



# Controlled Environment Agriculture's Role In Delivering Hope for Food Production

May 2023

 accenture



# AGENDA

**01**

**Context**

**02**

**CEA Explained**

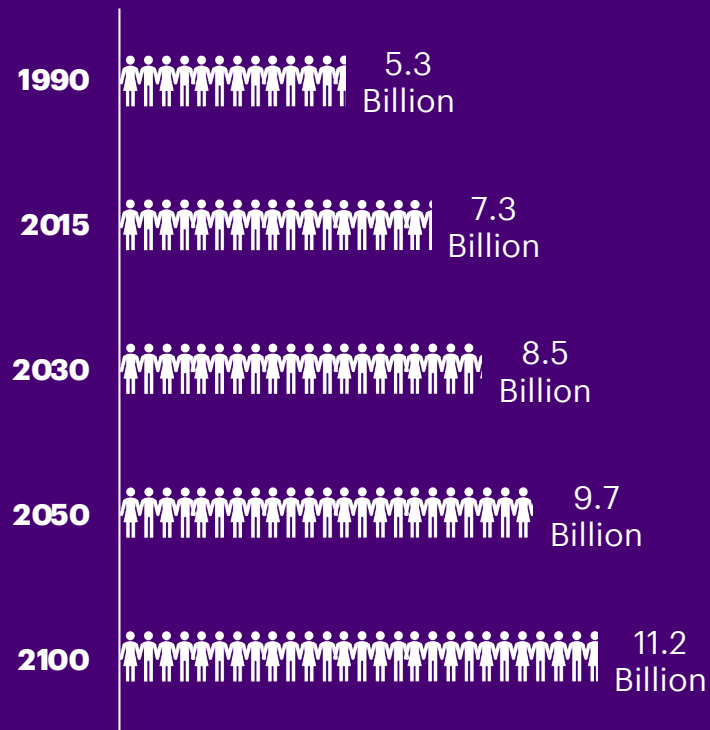
**03**

**Opportunities & Our POV**

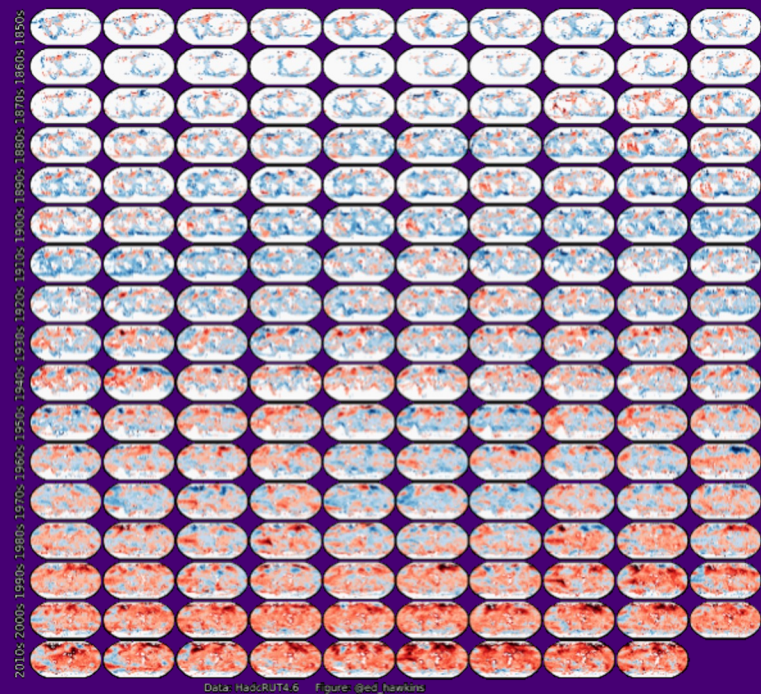


# Mankind faces unprecedented challenges to produce enough food.

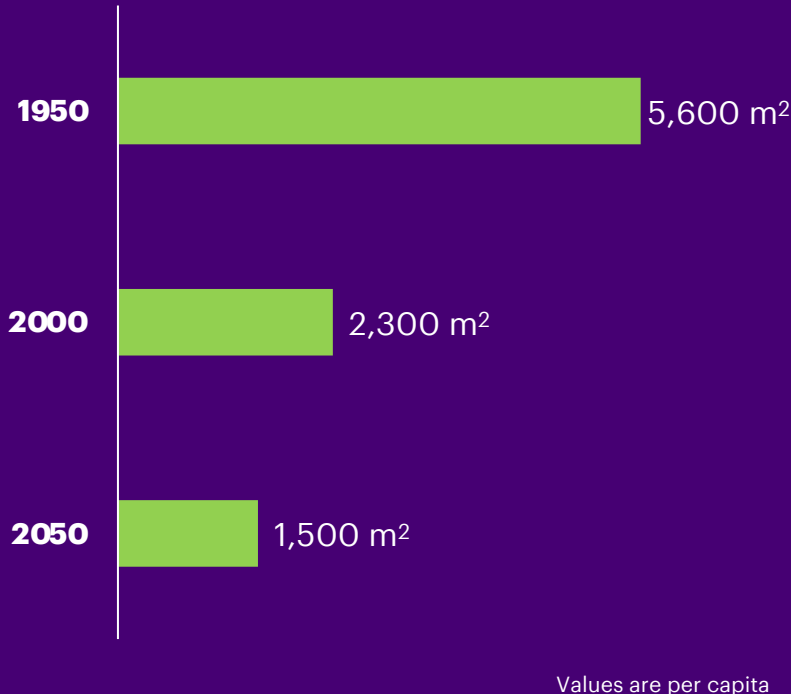
## The population is growing



## The climate is changing



## Arable land is decreasing



**Food production accounts for 26% of global greenhouse gas emissions and 70% of the world's freshwater is used for agriculture.**

Source: Accenture Research





# And Other Trends Are Driving Change



## CONSUMER DEMANDS

67% of customers expect companies to invest in long-term sustainable solutions, and 85% of customers are willing to pay more to get it



## SUSTAINABLE PRACTICES

Regulatory pressures continue to rise to demanding more sustainable practices and traceability

## SUPPLY CHAIN UNCERTAINTIES

Revenues and margins will be impacted by price volatility and supply chain uncertainties

## RELEVANCE & INNOVATION

90% of all executives believe their firms are under pressure to extend innovation

# Key Features of Controlled Environment Agriculture (CEA)

## Common Methods:

- Vertical Farming
- Green housing
- Aquaculture

**Environment:** Closed-loop agriculture geared to completely manage environmental conditions

**Grown Vertically:** Typically involves cultivating crops in efficient ways, like vertical stacked layers/shelves

**Nutrient Delivery:** Ability to automate/manage nutrient delivery

**Digitally Controlled:** Facility is completely controlled leveraging technology/automation.

**Lights:** Strategically placed and automatically managed light sources, typically LEDs.

**Optimized Genetics:** Ability to automate/manage nutrient delivery





# Fast Facts on Controlled Environment Agriculture



**75x**

Less farmland\*



**70%**

Less emissions

**95%**

Less water\*



**26**

**Crop turnovers per  
year** (vs 1 in traditional  
farming)

Yields up to  
**390X**

compared to  
traditional  
farming

**90%**

Less waste\*

**Minimal Use of  
Pesticides.**

Reduction of harmful  
crop protection due  
to controlled  
environments.



**Significantly less  
Food Illness**  
as a result of  
controlled growing  
environments



# But CEA Comes With Its Share of Challenges

Three main areas that CEA needs to overcome:



## HIGH ENERGY USAGE & CARBON FOOTPRINT\*

Farming 24/7, 365 days a takes intense energy usage and thus high carbon footprint



## LOW CROP DIVERSIFICATION

Formats is mostly limited to leafy greens, microgreens, and herbs, where economics is still favorable



## HIGH LABOR COSTS

Achieving an average of 390x more yield than traditional farming is also labor intensive



# Our POV in CEA

**CEA will be a viable option** to help combat food production challenges and drive sustainability **by as early as 2027\***

## Key inflection points:

### Falling Cost of Renewable Energy

- Solar to become cheapest source of new power by 2030 across US, Canada, China, India and 13 other nations

### Higher LED Efficiency

- LED lighting accounts for 50-60% of energy usage in VF
- Horticultural LED system efficiency expected to reach 70% in the next few years

### Advances in Plant Sciences & R&D

- CEA specific seed breeds can improve productivity, crop quality, crop diversity, and grow faster

### Use of Automation and AI/ML

- Use of hyper automation and robotics
- AI/ML, digital twin, other advances in manufacturing



**Cargill has already made investments develop a more resilient supply chains and supply of fresh foods from CEA**

## Cargill partners with AeroFarms for indoor grown cocoa

By Katy Askew

17-Aug-2021 - Last updated on 17-Aug-2021 at 16:25 GMT



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09-07-2021

**Local Bounti, Disruptive AgTech Company Redefining the Future of Farming, Announces Closing of \$200 Million Debt Financing Facility with Cargill to Accelerate Company's Expansion Plans**



Cargill eyes indoor farming for sustainable cocoa / Pic: Getty Image

**AEROFARMS**

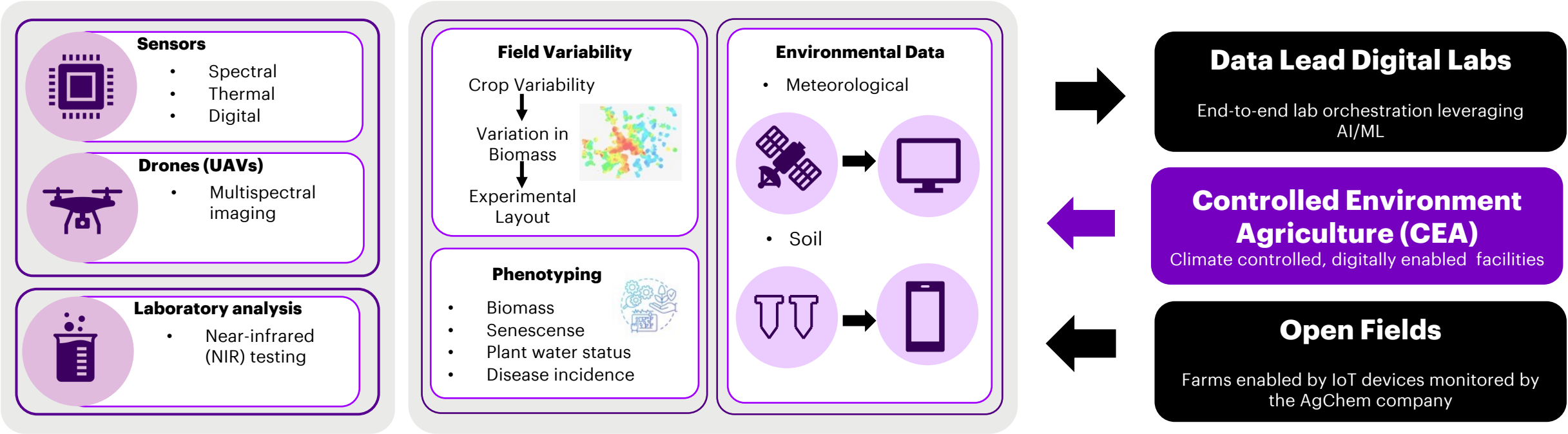
RELATED TAGS: vertical farming, Cargill








# CEA used to Accelerating product trials/R&D for Ag

Faster to market, potential to cut costs, and ability to delivery more sustainable products



## Sample Use Cases

|   |  |  |
|---|--|--|
|  <p><b>Utilize CEA for R&amp;D</b> of new corn varieties and <b>building an agtech tool to advance green house farming</b></p> |  <p><b>Unveils new modern glasshouse for R&amp;D</b> to drive faster introduction of new high-quality varieties of tomatoes</p> |  <p><b>Invested in CEA breeding center for vegetable innovations</b> in the Netherlands</p> |
|---|--|--|





# Our Work Spans Across All of Agriculture

Accenture delivers best in class solutions across the entire food value chain – from Seed to Table



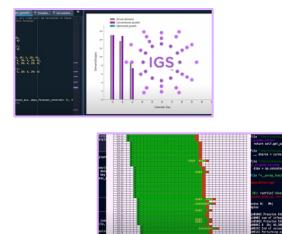
## Select Ag Partnerships



## Market Insights & Industry Point of Views



## Research Incubators (AI, ML, Quantum)



## Sustainability Accelerators in Ag



## Ag Innovation Centers



# Thank You

Read more here...

