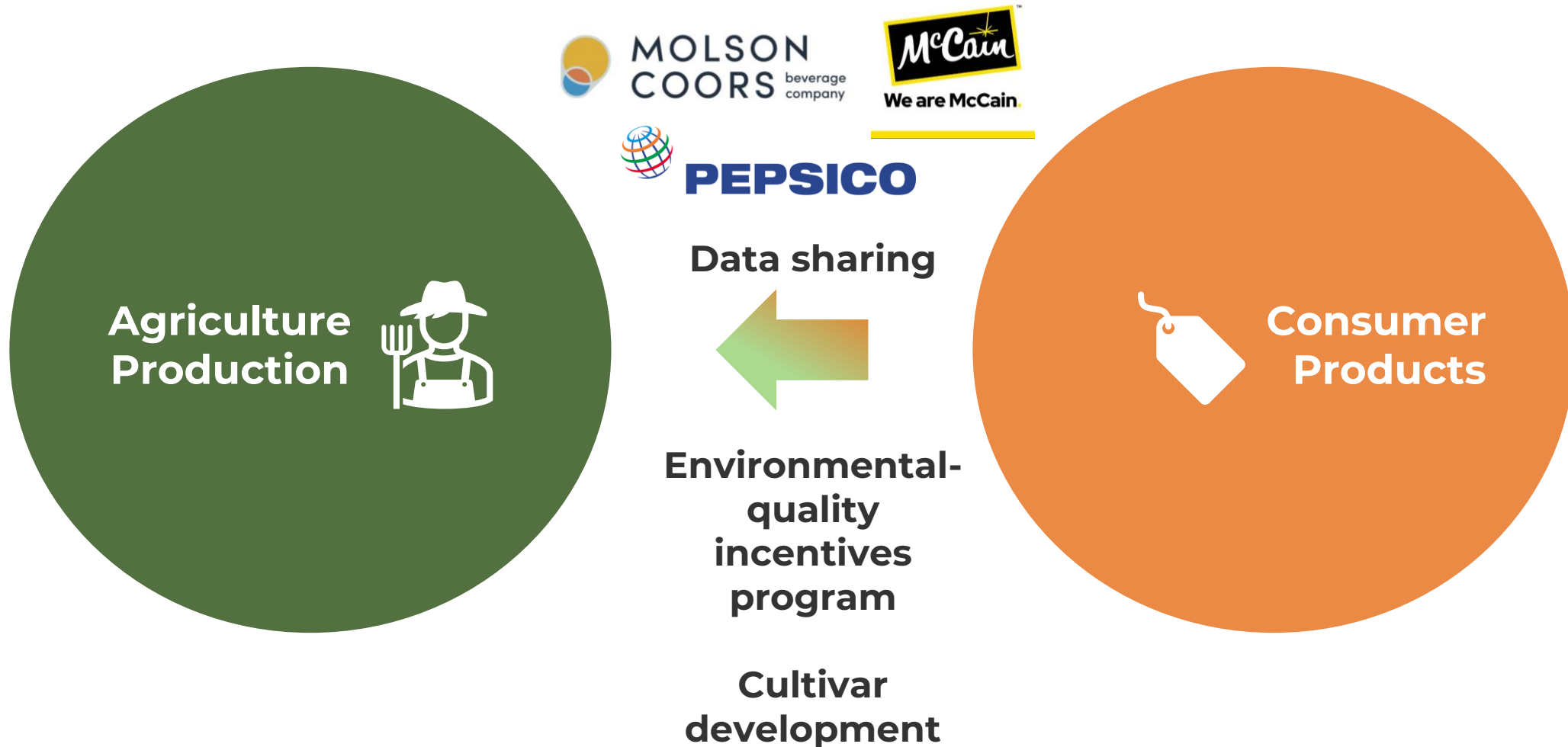
3 | What tech can make a difference today

4 | Strategic steps and key takeaways

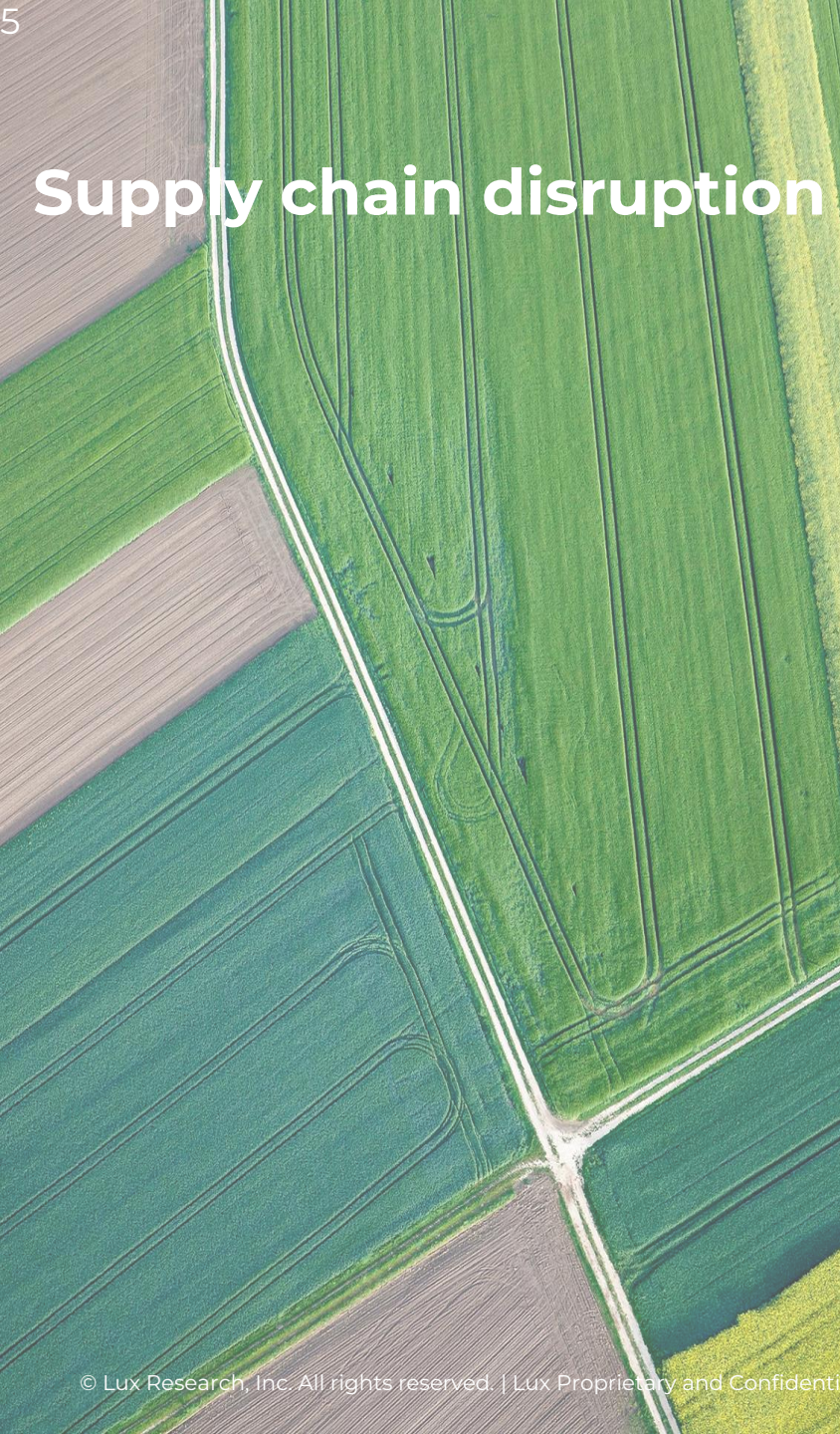
There is a critical but shrinking gap between decisions and data for agriculture production and consumer product needs



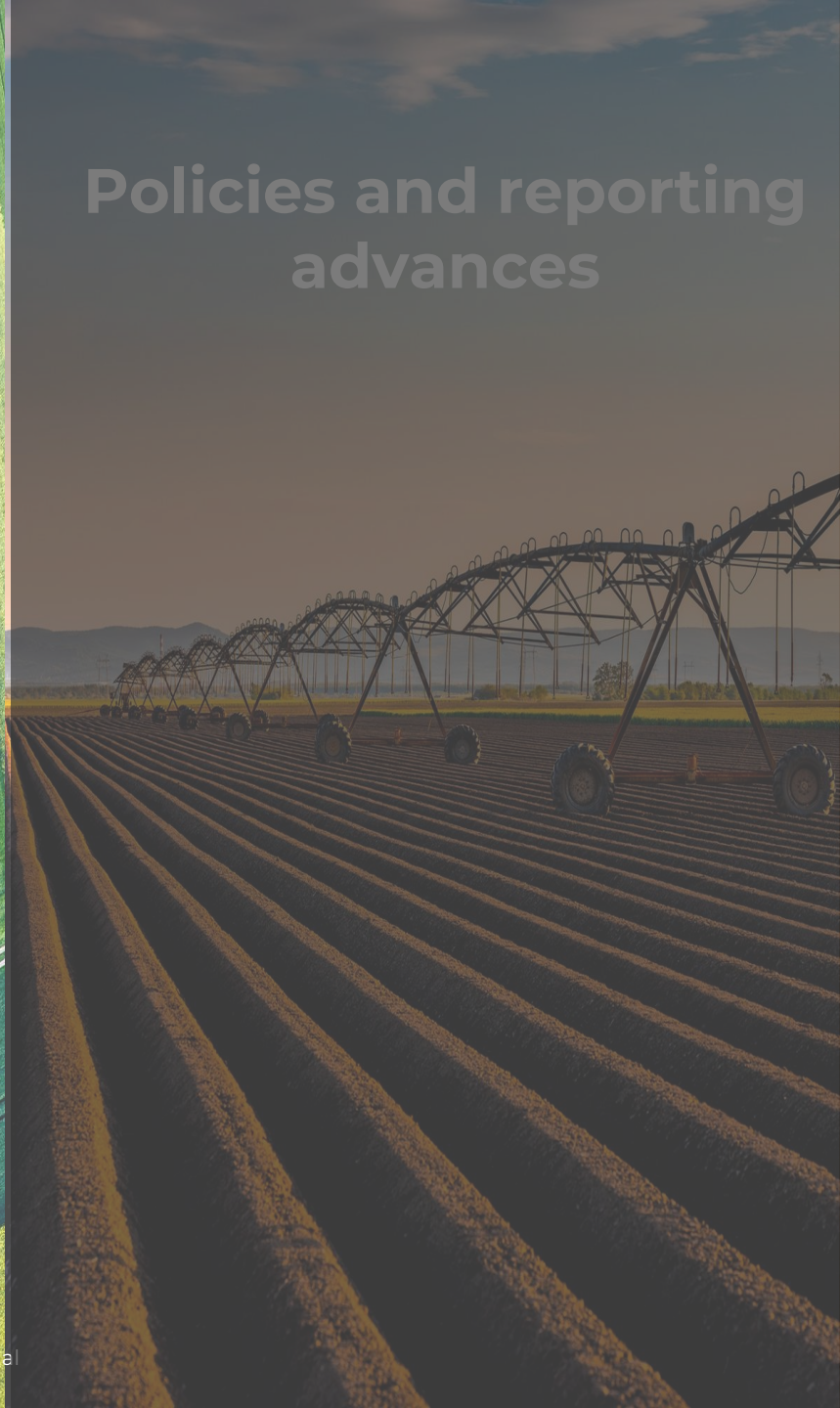
There is a critical but shrinking gap between decisions and data for agriculture production and consumer product needs



Supply chain disruption



Policies and reporting advances



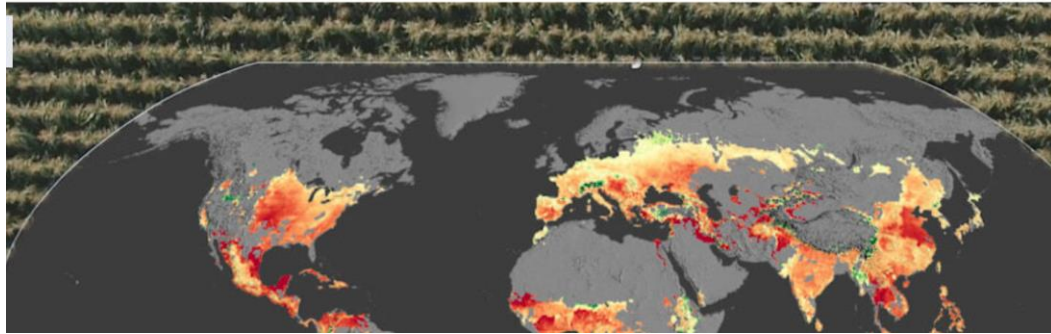
Clean label and product certifications



Agriculture and supply chain disruption due to extreme weather



Global Climate Change Impact on Crops Expected Within 10 Years, NASA Study Finds



World's wheat supply at risk of a dangerous shock due to heat and drought, study warns

New research outlines a worst-case scenario in which extreme weather hammers winter wheat crops in both the U.S. Midwest and northeastern China in the same year.



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How climate change is raising the cost of food

By Irina Ivanova
June 9, 2023 / 11:14 AM EDT / MoneyWatch

f X

New study finds global climate change could impact the flavor and cost of American beer

By Alex Hood 27 OCT 2023 3 minute read



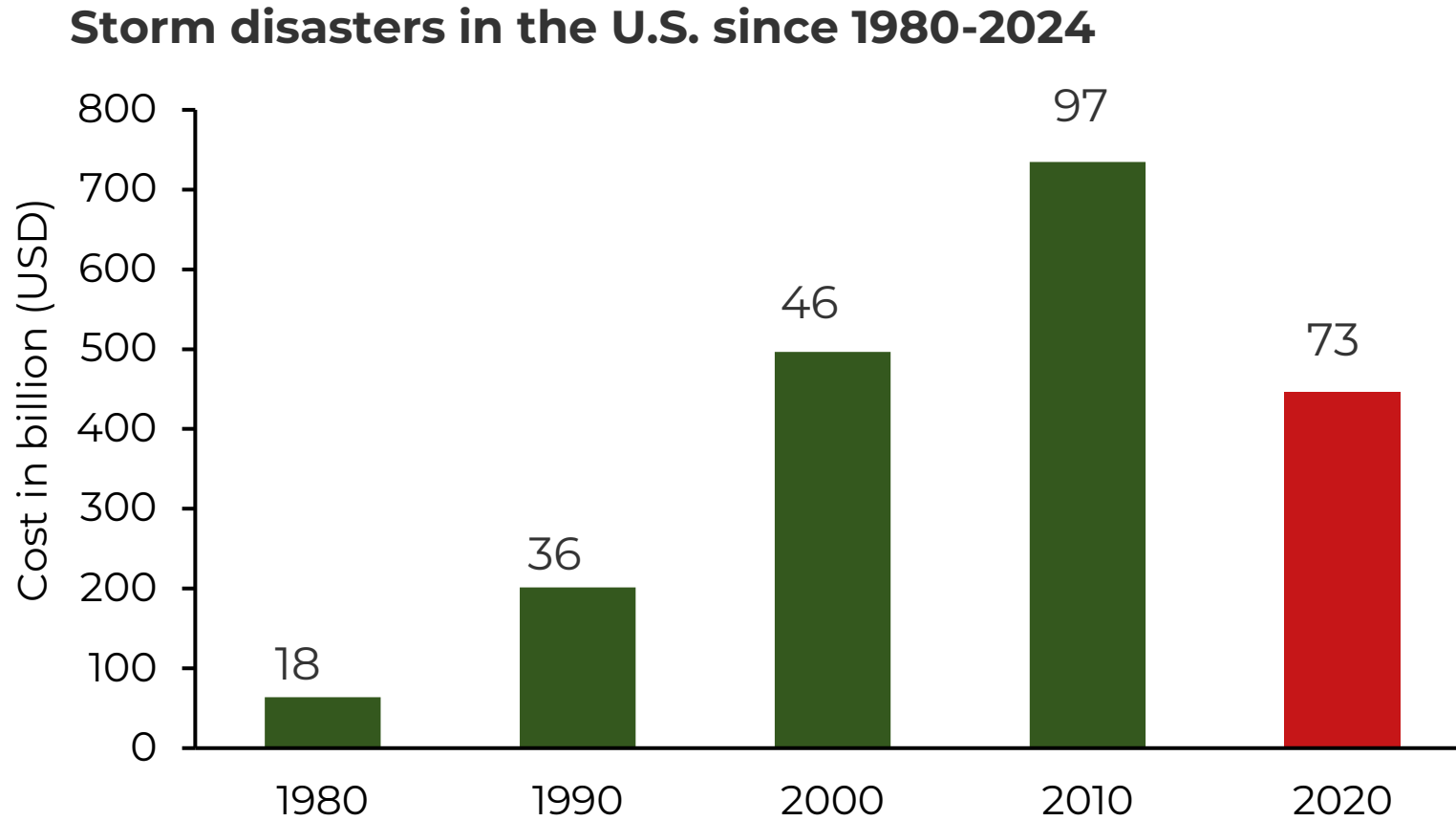
Crop insurance pays farmers billions of dollars for weather-related losses closely linked to the climate crisis



By Anne Schechinger (EWG)

NOVEMBER 1, 2023

The frequency of extreme weather is on the rise



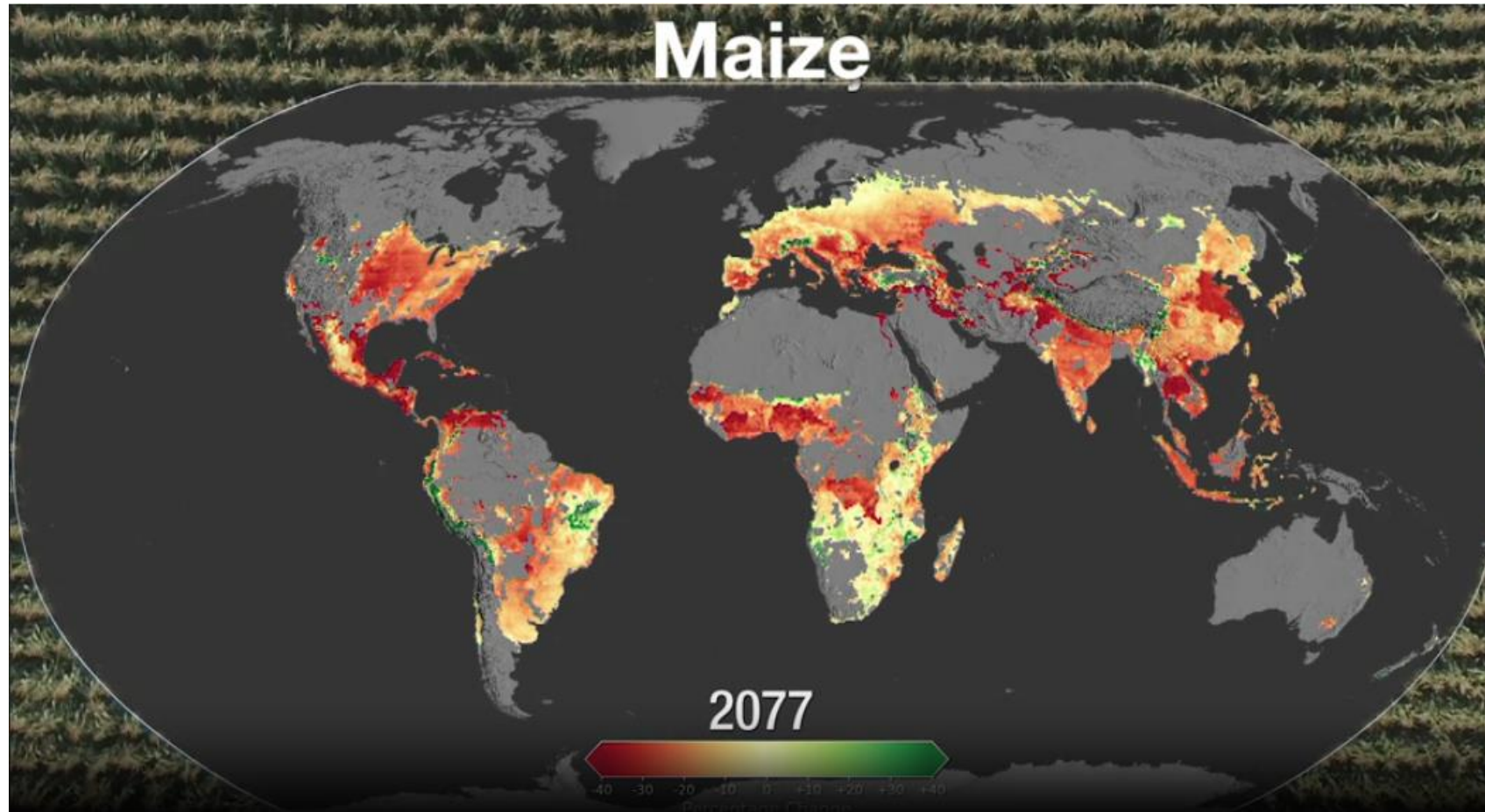
Weather-related losses led to skyrocketing indemnity payments

Climate Incident	2001	2022	% change
Drought	USD 965.5 million	USD 7.6 billion	690
Excess moisture	USD 1 billion	USD 2.2 billion	123
Hail	USD 228.3 million	USD 692.9 million	204
Heat	USD 142.5 million	USD 1.6 billion	1,012
Freeze	USD 78.6 million	USD 683.9 million	771

Source: [EWG](#)



Major crops around the world will see yields decrease



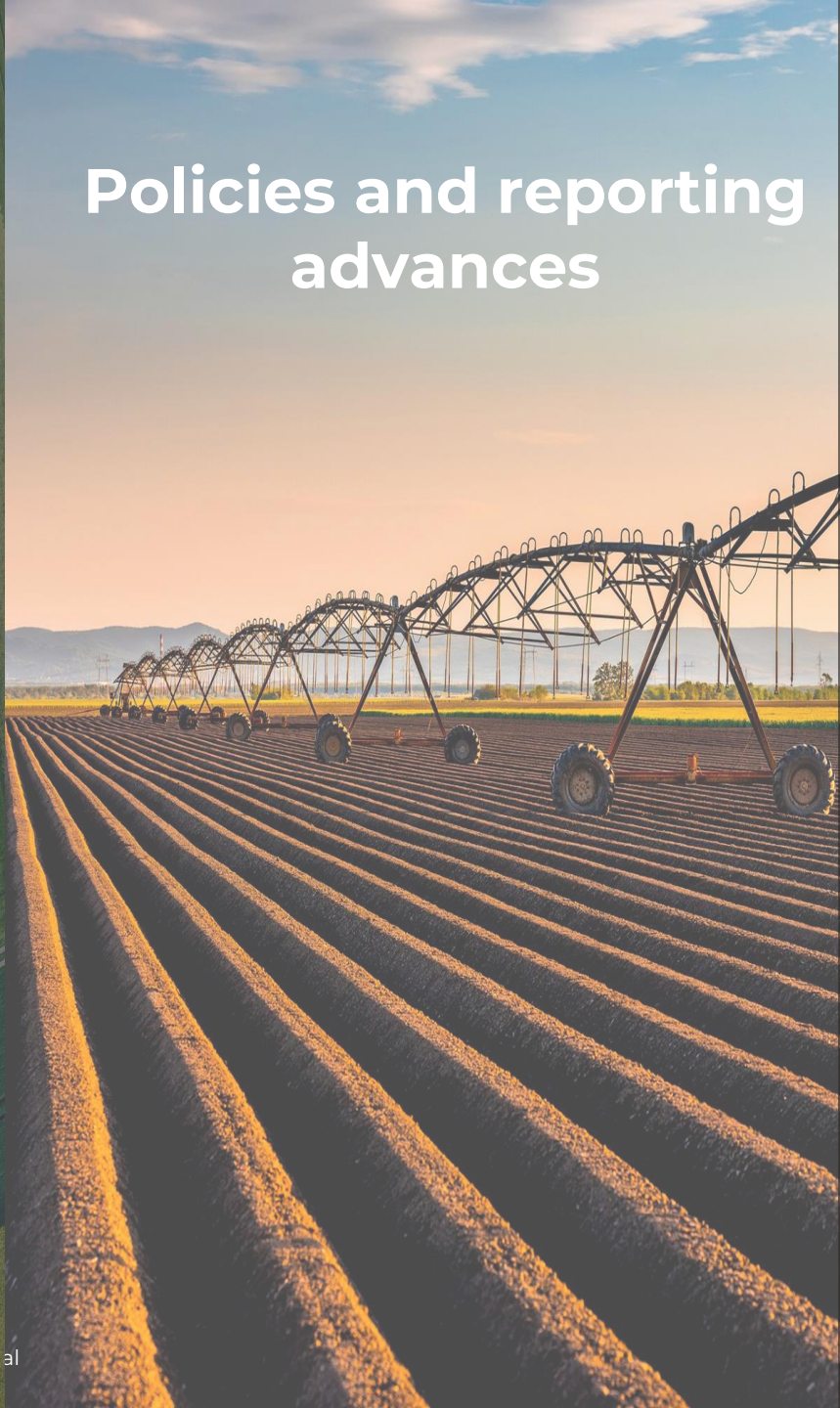
The cost of inputs is increasing

Percent Change from Start Year to End Year	2012–2021	2017–2021	2021–2022
Feed	1.6%	2.6%	13.1%
Seed	1.3%	-1.4%	-0.3%
Anhydrous ammonia	2.3%	11.7%	69.4%
Diammonium phosphate (18-46-0)	2.0%	12.1%	65.4%
Potash	0.9%	12.9%	56.7%
Agricultural chemicals	0%	-1.5%	2.0%

Supply chain disruption

Policies and reporting advances

Clean label and product certifications



Policies place new requirements on CPGs

SEPTEMBER 2020

Farm to Fork Strategy

The EU aims to reduce synthetic fertilizer use by 30% and pesticides by 50% by 2030.

DECEMBER 2022

Regulation on Deforestation-Free Products (RDFP)

The RDFP mandates any company importing specific commodities to the EU to prove that the items are deforestation-free.

JANUARY 2024

EU finalizes ESG reporting rule

EU and non-EU companies with securities listed on a regulated EU market will report on environmental factors including Scope 1, 2, and 3 greenhouse gas emissions as well as water/marine resources, circular economy, pollution, and biodiversity.

FEBRUARY 2022

India to replace diesel with green energy on farms by 2024

To achieve this goal, the Indian government is giving farmers an incentive to use solar for irrigation pumps.

NOVEMBER 2023

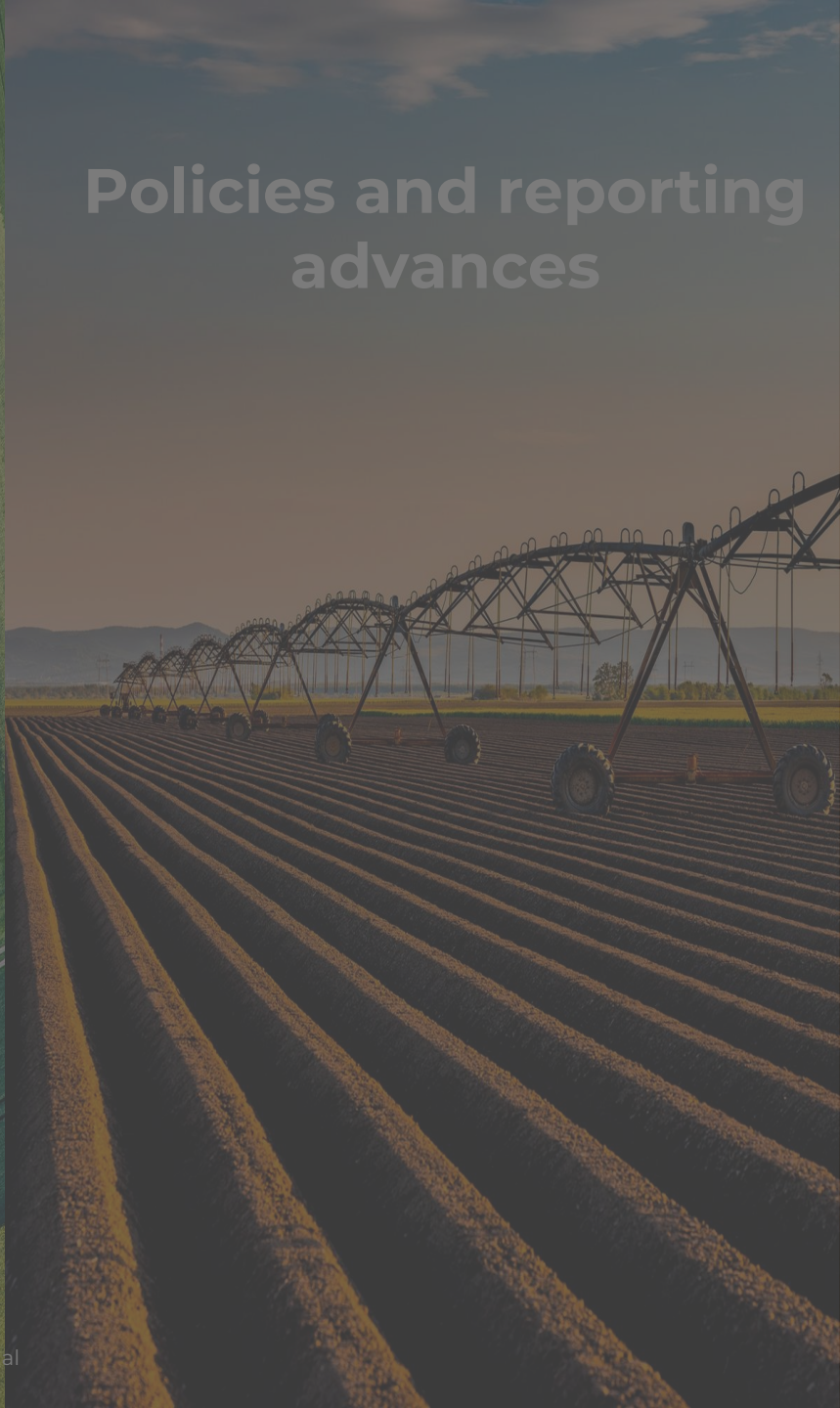
U.S. Farm Bill

The bill will focus on climate mitigation and adaptation. This means risk management will be a top priority.

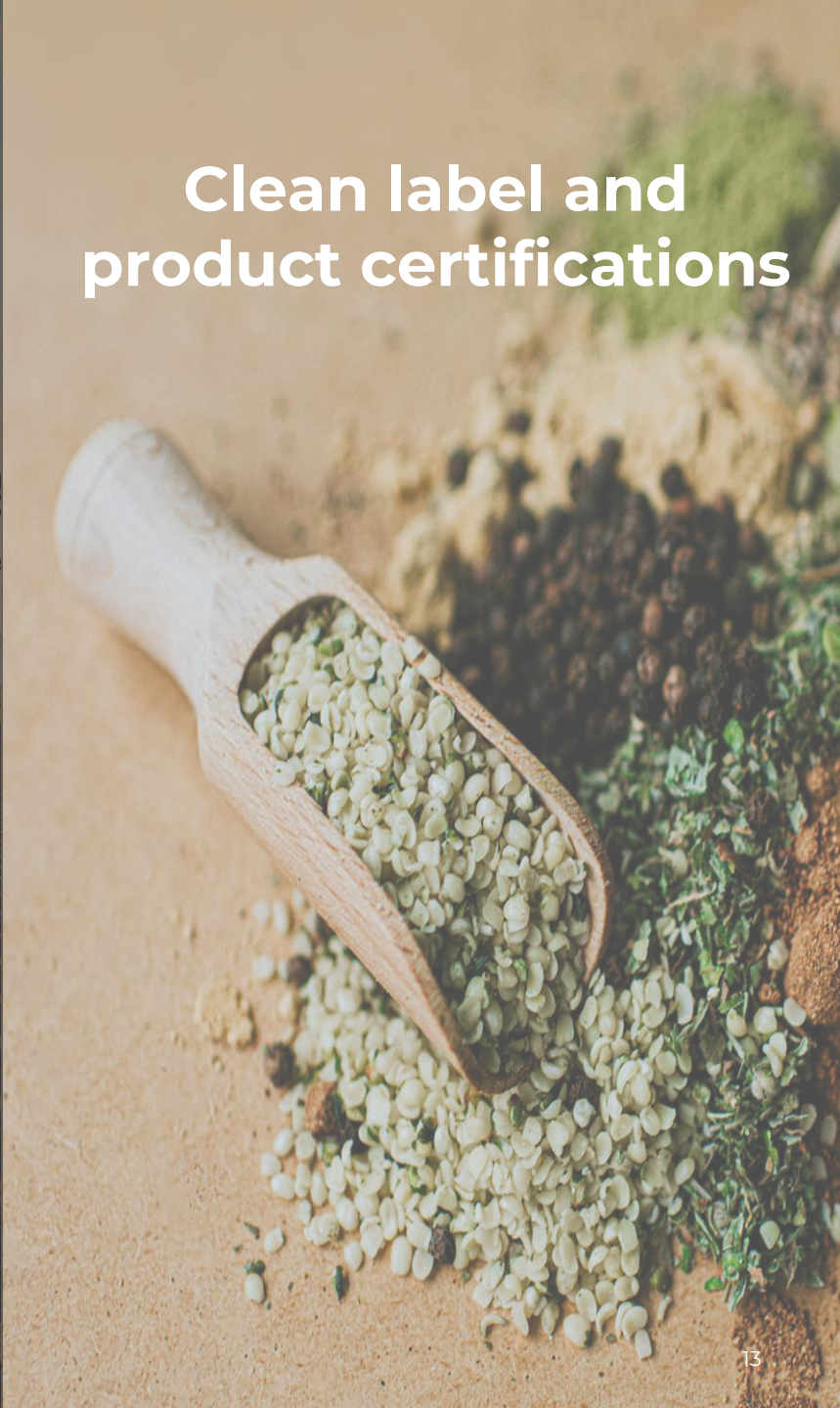
Supply chain disruption



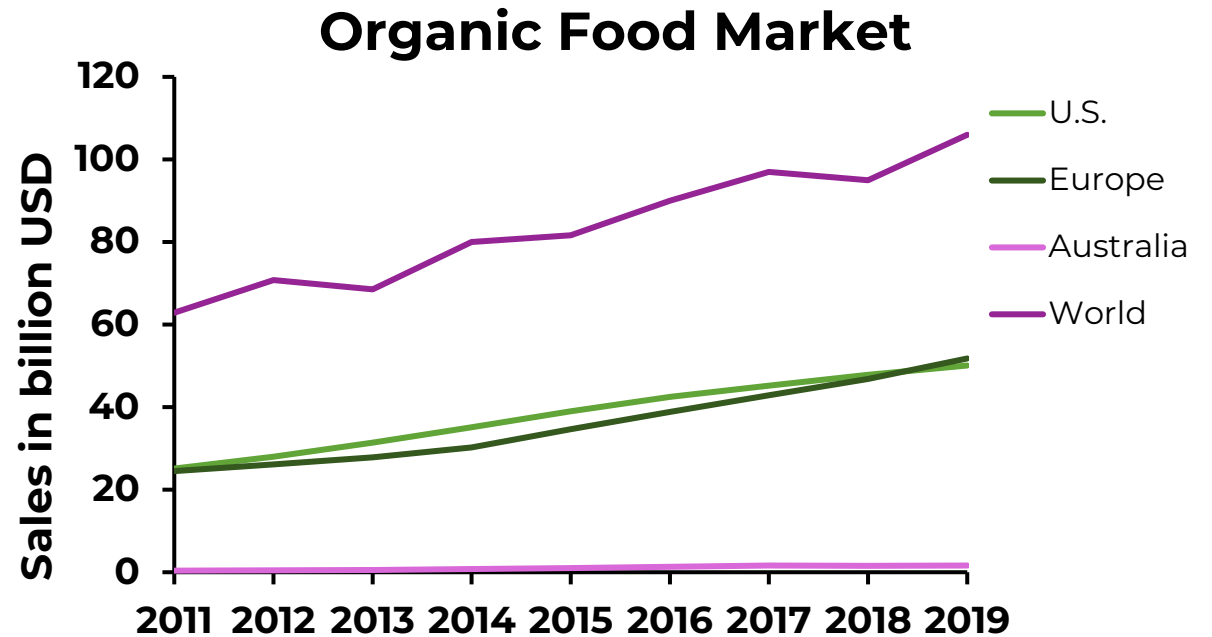
Policies and reporting advances



Clean label and product certifications



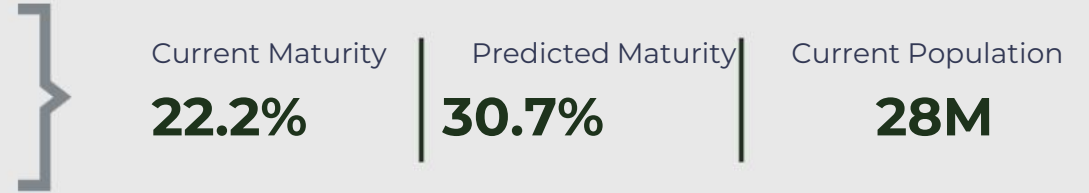
Consumer demand for organic is growing



- North America is dominant with 42% market share.
- Organic food, led by fruits and vegetables, will lead the market with more than 90% share by 2027.
- The modern retail segment is set to grow at 12% compound annual growth rate by 2022 to 2027.

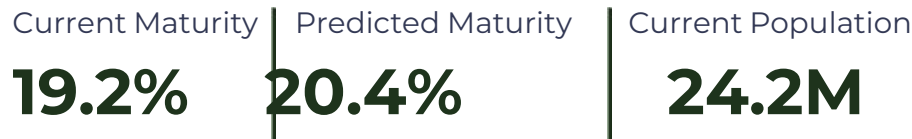
Research Topic: **Clean labels and ingredients**

They want to prove that their decisions are based on evidence. Life decisions for these people are made after gathering extensive amounts of data and executing a great deal of research. They believe that there is a “right” way to do things, which needs to be substantiated with empirical proof.



Tasting Real Food

Consumers associate "clean" and natural ingredients with superior taste and quality and believe artificial and processed ingredients detract from the enjoyment of food. They are willing to pay more for products with clear claims of whole, nutritious ingredients and prefer foods without artificial thickeners or preservatives.



Getting Essential Nutrients

Consumers believe clean-label foods should provide essential nutrients without excess sodium, sugar, and fat. They choose foods with natural ingredients to prevent diseases and improve health.



Digital agriculture connects CPGs to their supply chain more effectively

Extreme weather events will disrupt supply.

Increased input costs challenge livelihoods and product costs.

Policy changes create the need to monitor and evaluate supply chain impacts.

Consumers transition to desiring essential nutrients through simple ingredients.



There is a significant opportunity to enhance product value by building supply chain resilience moving from the grower outward.



Agenda

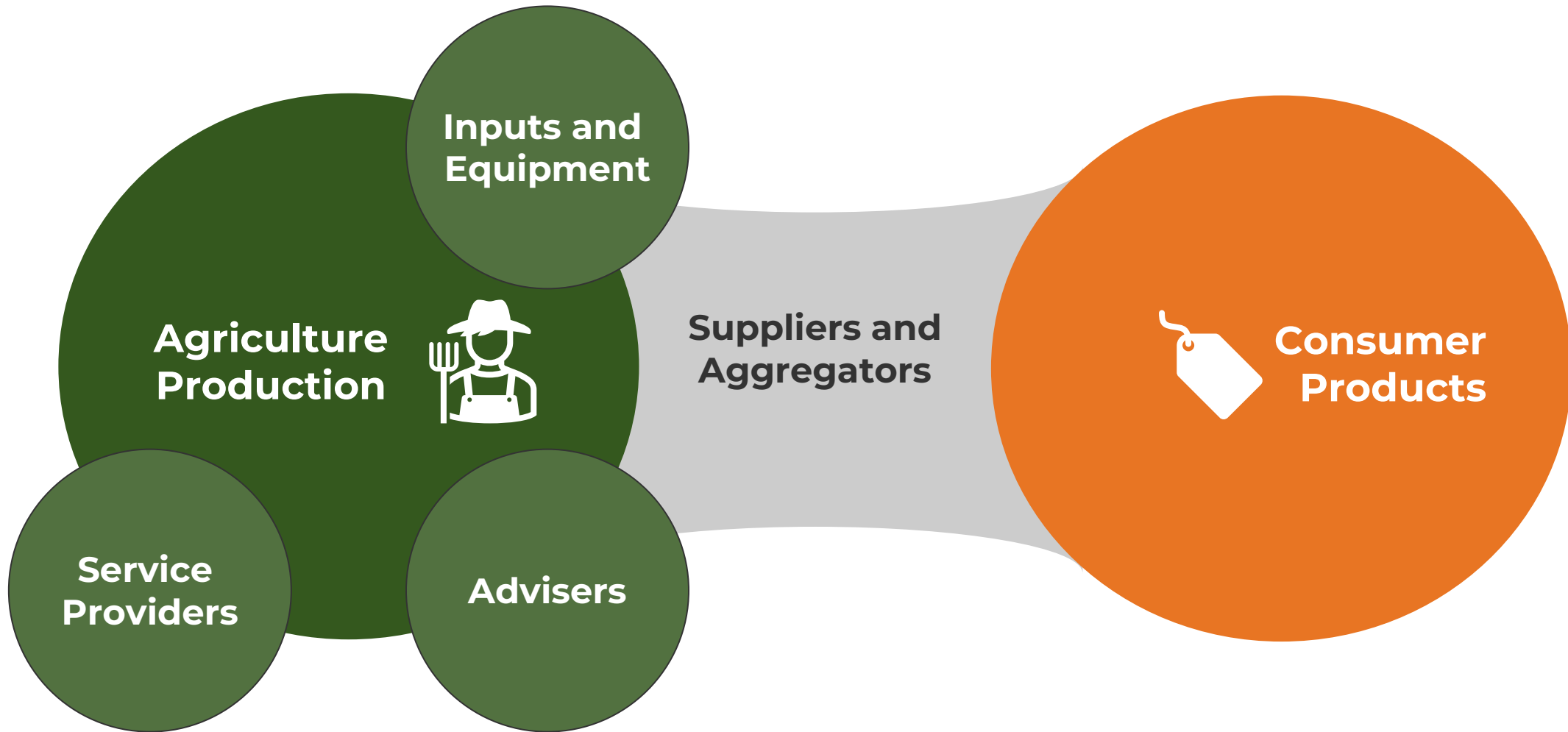
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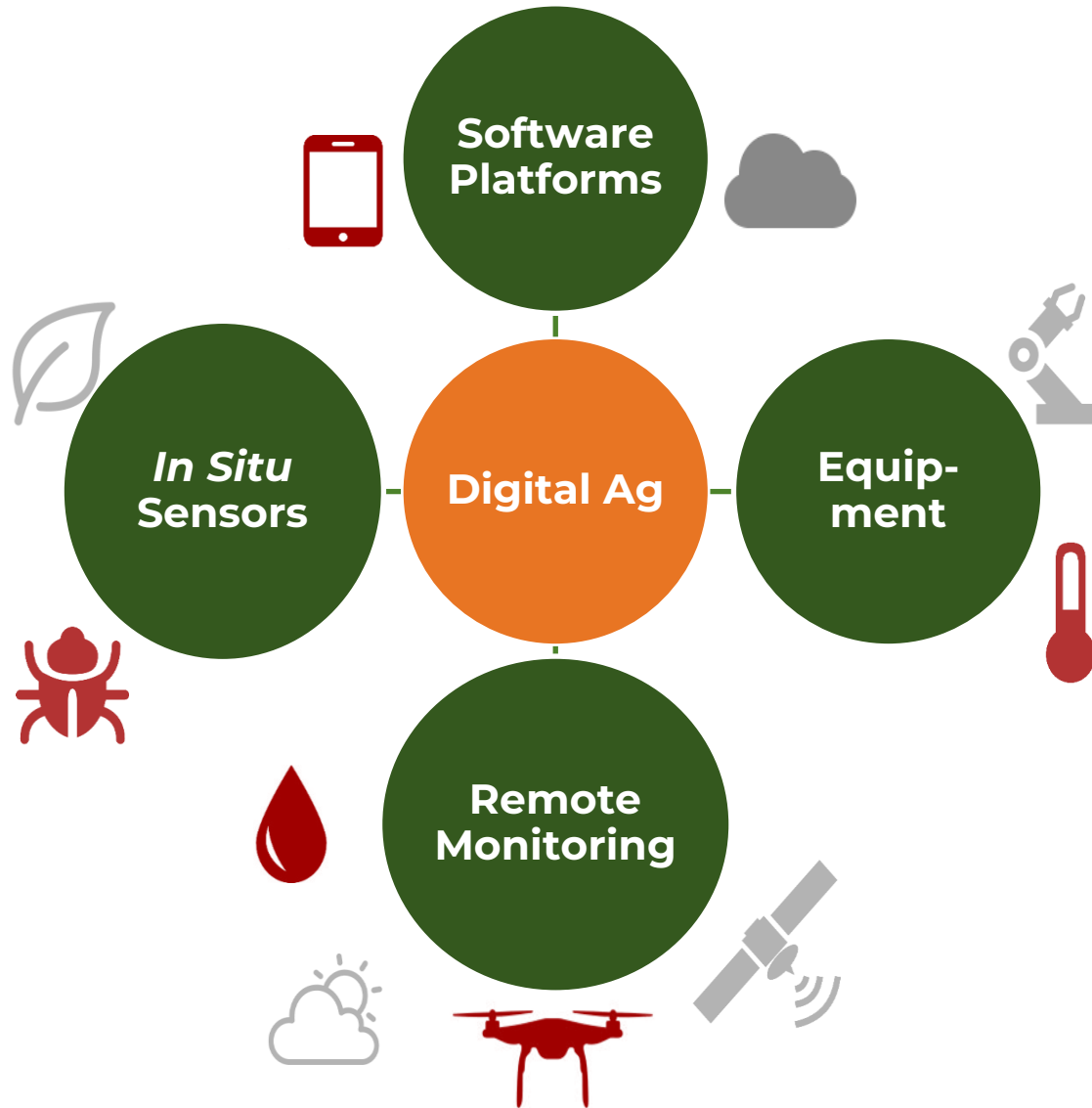
3 | What tech can make a difference today

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Complex relationships among stakeholders also complicate where and how to engage



Digital agriculture is an ecosystem of technologies



Software platforms: Data aggregation, farm management, transactions/trading, and asset tracking/traceability.

Equipment: Precision application and automated equipment that use machine vision and environmental sensing.

Remote monitoring: Satellite or aerial collected information of various spectral bands applied to scouting, phenotyping, and development of variable-rate-application maps.

In situ sensors: Weather, soil, plant, or pest and disease sensors providing near real-time information.

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Aligning on the needs of growers and CPGs

Growers

Yield

Maximize or reduce variation in yield per acre



Costs

Create short-term and long-term ROI



Resiliency

Reduce year-over-year production variation



CPGs

Availability

Prevent or minimize supply disruptions



Policy

Report on supply chain impacts



Sustainability

Decarbonize, optimize water use, and promote regeneration



Evaluating the needs of growers and CPGs

Growers

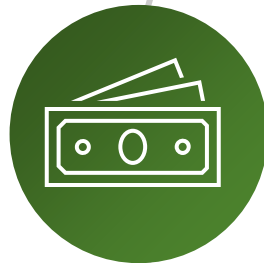
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Methodology

Ease of implementation

- Green – Technology is drop-in without experts required, and global solutions available
- Orange – Expert required for installation, and solutions available regionally
- Red – Highly skilled labor required, with few solutions

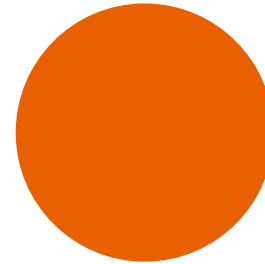
Impact on key need

- Large – Known and substantial direct impact on need
- Medium – Indirect impact or maintenance of current state
- Small – No observable impact

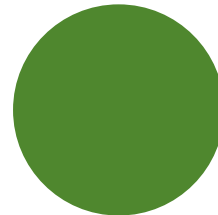
Growers



Yield

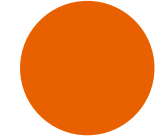


Costs

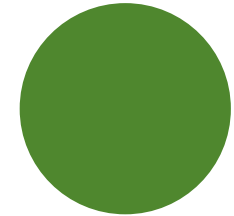


Resiliency

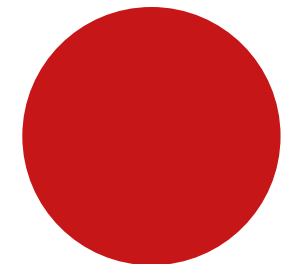
CPGs



Availability



Policy



Sustainability



**Sample
assessment**

Software platforms

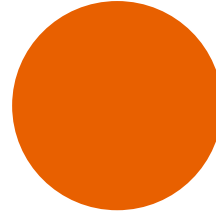
Accessible technology and aligned impact create opportunity for CPGs.



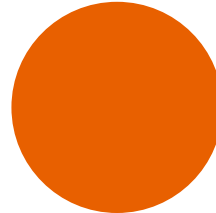
Software platforms enable data connection, especially for understanding resiliency, availability, and sustainability metrics.

Connecting to policy remains a challenge given local and regional complexity.

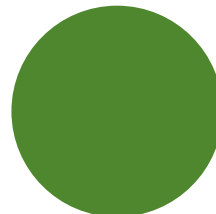
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Yield



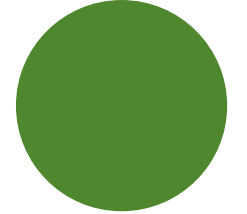
Costs



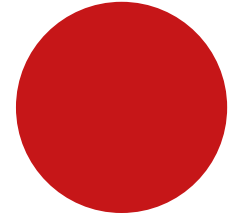
Resiliency



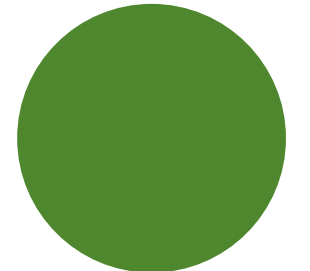
CPGs



Availability



Policy



Sustainability

General Mills partnering with Regrow on Scope 3 emissions

Joining hands along with Quantis and Regrow

- Scaling data collection and analysis methodology for Scope 3 emissions.
- General Mills aim to reduce greenhouse gas emissions by 30% across its value chain by 2030 to achieve its net-zero emission mission by 2050.



Align strong modelling with on the ground expertise to hit sustainability monitoring goals on time. Regrow's models are applied broadly with those connected to agriculture, including Cargill, for monitoring, measurement, reporting, and verifying (MMRV) use cases.



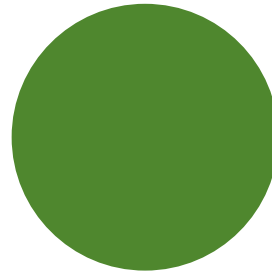
Equipment

Precision equipment is hard to support, but adoption impacts sustainability and yield.

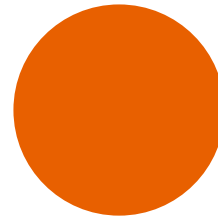


The use of precision equipment is advancing, with strong connections between economic and sustainability objectives. Influence requires partnership with an OEM.

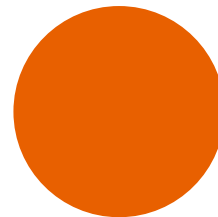
Growers



Yield



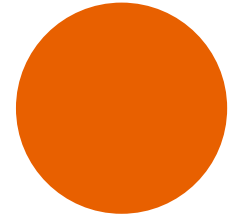
Costs



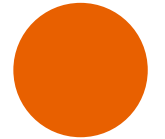
Resiliency



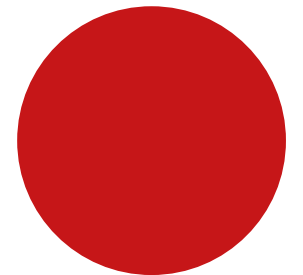
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Sustainability

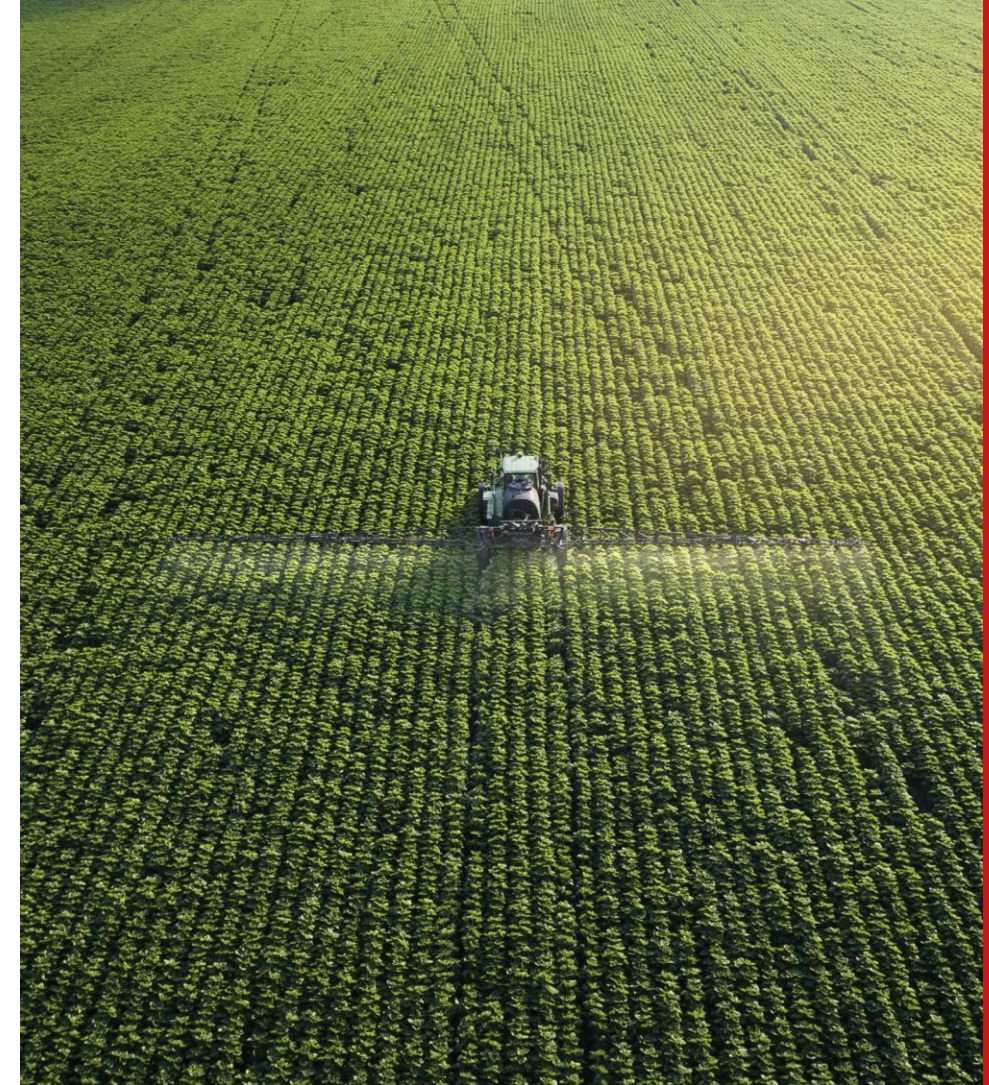
Partnerships with OEMs currently stop at the aggregator or co-op level

Building equipment-captured information into sustainability measurement, reporting, and verification

- John Deere uses data captured during equipment use and its Operations Center to document applied practices.
- Accurate data input remains a key bottleneck for growers during transitions to new practices or to generate voluntary credits.



It remains difficult for CPGs to engage with OEMs directly, but there is a clear opportunity to improve adoption of new technologies through incentivization programs for precision application technologies or by using the software aligned to equipment use.



Cargill RegenConnect

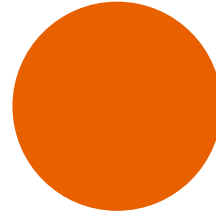
Remote monitoring

Remote monitoring is a primary source of information that can be fit to specific needs.

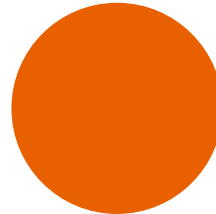


Remote monitoring serves as a bridge between advanced agricultural practices and supply chain information requirements.

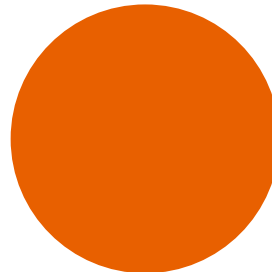
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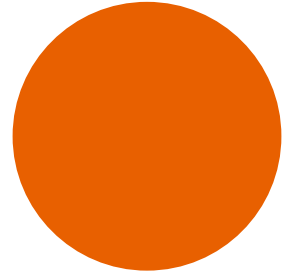
Costs



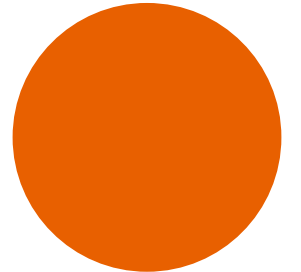
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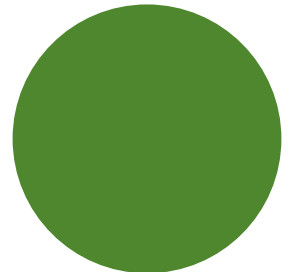
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Sustainability

McCain Food acquires Presia Ag to strengthen its supply chain

Driving innovation for McCain by acquisition

- Presia's technology is satellite-based, data-driven intelligence that helps farmers better evaluate and predict crop yields, optimize harvest timing, and enhance on-farm sustainability practices. Presia's sole focus is on potato crops.
- McCain purchased predictive crop intelligence technology from Resson in 2022 after a nine-year partnership.



This acquisition is one of many for CPG companies that helps them use digital technologies to better understand production and make their supply chain resilient.



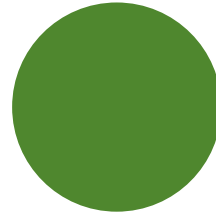
In situ monitoring

In situ monitoring can ground truth models and reduce year-to-year yield variation.

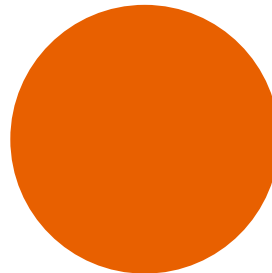


Beyond weather, pests, and soil nutrition, *in situ* monitoring improves the certainty of carbon monitoring for MMRV. CPGs need partners capable of monitoring or ground-truthing field scale measurements.

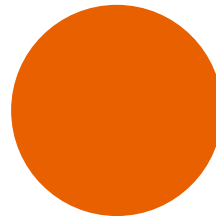
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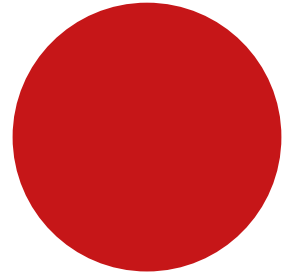
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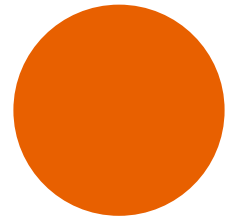
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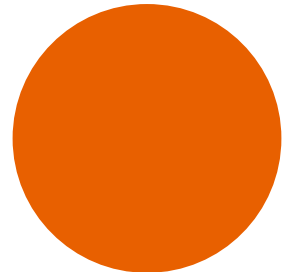
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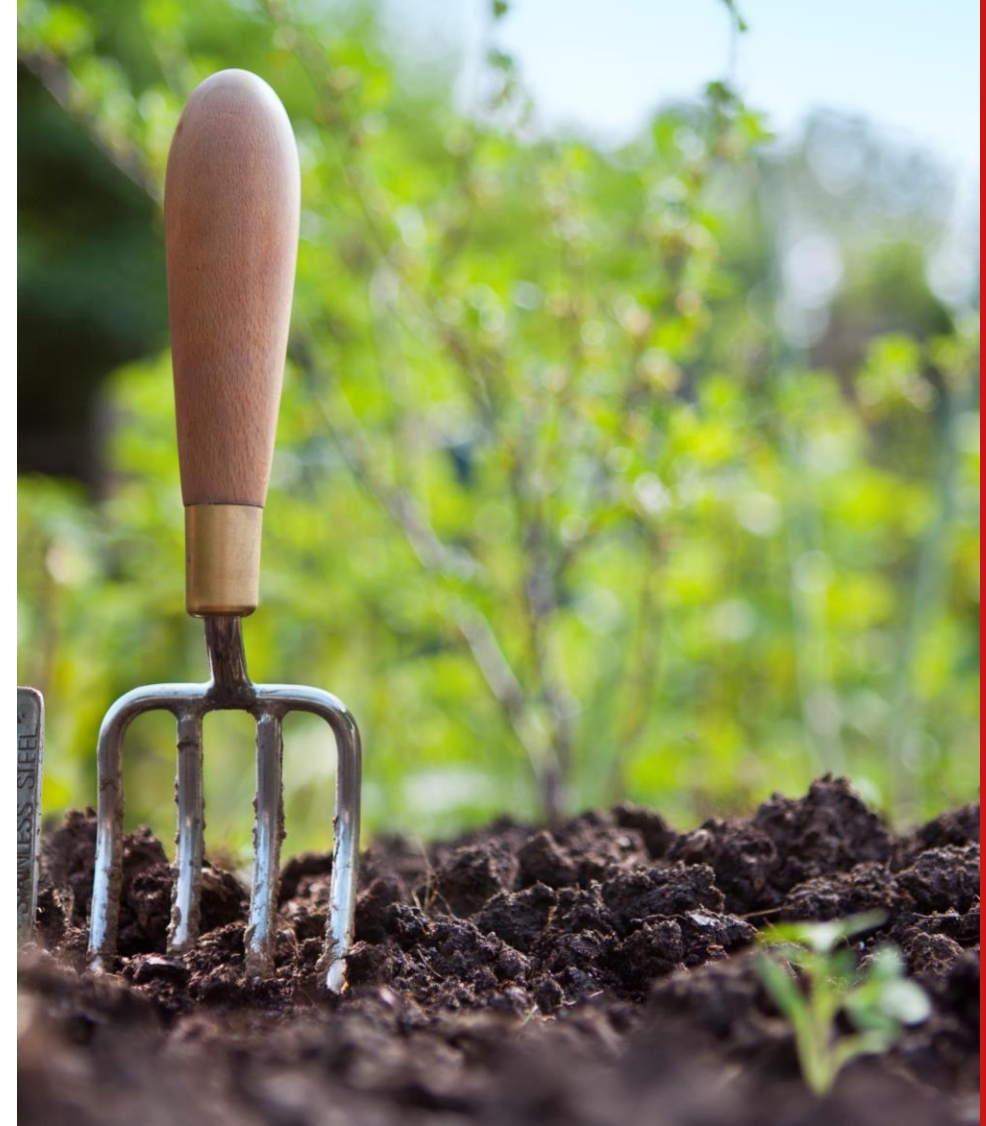
Rapid, agile, and scalable tech is seeing integration with microbiome analyses

In-field sensors offer clear optimization potential

- From water to nitrogen to carbon, companies have emerged that are simplifying sampling and ground truthing.
- Partnerships are underway to connect physical, chemical, and biological soil data.
- Trace Genomics and Earth Optics will collaborate on improving the resolution and ease of MMRV.



The connection of data provided by *in situ* sensing systems is most prominent for reduced water use, but there is a clear and emerging opportunity to communicate how agricultural practices affect soil health parameters tied to CPG sustainability targets.



Agenda

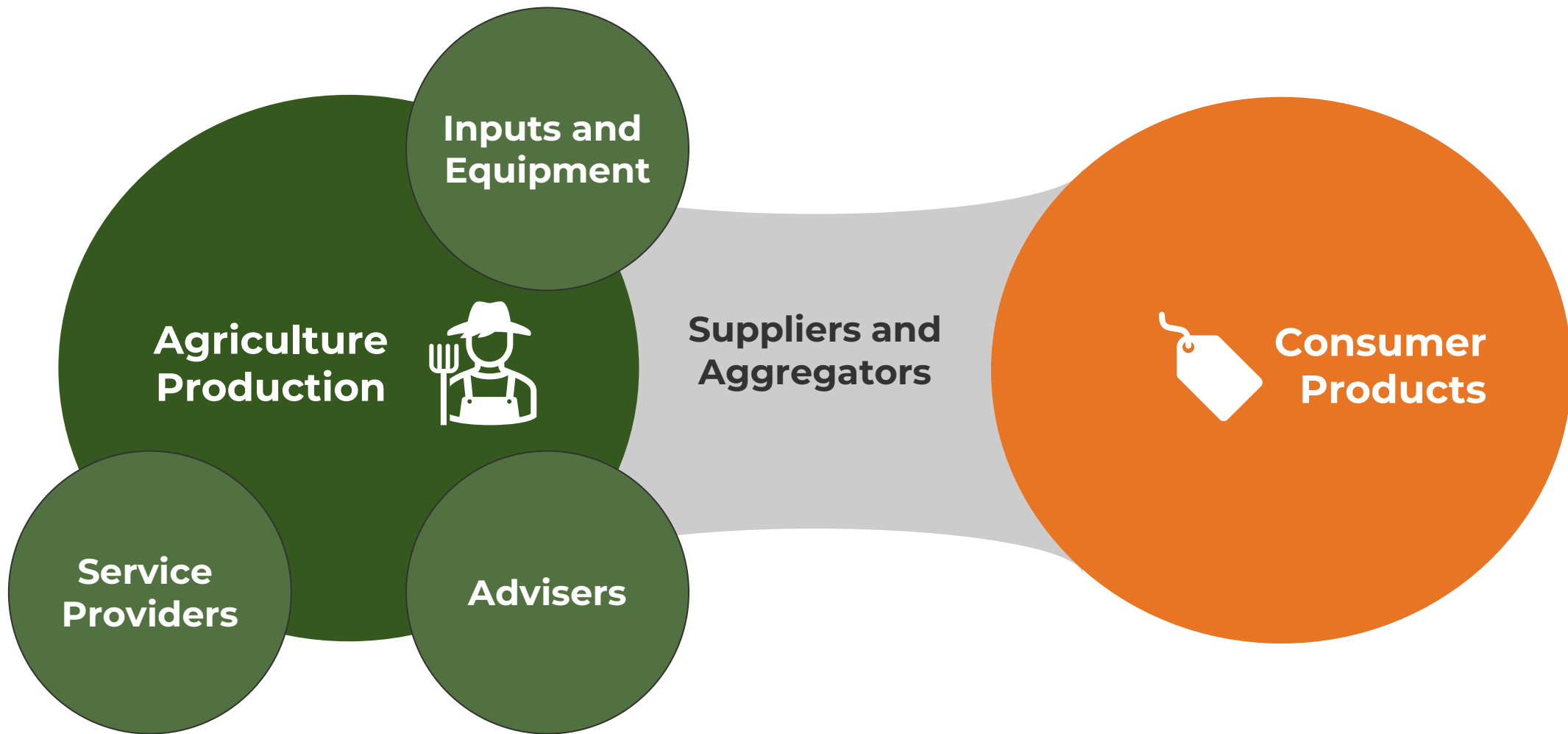
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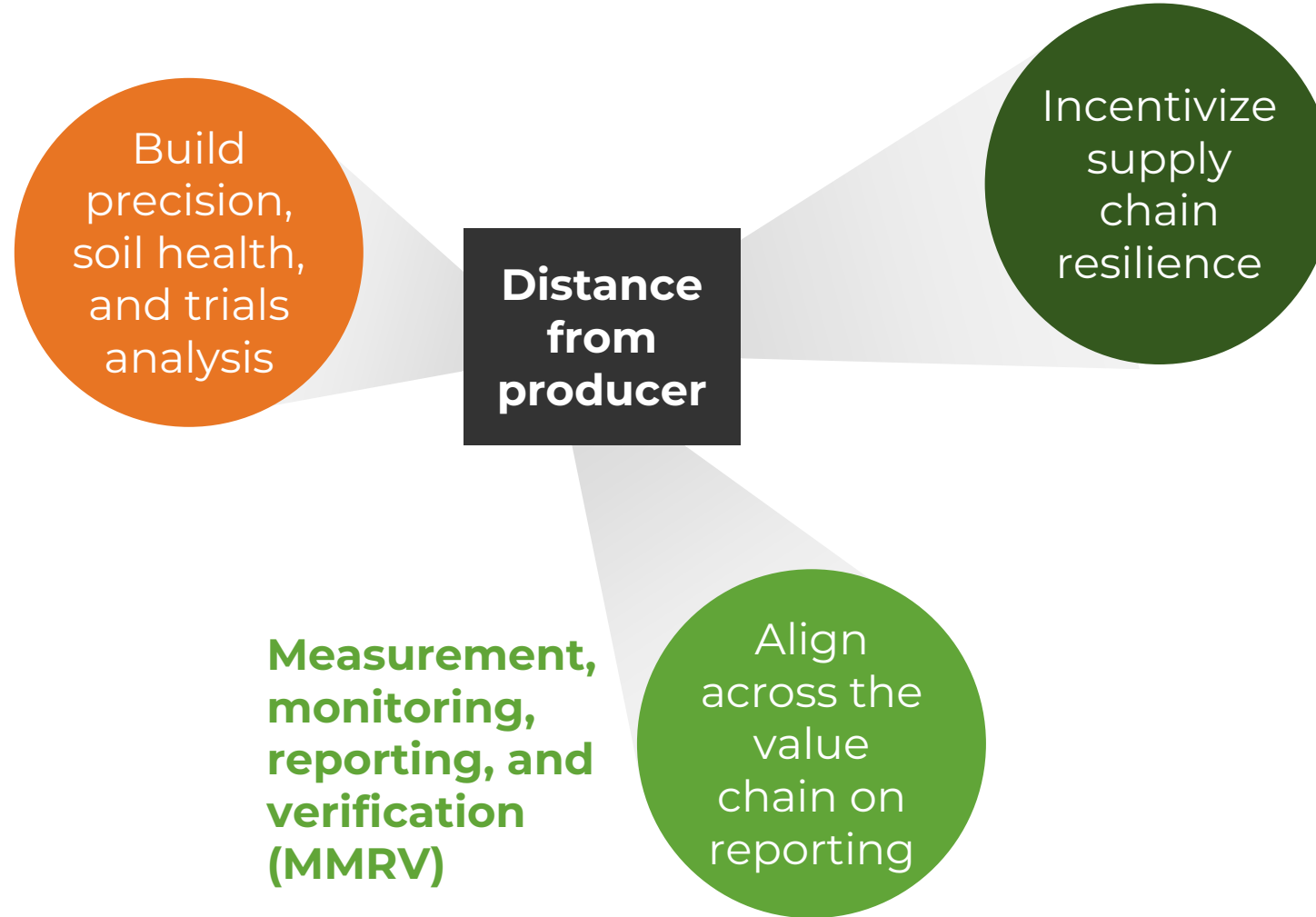
Sustainability

Decarbonize, optimize water use, and promote regeneration



3 options emerge, and all options connect to resilience

Numerous solutions are available but are challenged by implementation and realignment of insight to CPG needs



Finance or support education on use of technologies that build resilience

Key Takeaways

- 1** Digital technologies are available that can have a direct impact on short-term and long-term opportunities.
- 2** Consolidation of capabilities to expand from growers to CPG is underway.
- 3** Success requires a mix of direct interaction with software platforms and a willingness to support adoption of other technologies for those farther from the grower.

Thank you

A link of the webinar recording will be emailed within 24–48 hours.

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