



# Wells Fargo Innovation Incubator (IN<sup>2</sup>) Webinar Series

*June 23, 2020*



# Agenda

## Welcome from IN<sup>2</sup>

- Trish Cozart, IN<sup>2</sup> Program Manager, NREL

## Sustainable Agriculture Trends

- Chris Sworder, Associate, Agriculture & Food, Cleantech Group
- Anthony Deorsey, Consultant, Cleantech Group
- Todd Allmendinger, Director of Consulting & Research, Cleantech Group

# About the Wells Fargo Innovation Incubator (IN<sup>2</sup>)

Launched in 2014 with an initial \$10 million commitment by the Wells Fargo Foundation, and expanded in 2017, the Wells Fargo Innovation Incubator (IN<sup>2</sup>) is now a **\$30 million program** supporting innovative technologies and innovators. The program is managed and run out of the National Renewable Energy Laboratory (NREL).

IN<sup>2</sup> provides technical assistance that leverages the capabilities, facilities, equipment and the deep expertise that exists at NREL and the Donald Danforth Plant Science Center to help companies **de-risk technologies and ease their path to market adoption and deployment**. IN<sup>2</sup> also fosters the cleantech ecosystem through our Channel Partner awards program.



Technology Incubator



Channel Partner Awards Program

# Cleantech Group Award for 2020 Technology Briefing Series

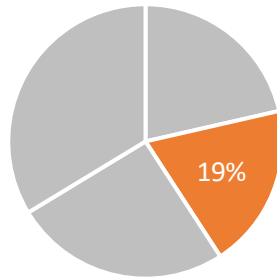
- Define the value chains, business activities and relate the trends to stakeholders and portfolio companies
- Geographic focus in North America
- Focused on the technology sectors of IN<sup>2</sup>





# IN<sup>2</sup> Focus Areas

## COMMERCIAL BUILDINGS



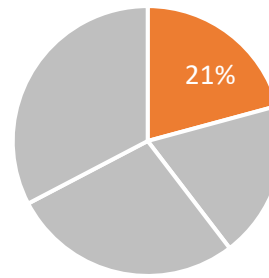
Consumes 19% of the U.S. energy



Buildings responsible for 40% global GHG emissions

- Data Infrastructure
- Energy Analysis
- Energy Management
- Energy Storage
- HVAC Systems
- Smart Glass
- Water

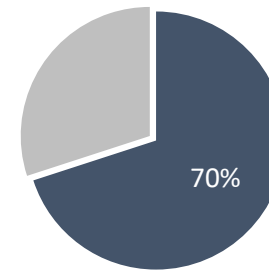
## HOUSING



Consumes 21% of U.S. energy

- Advanced manufacturing & construction process
- Materials
- Community and district-level technology and planning tools
- Energy-efficient technologies

## AGRICULTURE



Consume 70% of world's water supply and 14% of energy



24% global GHG emissions

- Crop Production
- Plant Science
- Precision Agriculture

# Briefings Schedule

April	<u>Macro Trends &amp; Overviews</u>
May	<u>Commercial Buildings</u>
June 23 <sup>rd</sup>	Sustainable Agriculture
Sept 15 <sup>th</sup>	Housing

# Briefing

## *Sustainable Agriculture*

23 June 2020



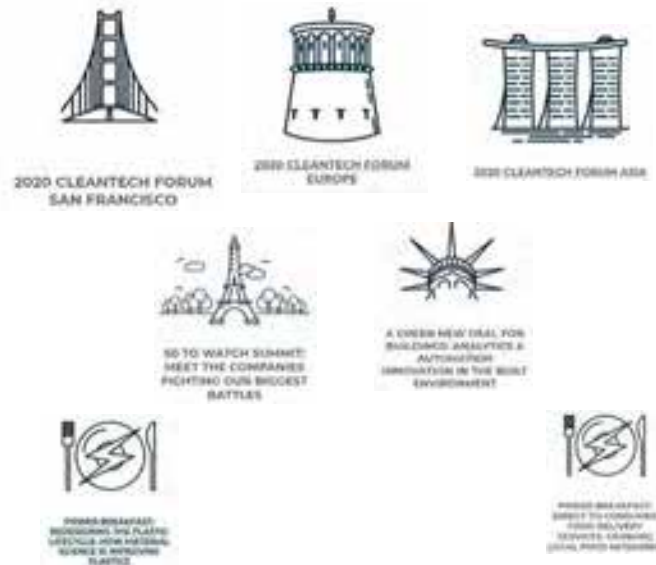
# Cleantech Group: Introduction

*Our research, consulting and events catalyze opportunities for sustainable growth powered by innovation.*



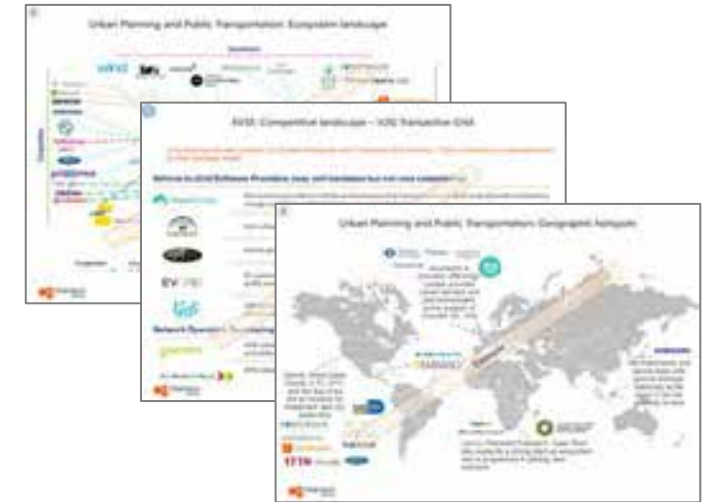
## Research

Markets change. Companies evolve. Our research delivers the insight you need to stay ahead of the trends. For deep dives into the market, our expert analysts publish Sector Insights, Investment Insights and provide customized briefings.



## Events

Engage with industry leaders and innovators from across the breadth of the global sustainable innovation ecosystem. Find capital, advisors, partners and co-investors at our international events. In person events or through Cleantech Interactive - a single platform that will introduce you to an entire community every month.



## Consulting

Build strategies to engage external innovation and thrive as your industry transforms. We'll help you set priorities and determine where and how to find the partners and investment opportunities that take your business forward.



# Sustainable Innovation is our focus



**AGRICULTURE  
& FOOD**



**ENERGY  
& POWER**



**MATERIALS  
& CHEMICALS**



**RESOURCES &  
ENVIRONMENT**



**TRANSPORTATION  
& LOGISTICS**



Enabling technologies, Business models and Themes



# Our research methodology

We help corporate strategy teams, investors and innovators identify, evaluate and connect with the best of global innovation

## Inputs

### Secondary Information



#### Public Data

Public news, reports, data  
Global web crawling

### Primary Information



#### Start-up interviews

Business model  
Traction  
Partnerships



#### Proprietary Information

Ecosystem interviews  
Boards and roundtables  
CTG events insights

## Resources

### Proprietary database



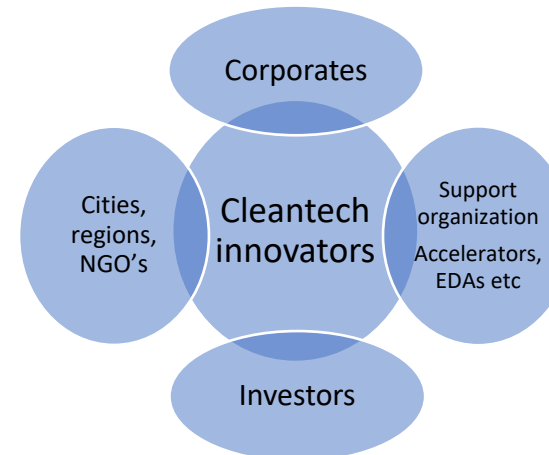
30k+ companies  
20k+ rounds  
21k partnerships  
4k M&A events



### Experienced Analysts



### Established ecosystem relationship



## Market Intelligence

- **Innovation:** business model and/or technology – creating or capturing new sources of value
- **Opportunities and disruption:** from business activities all the-way up to and across whole industrial sectors
- **Companies:** what are innovative companies doing? how do they make money? how do they compete and differentiate themselves?
- **Where to watch:** for new sources of innovation
- **Who** is funding, investing, partnering to grow and commercialize innovative companies



Chris Sworder, Lead Analyst, Agriculture & Food

# Sustainable Agriculture

## » Overview

Business Activity

Circular Economy

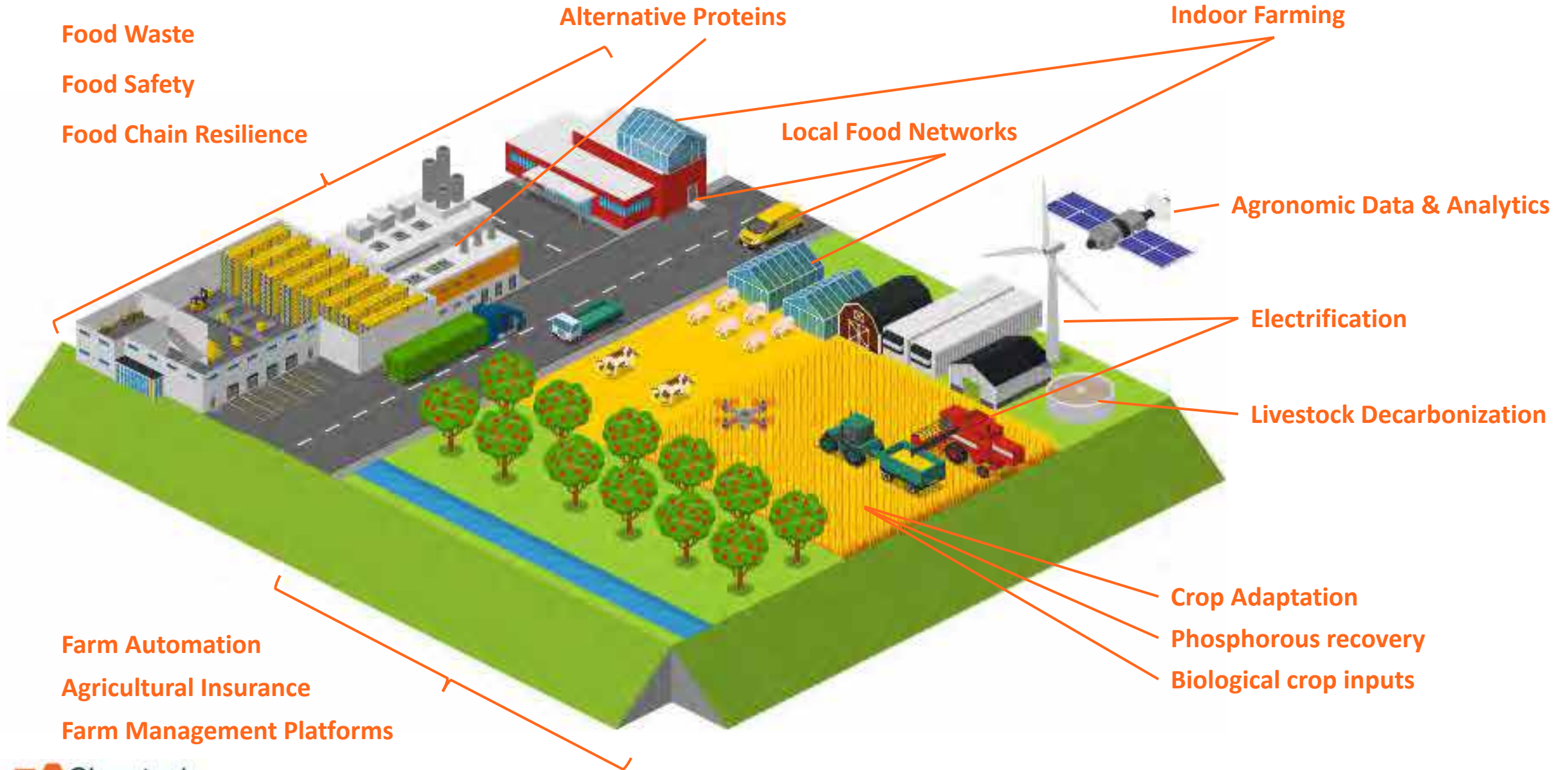
Decarbonization & Electrification

Cities & Urbanization

Digitalization, Decentralization, Automation

Resilience

# Sustainable Agriculture

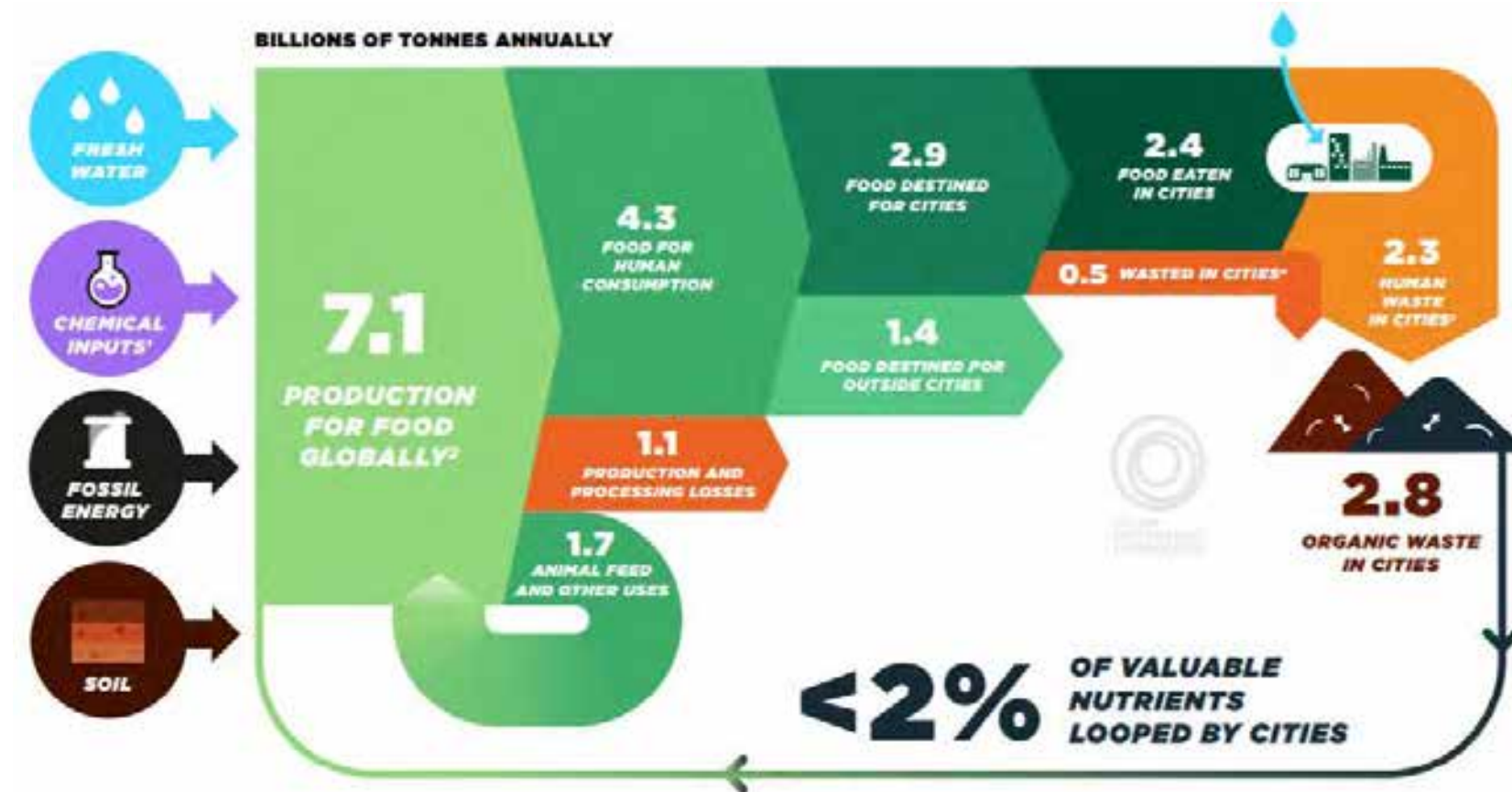




## Increase water, land and resource efficiency

## Consumer awareness/choices

## Regenerative agriculture



Source: McArthur Foundation

# Challenges

Environmental benefit vs. yield increases

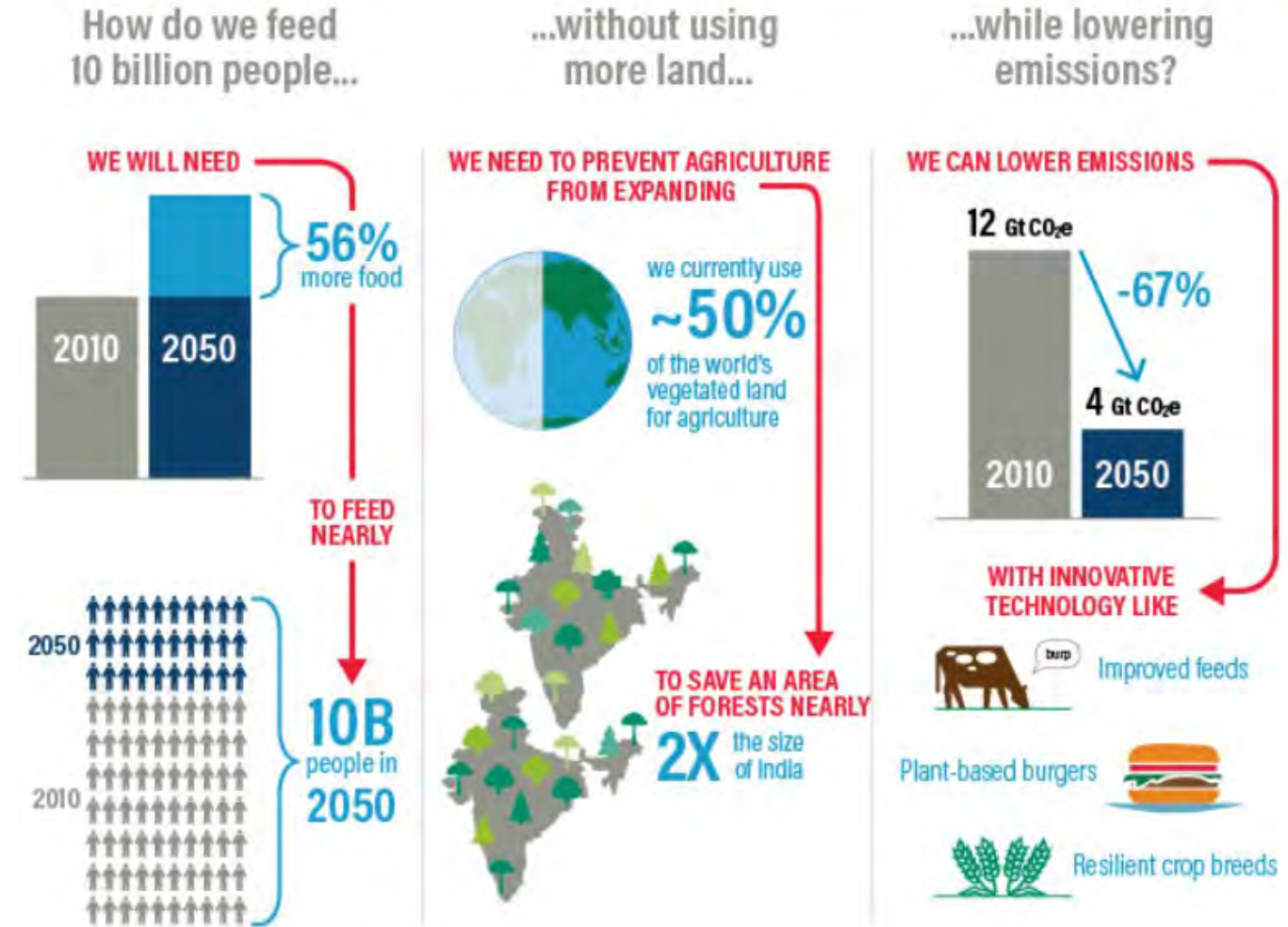
Population urbanization

Agricultural labor crisis

Rural connectivity

Slow technology adoption rates

## CREATING A SUSTAINABLE FOOD FUTURE BY 2050



Source: World Resources Institute

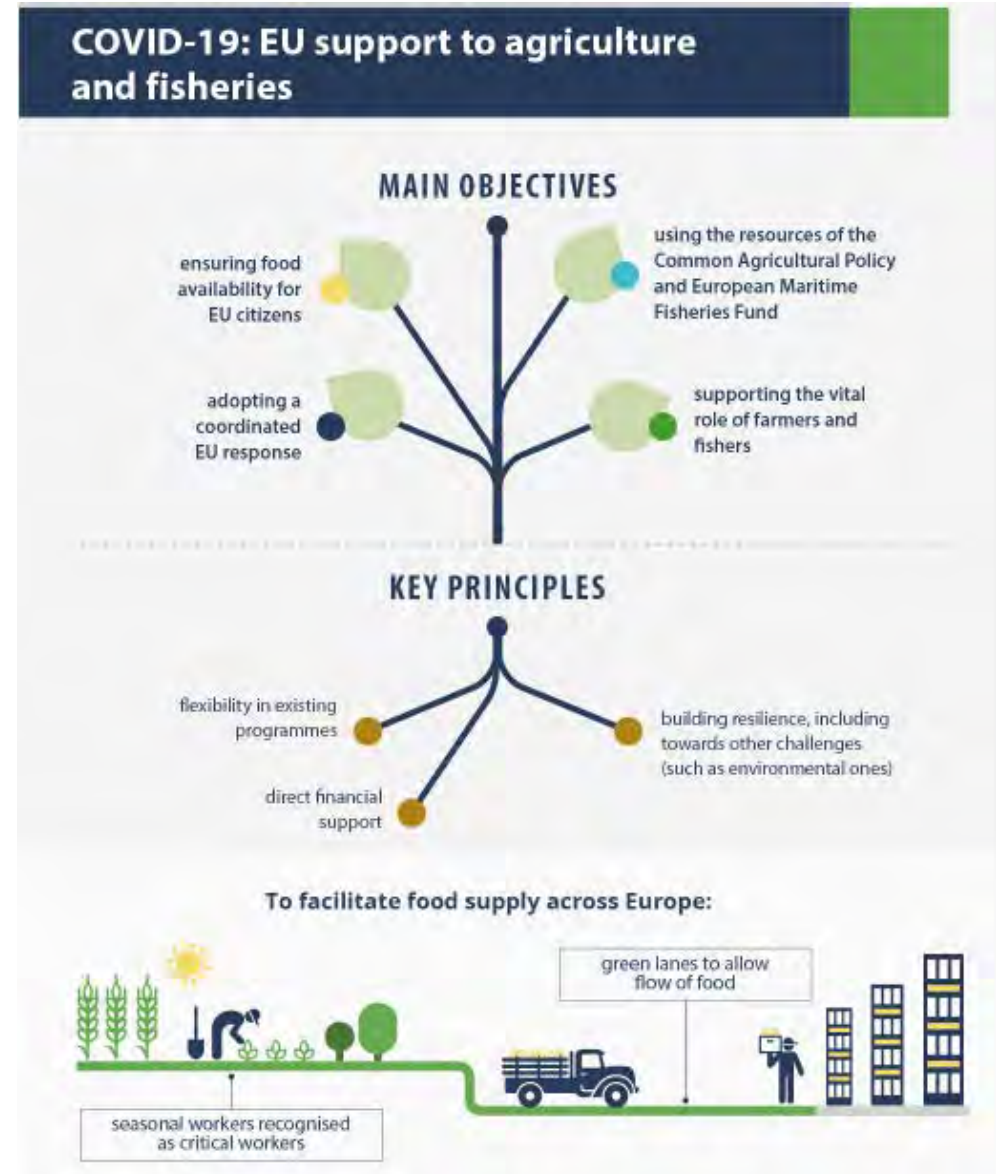
# Covid-19: Sustainable Agriculture Impacts

Supply chain resilience tested

Food service industry disruption

Harvesting capacity unpredictability

Food security in the spotlight



Source: European Commission



# Sustainable Agriculture: Business activities across the value chain



# Sustainable Agriculture *Five Macro Trends*





# Sustainable Agriculture

*Business activities for deep dives*



# Sustainable Agriculture



Overview

 Business Activity

**Circular Economy**

Decarbonization & Electrification

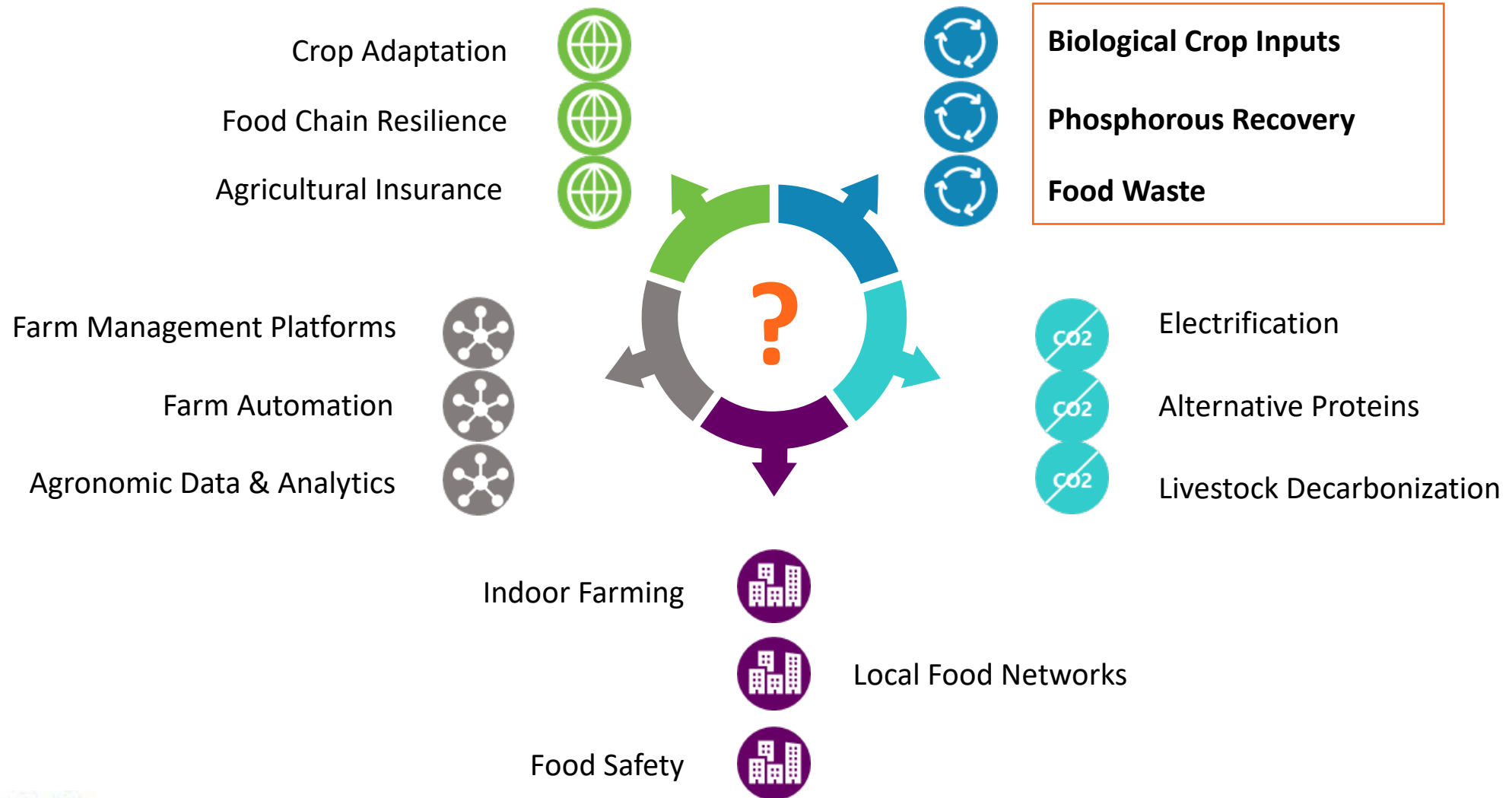
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# Sustainable Agriculture

*Business activities for deep dives*



# Biological Crop Inputs



## Description

- Developing non-chemical crop inputs
- Development of biological fertilizers, pesticides, and herbicides

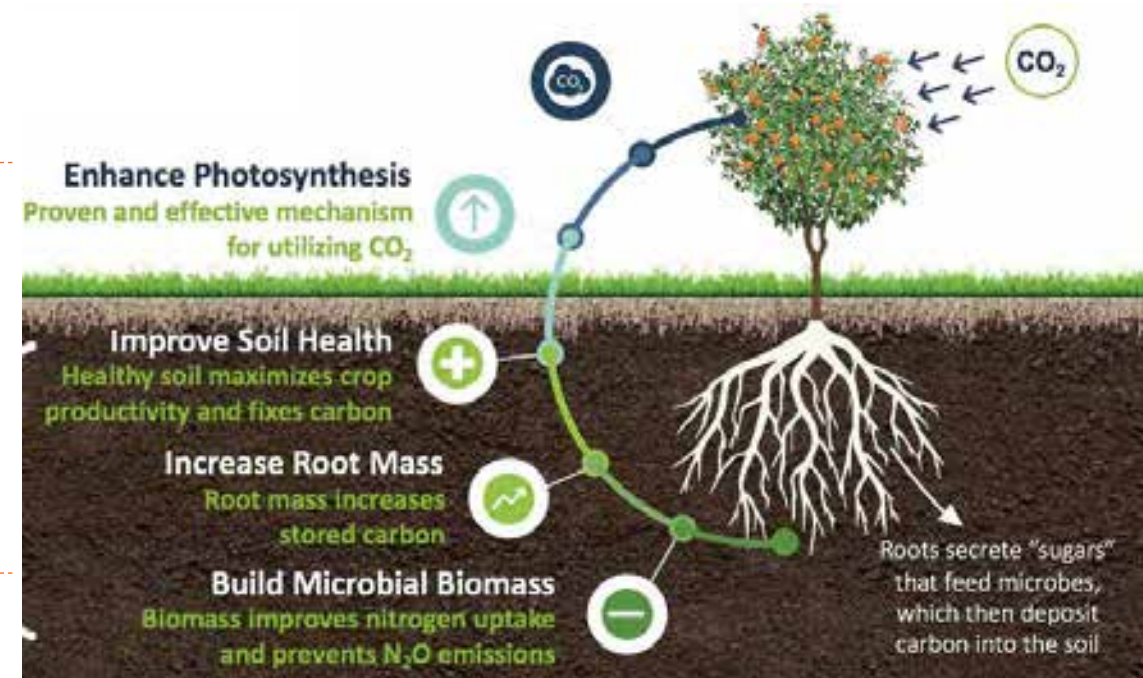
## Trends

- Enabling nitrogen fixation in rice, wheat, and maize
- Developing new modes of action for pesticides
- Increasing soil carbon content

## Opportunity for innovation

- High throughput microbe discovery
- Genetic engineering of beneficial microbes
- A new supply chain for biological products

## Biological Crop Inputs



Source: Locus Agricultural Solutions

## Biological Crop Inputs: Innovators and ecosystem



**Intrinsyx Bio (US)** – Developer of endophytic microbes used to fix nitrogen directly from the atmosphere in plants. Part of the THRIVE incubator in 2018.



**AgroSpheres (US)** – Developer of an encapsulation delivery system for microbial products. A portfolio company of the IN2 program since May 2020. \$4.5 million Series A investment from National Science Foundation and Ospraie Ag Science.



**Pluton BioSciences (US)** - Supplier of the agricultural industry with microbes that are specifically targeted at various pests. Recently acquired a lab in St Louis Microbe Inotech Laboratories. A portfolio company of the IN2 program since May 2020.



**Lavie Bio (Israel)** - Biological inputs including bio-stimulants, bio-pesticides, and plant nutrition products. Subsidiary of Israeli corporate Evogene, invested in by Corteva, which also exchanged all of the share of their subsidiary Taxon Biosciences into the new company to accelerate development.

### Investors



### Ecosystem







## Description

- Recovering phosphorous from wastewater streams
- Developing slow-release phosphorous fertilizer

## Trends

- Increasing focus on farm wastewater treatment
- Improvement of precision and slow-release phosphorous fertilizer products

## Opportunity for innovation

- Precision phosphorous fertilizer products
- Waste mining / urban mining
- Low grade phosphate rock extraction

## Phosphorous Recovery



Source: Veolia Water Technologies

# Phosphorous Recovery: Innovators and ecosystem



**Phospholutions (US)** – Working to recover phosphorous through improved nutrient release as fertilizer, mitigating nutrient load in aquatic systems, and environmental remediation. First product in market to improve nutrient retention in agricultural soil.



**Ostara (CAN)** – Phosphorous and nitrogen recovery from used water streams converted to fertilizer. Wide commercial deployment since 2005 founding. Recent announcements to scale up phosphorous treatment in response to growing demand.



**Anuvia Plant Nutrients (US)** – Developer of a bio-based product that accelerates natural bio-availability of phosphorous and nitrogen. Organic MaTRX™ process binds with nutrient ions to create a slow-release solution that feeds crops and the soil for increased production.



**NuReSys (BL)** – Producer of a technology that recovers phosphates and nitrogen from wastewater.

## Investors



1855 Capital



VANTAGE POINT  
CAPITAL PARTNERS

## Ecosystem





Description

- Prevention, recovery, and recycling of food waste

Trends

- Improving production accuracy
- Secondary markets for ugly and excess produce
- Increasing fresh produce shelf life
- Consumer pressure on wasteful retailers

Opportunity for innovation

- Food coatings and senescence blockers
- Demand forecasting, production optimization
- Upcycled products

## Food Waste



Source: ReFED



**Apeel Sciences (US)** - Organic, non-toxic food coatings which lengthen shelf-life and protect against pests. Beginning in avocados with Kroger, expanding into new categories and continents with \$250 million raise in May 2020.



**Full Harvest (US)** – Secondary market for ugly and excess fresh produce. Typically connects farmers and distributors with excess produce with food product manufacturers such as juice brands.



**Afresh Technologies (US)** - Intelligent forecasts and inventory planning for fresh produce. Thrive accelerator alumnus. Working with retail partners and expanding sales and marketing after \$6.1 million Series A in Sept. 2019.



**PeelPioneers (NL)** - Fruit peel processing technology to extract oils and produce livestock feed.

### Investors



### Ecosystem

URBAN-X



# Sustainable Agriculture



Overview

 Business Activity

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**Decarbonization & Electrification**

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Resilience



# Sustainable Agriculture

*Business activities for deep dives*



## Description

- Electrification of diesel farming machinery
- Solar-powering farm machinery & irrigation systems

## Trends

- Increasing use of smaller autonomous electric-powered robotics on farms
- As-a-service off-grid solar powered farm machinery business models

## Opportunity for innovation

- Battery cycling solutions to provide 24-hour operation
- Electrification of multi-purpose robots
- Robust, off-grid solar power and storage solutions

## Electrification



Source: John Deere