AI-Enhanced Value Chain Efficiency for Plant Factories.

Yoshihisa Usami Director Farmship Inc.

FARMSHIP

Agenda

1. About Farmship
2. Global Agricultural Challenges
3. Environmentally Friendly Plant Factories
4. Increasing Efficiency in Agriculture Using AI
5. Future Prospects and Vision

1. About FARMSHIP

Company Name
Farmship Inc.

Start-up
Mar.2014
Established in Tokyo

Location
Head Office-Tokyo,
Laboratory-Shizuoka Pref.

Parent company
RYODEN CORPORATION

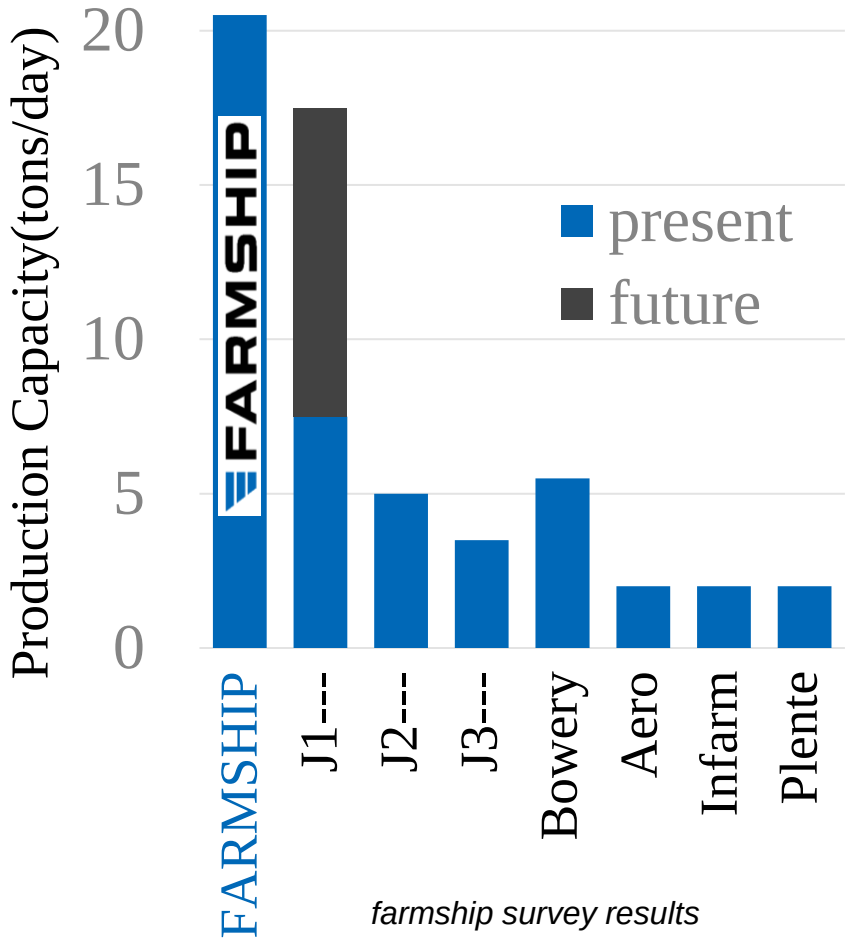
Group Companies
BlockFARM,inc.
PT. VERTICAL FARM INDONESIA

We build big plant factories and sell vegetables.

3 ton/day newest plant factory in Shizuoka, Japan

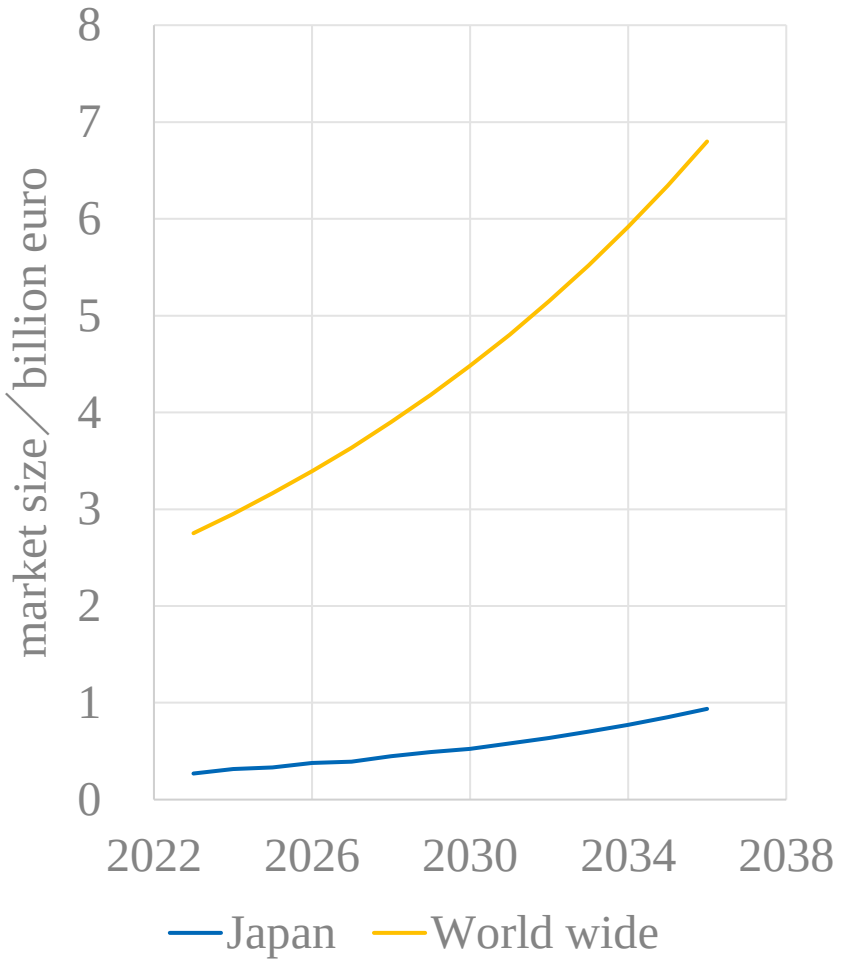
1. About FARMSHIP's Plant Factory Market

The largest plant factory capacity in the world launched by Farmship



farmship survey results

Plant Factory Market



Agenda

1. About Farmship

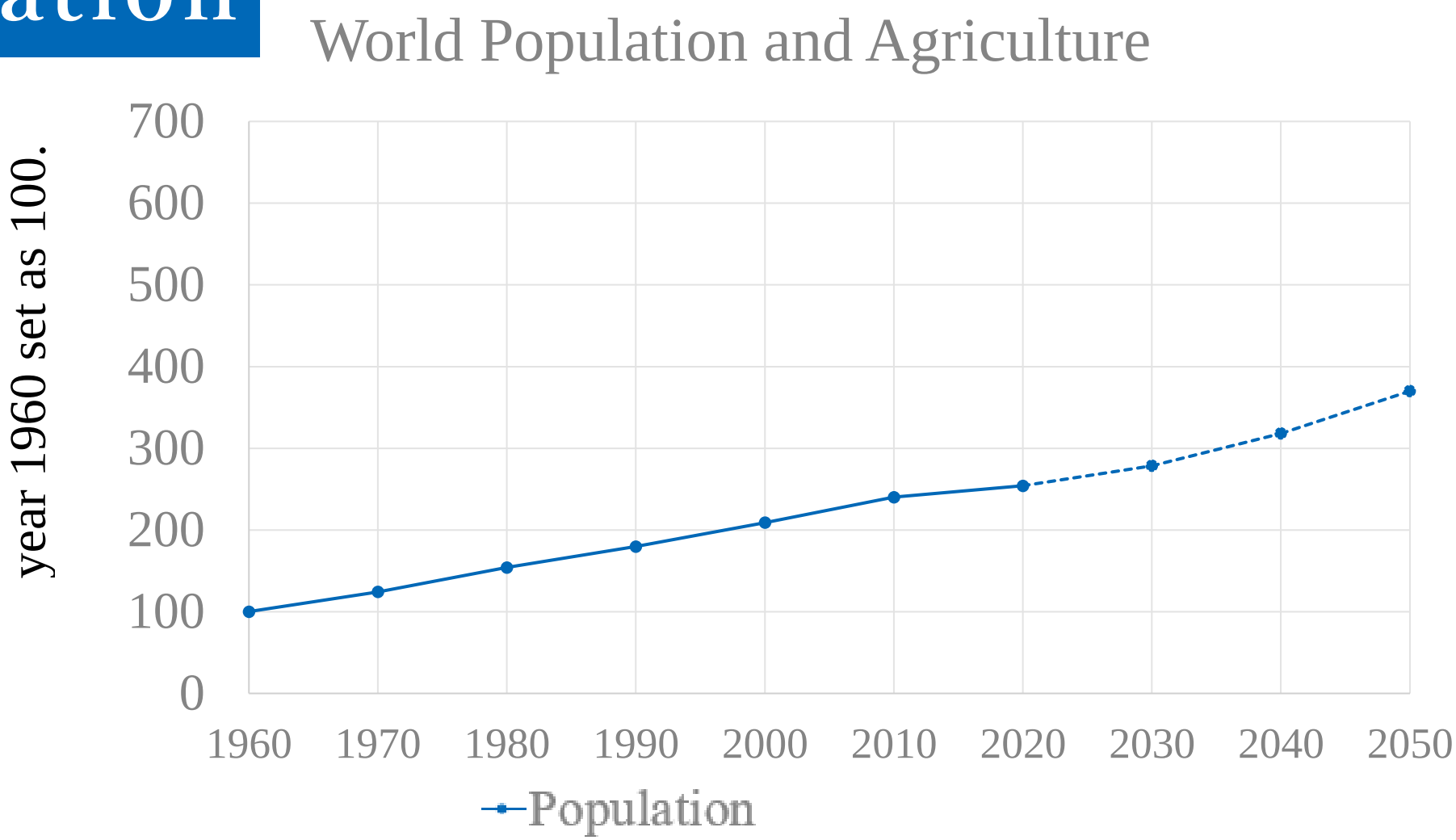
2. Global Agricultural Challenges

3. Environmentally Friendly Plant Factories

4. Increasing Efficiency in Agriculture Using AI

5. Future Prospects and Vision

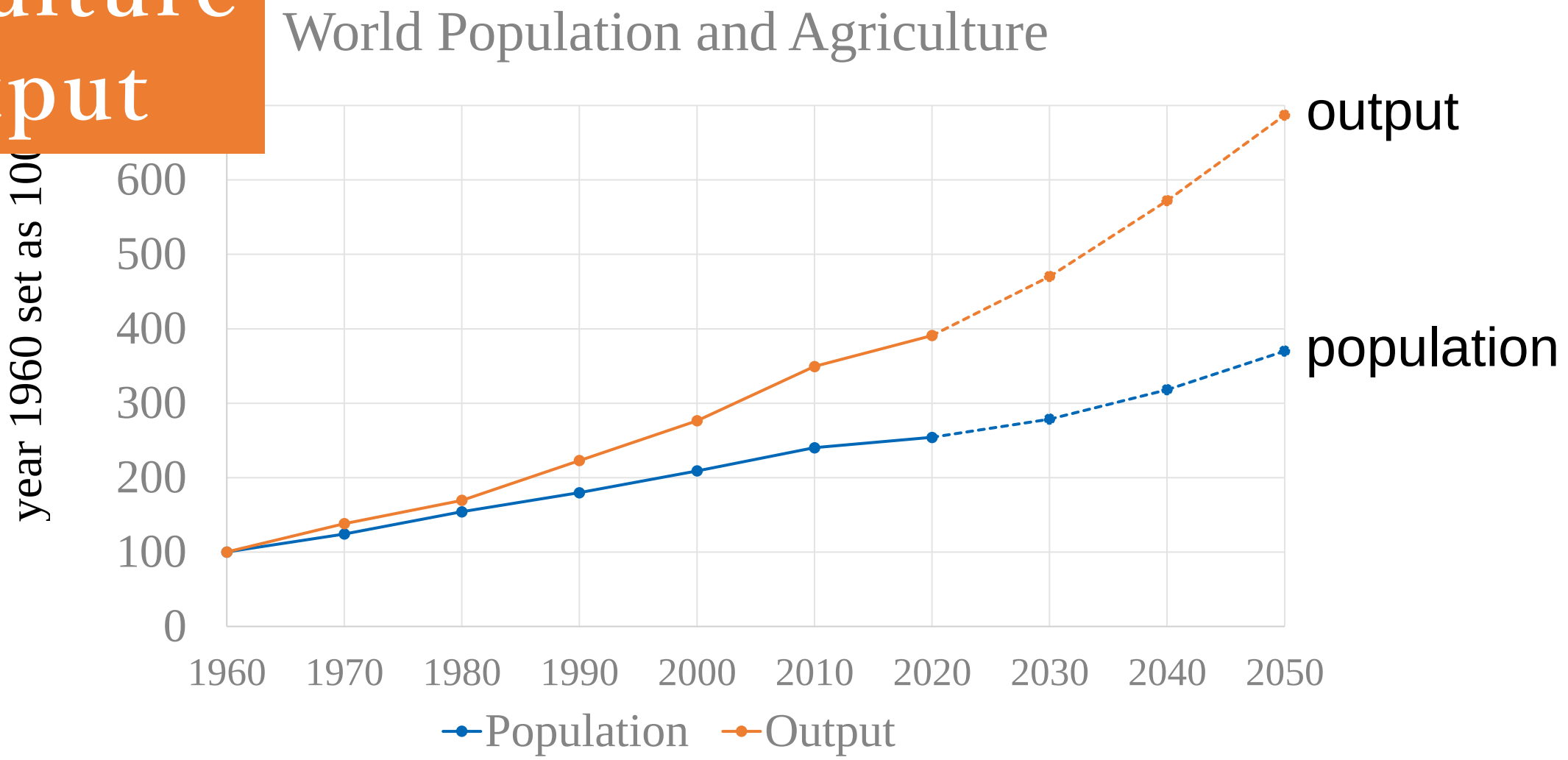
Population



Schroders calculated from FAO OECD USDA BAML

https://www.schroders.com/ja-jp/jp/intermediary/insights/sustainable-food-and-water/

Agriculture Output

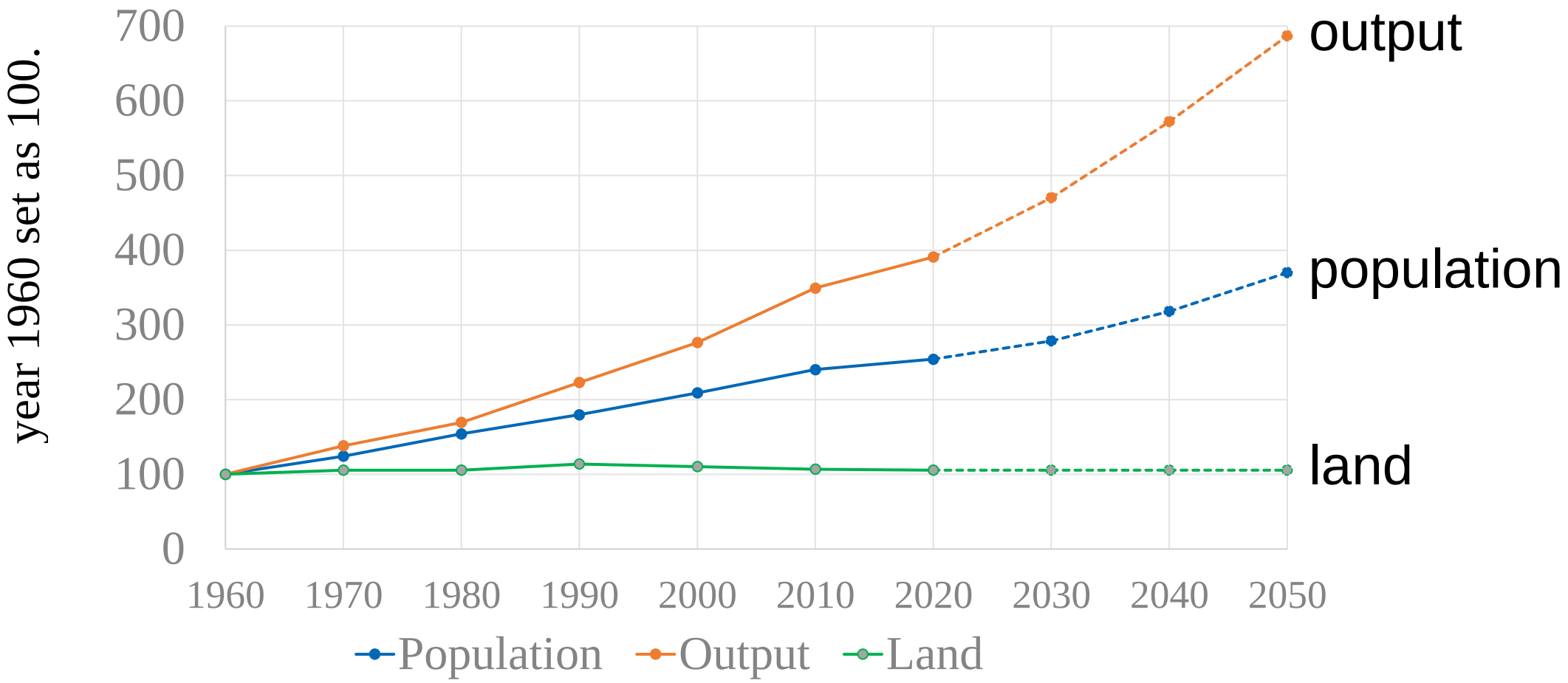


Schroders calculated from FAO OECD USDA BAML

https://www.schroders.com/ja-jp/jp/intermediary/insights/sustainable-food-and-water/

Land

World Population and Agriculture

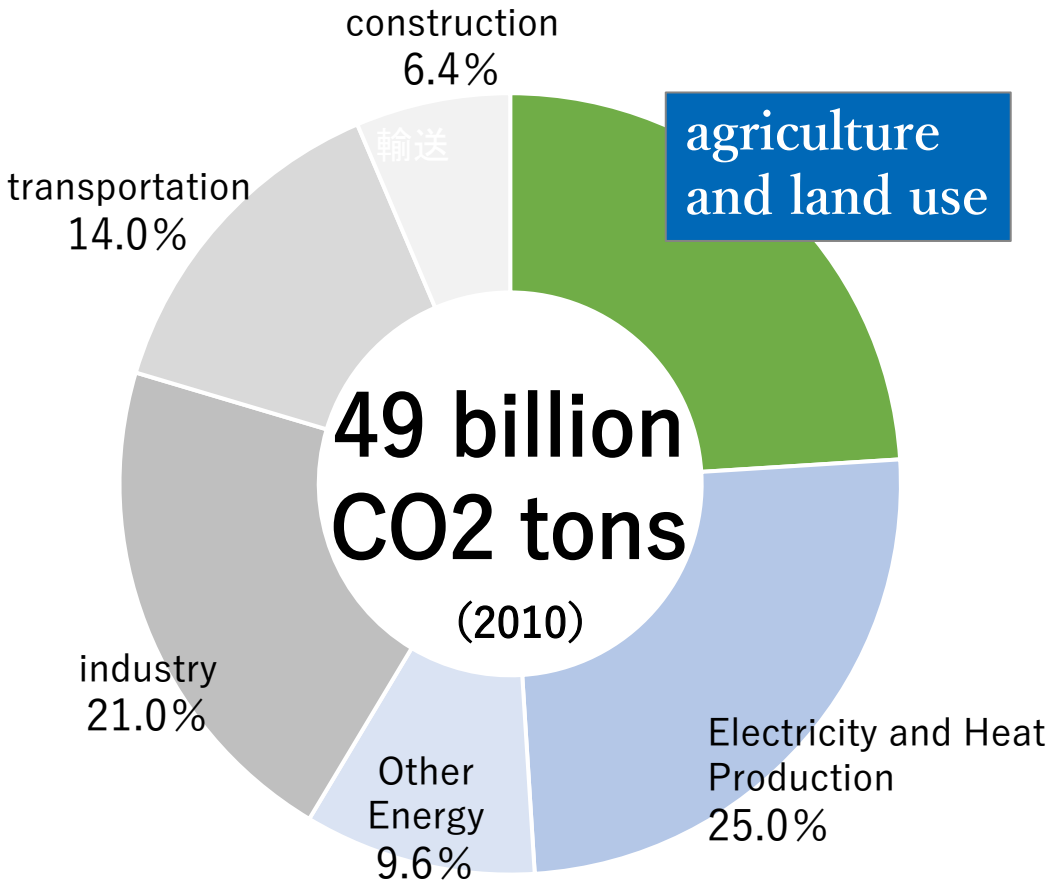


Schroders calculated from FAO OECD USDA BAML

https://www.schroders.com/ja-jp/jp/intermediary/insights/sustainable-food-and-water/

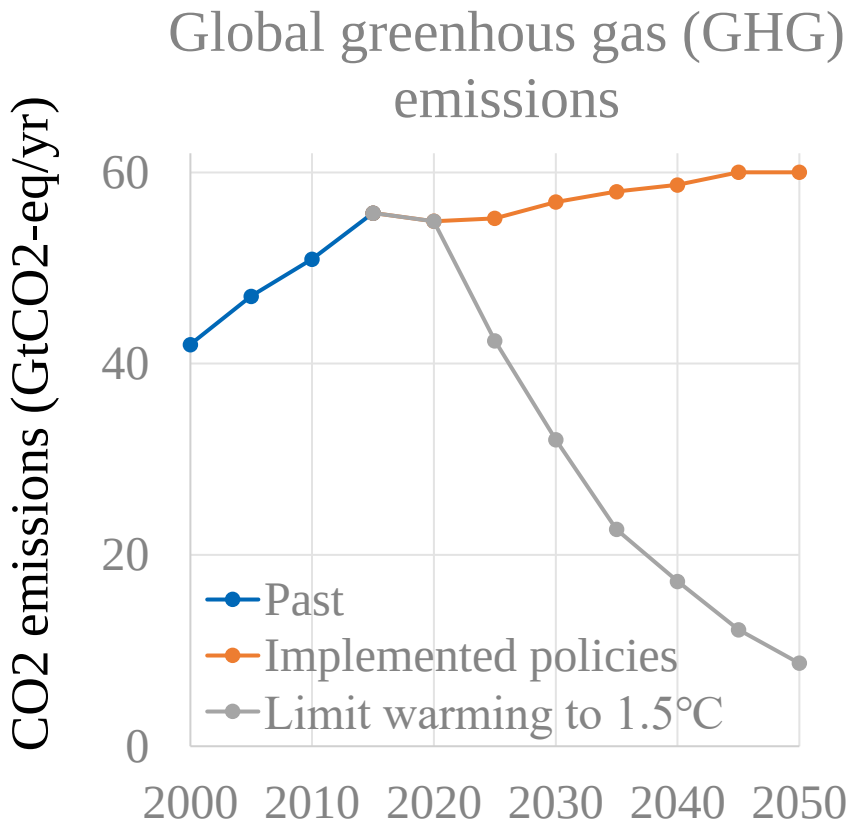
2. Global Agricultural Challenges

GHG from agriculture and land use is 1 ／ 4 of the world



https://www.env.go.jp/earth/ipcc/5th/pdf/ar5_wg3_overview_presentation.pdf

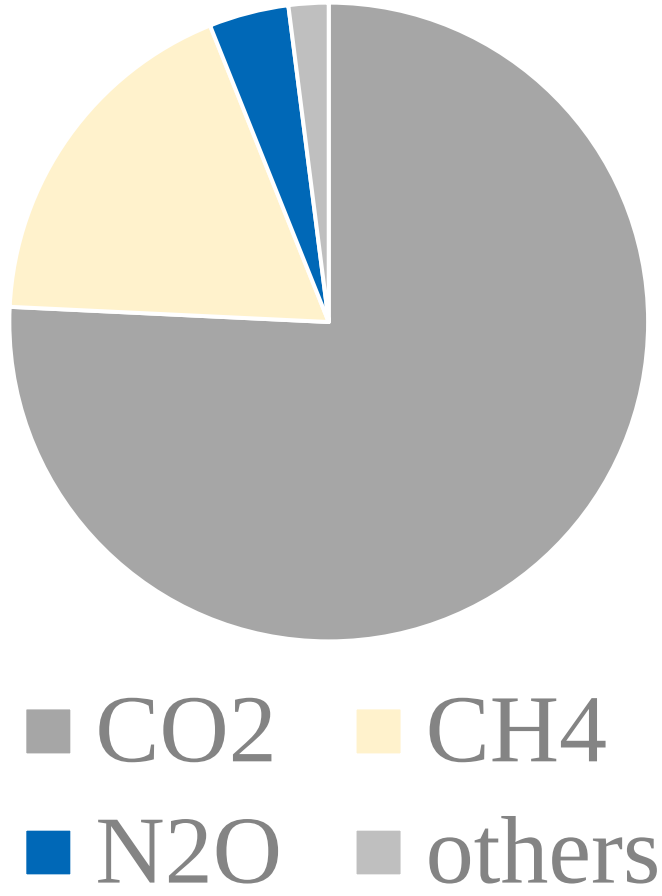
To reduce global warming
by the Paris Agreement target of 1.5°C,
GHG emissions must be reduced by 1/6th.



https://scienceportal.jst.go.jp/newsflash/20230324_n01/

2. Global Agricultural Challenges

Greenhouse Gas (GHG)		Most affected sources of emissions in Japan	Global Warming Coefficient
Carbon Dioxide	CO2	Fossil fuel combustion [excluding emissions from soil]	1
Methane	CH4	Agriculture (Livestock, Paddy field)	25
Nitrous Oxide	N2O	Agriculture(fertilizer)	298



https://www.pref.kanagawa.jp/osirase/0323/climate_change/contents3/page1-2.html

https://gurilabo.igrid.co.jp/article/4140/

Agenda

1. About Farmship

2. Global Agricultural Challenges

3. Environmentally Friendly Plant Factories

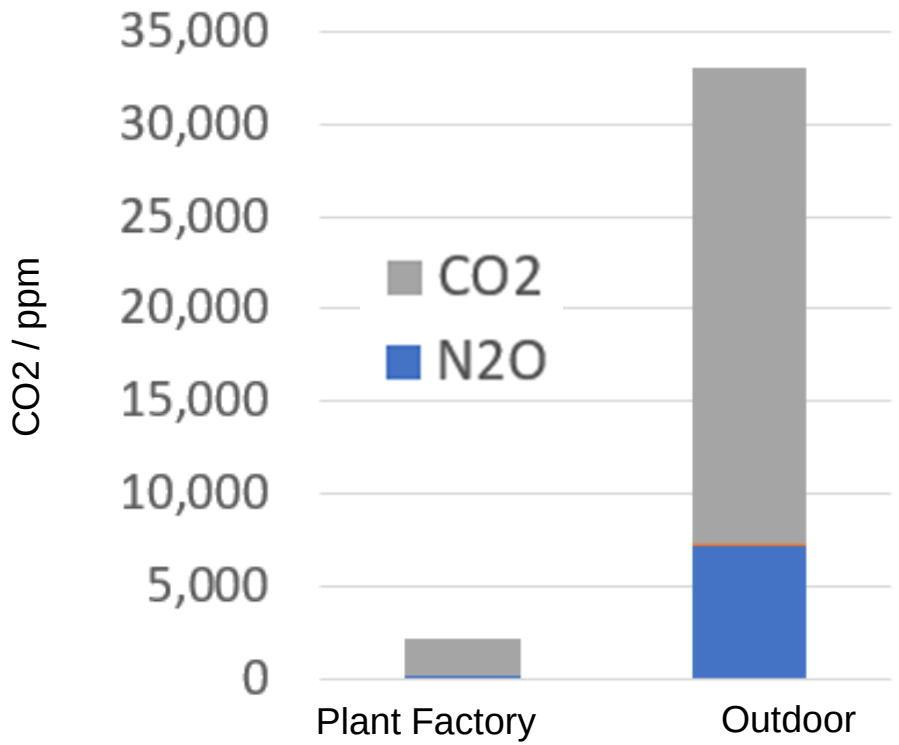
4. Increasing Efficiency in Agriculture Using AI

5. Future Prospects and Vision

3. Environmentally Friendly Plant Factories

FARMSHIP

Our Measurement Results



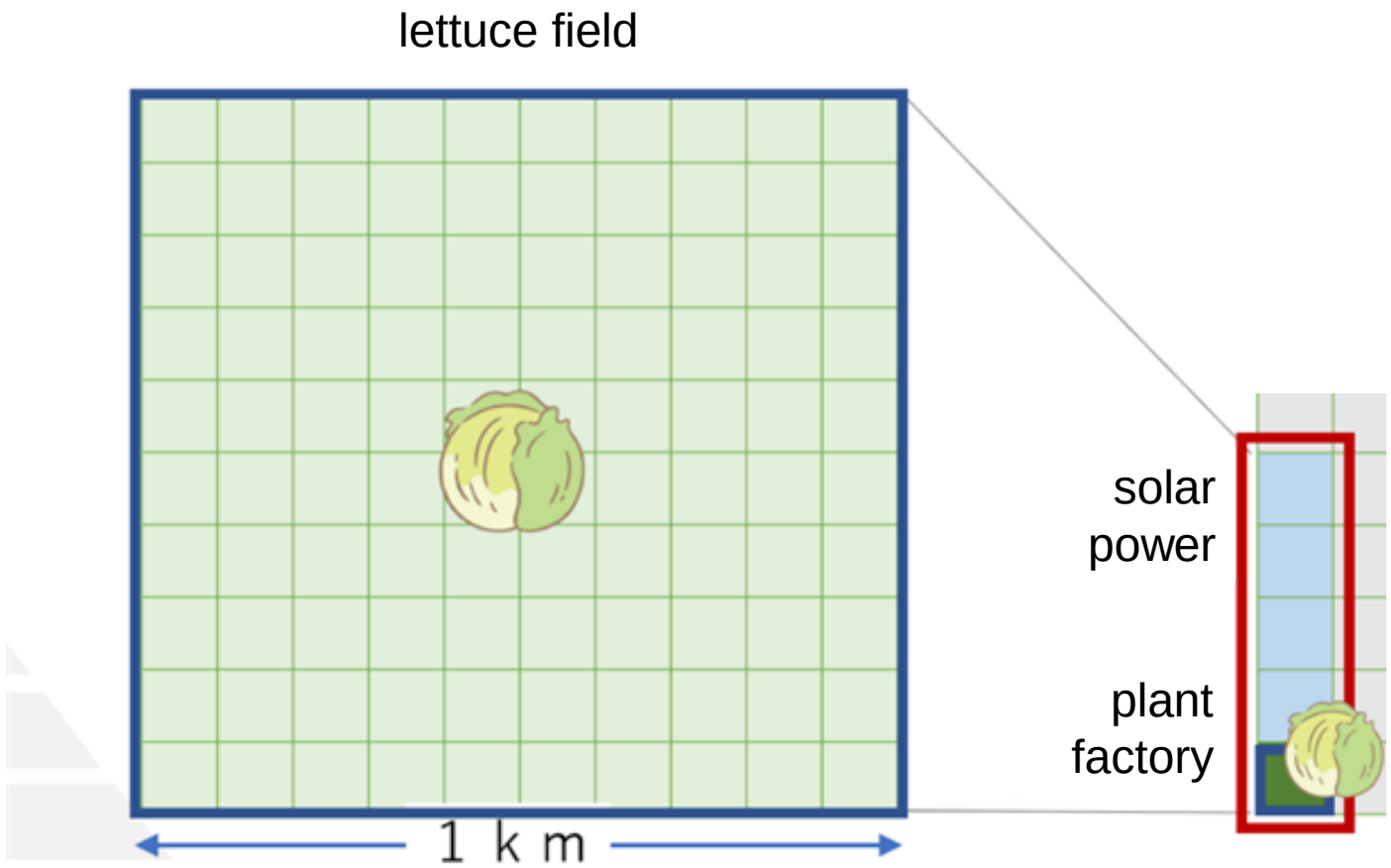
Our Agriculture

No pesticides, 1/10 fertilizer, 1/100 water

Compared with conventional agriculture

3. Environmentally Friendly Plant Factories

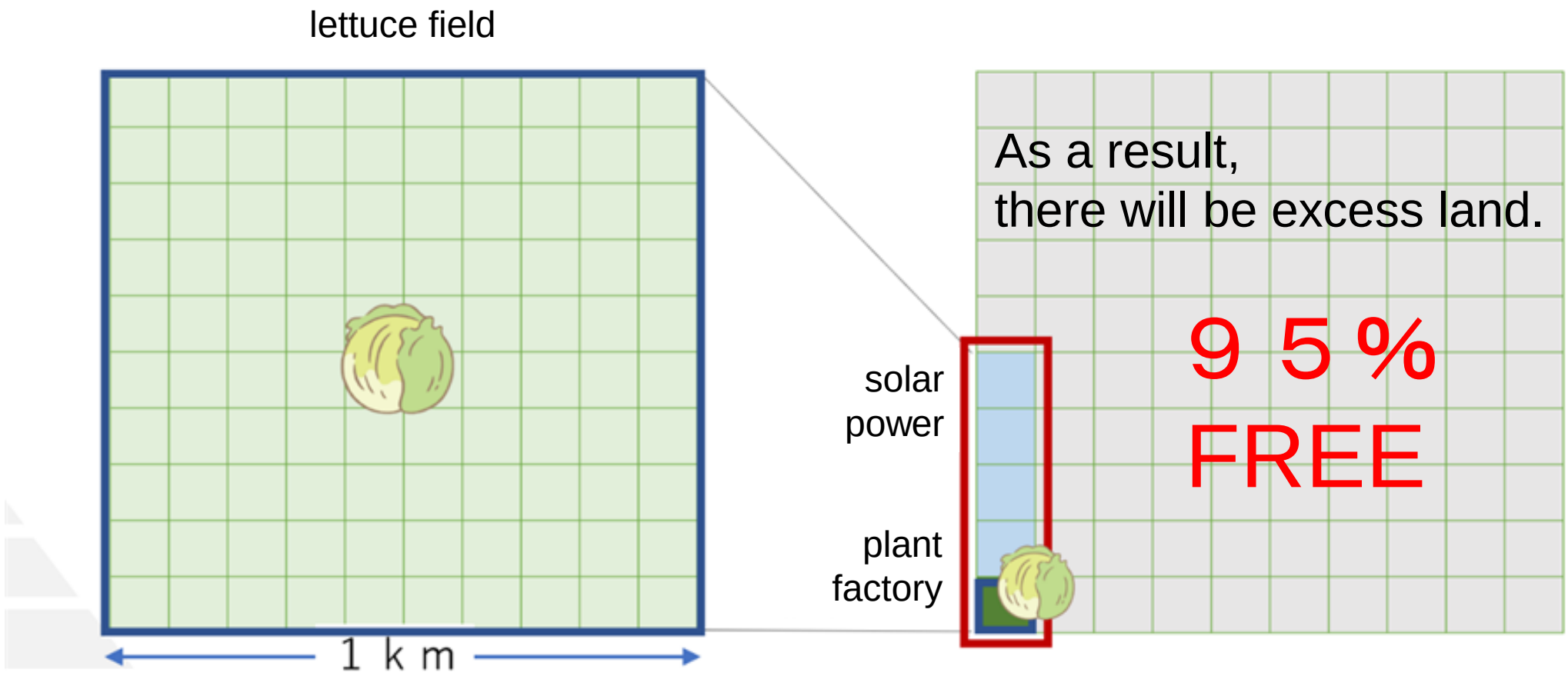
Zero-emission vegetable production on just 5% of conventional agriculture space.
Negative emissions if power is generated on vacant land.



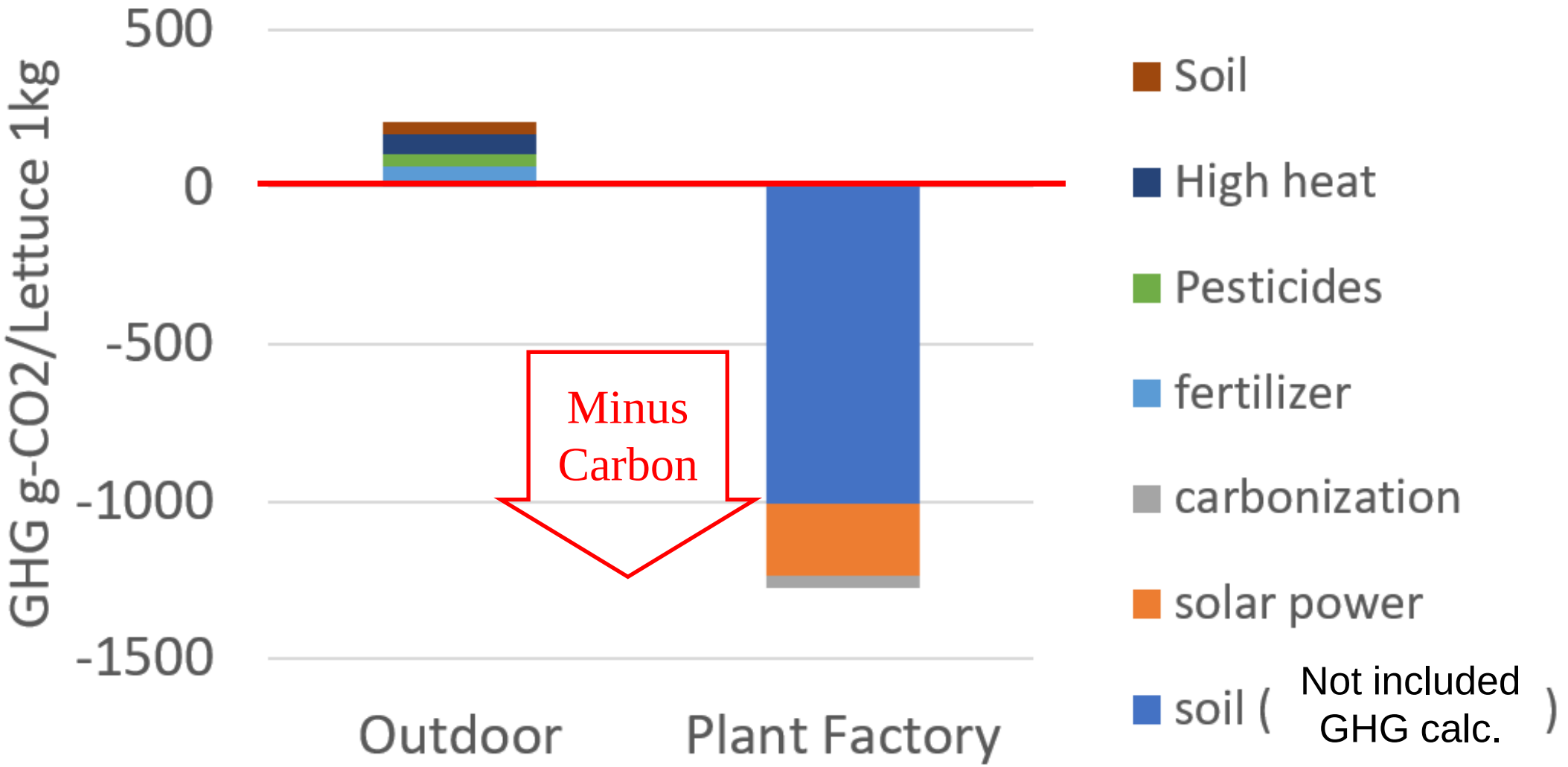
3. Environmentally Friendly Plant Factories

FARMSHIP

Zero-emission vegetable production on just 5% of conventional agriculture space.
Negative emissions if power is generated on vacant land.



3. Environmentally Friendly Plant Factories



Agenda

1. About Farmship

2. Global Agricultural Challenges

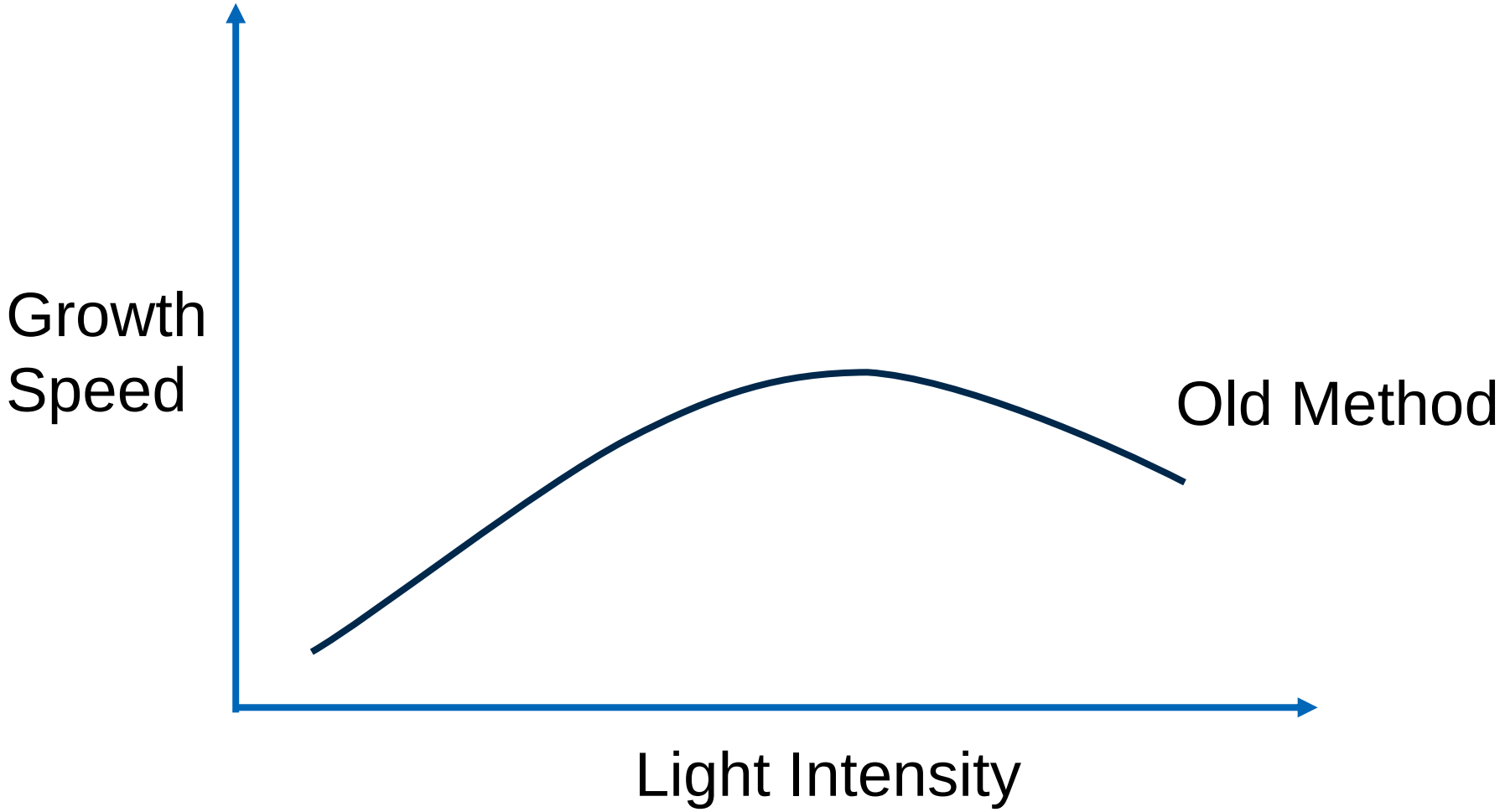
3. Environmentally Friendly Plant Factories

4. Increasing Efficiency in Agriculture Using AI

5. Future Prospects and Vision

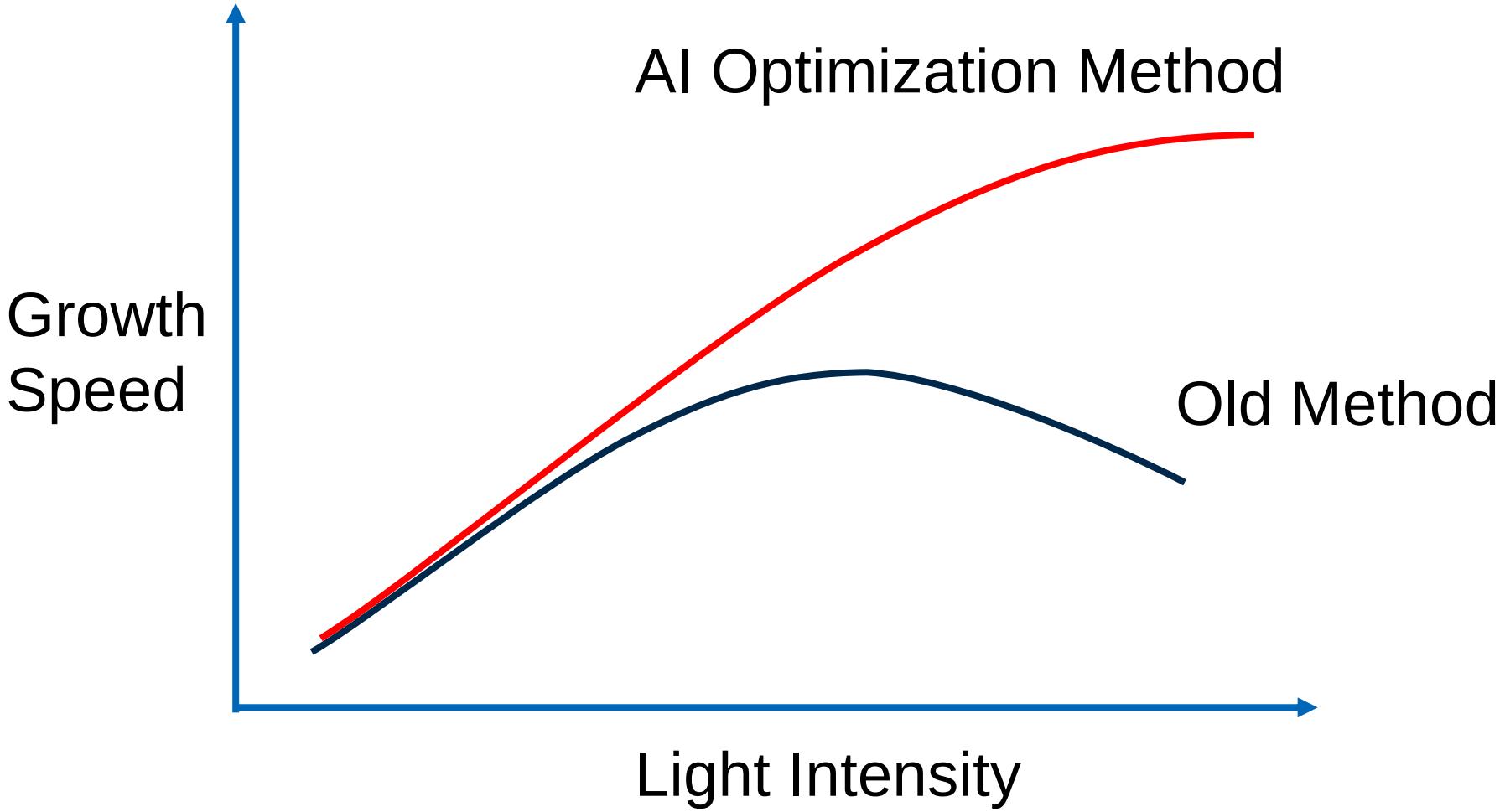
4. Increasing Efficiency in Agriculture Using AI

Optimization of Cultivation Conditions by AI



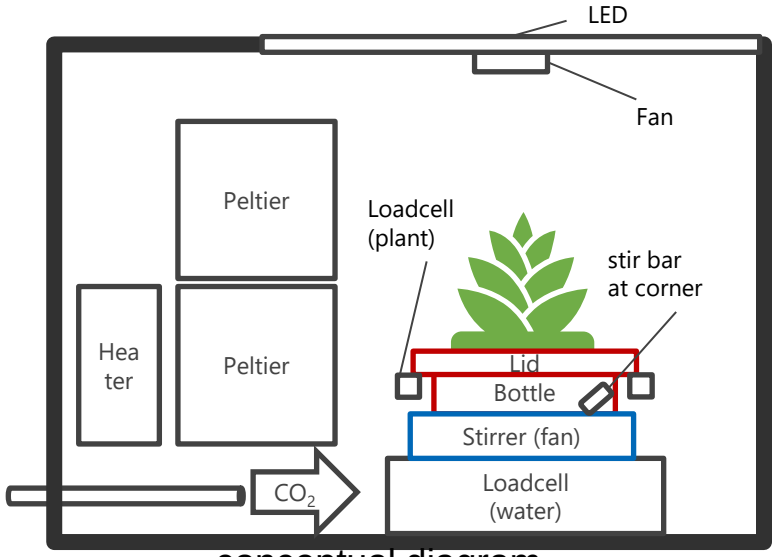
4. Increasing Efficiency in Agriculture Using AI

Optimization of Cultivation Conditions by AI

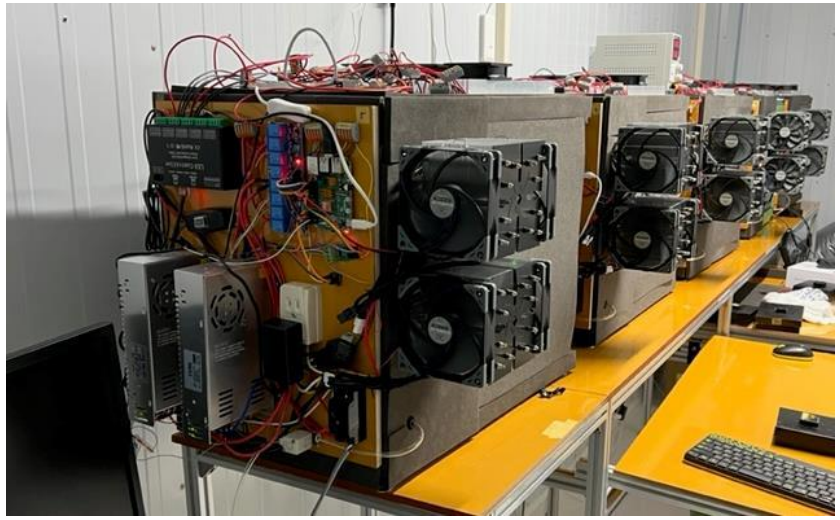


4. Increasing Efficiency in Agriculture Using AI

AI-powered Growth Environment Control and Measurement Equipment



conceptual diagram



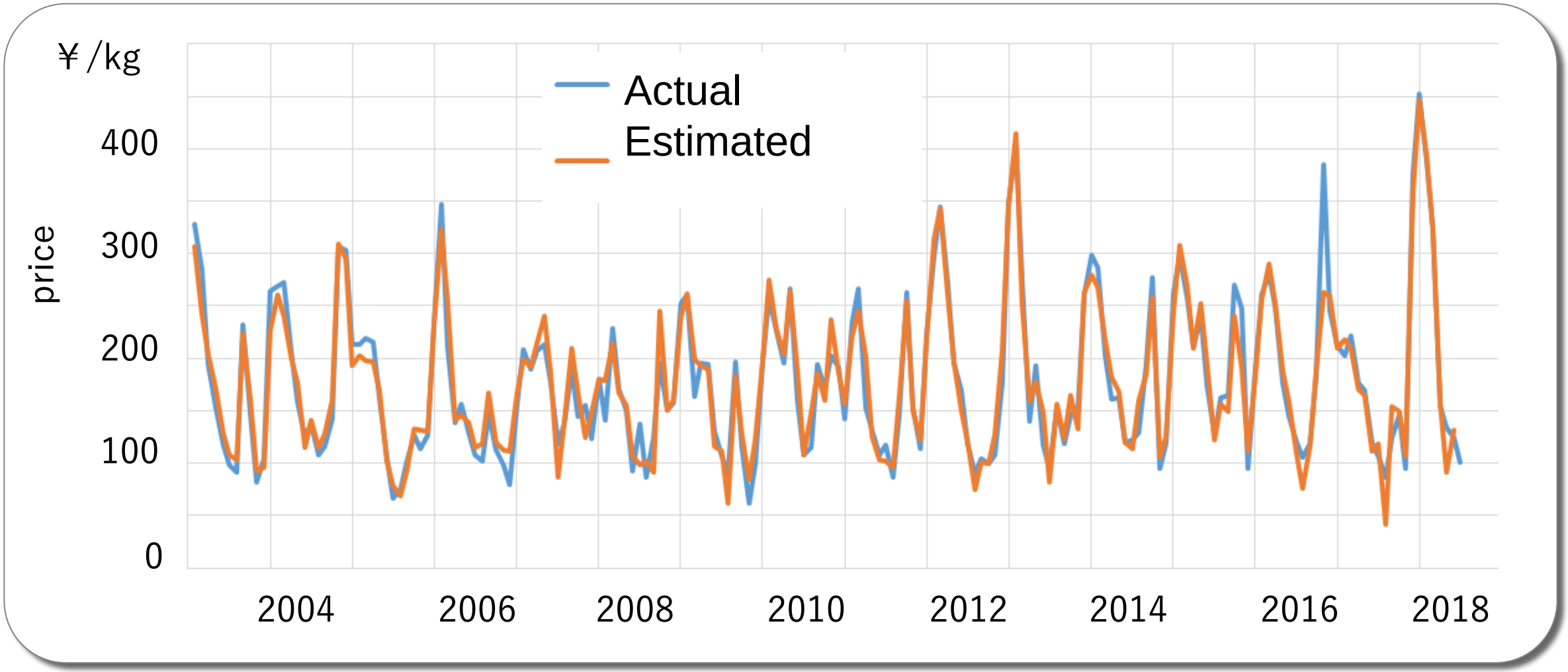
appearance

Accelerate cultivation speed by examining growth rate conditions

	cultivation method	cultivation period	1	2	3	4	5	6	7	8	9	10	11	12
growing period	outdoor cultivation	12 week												
	Conventional plant factory	5 week												
	This system	2.5 week												

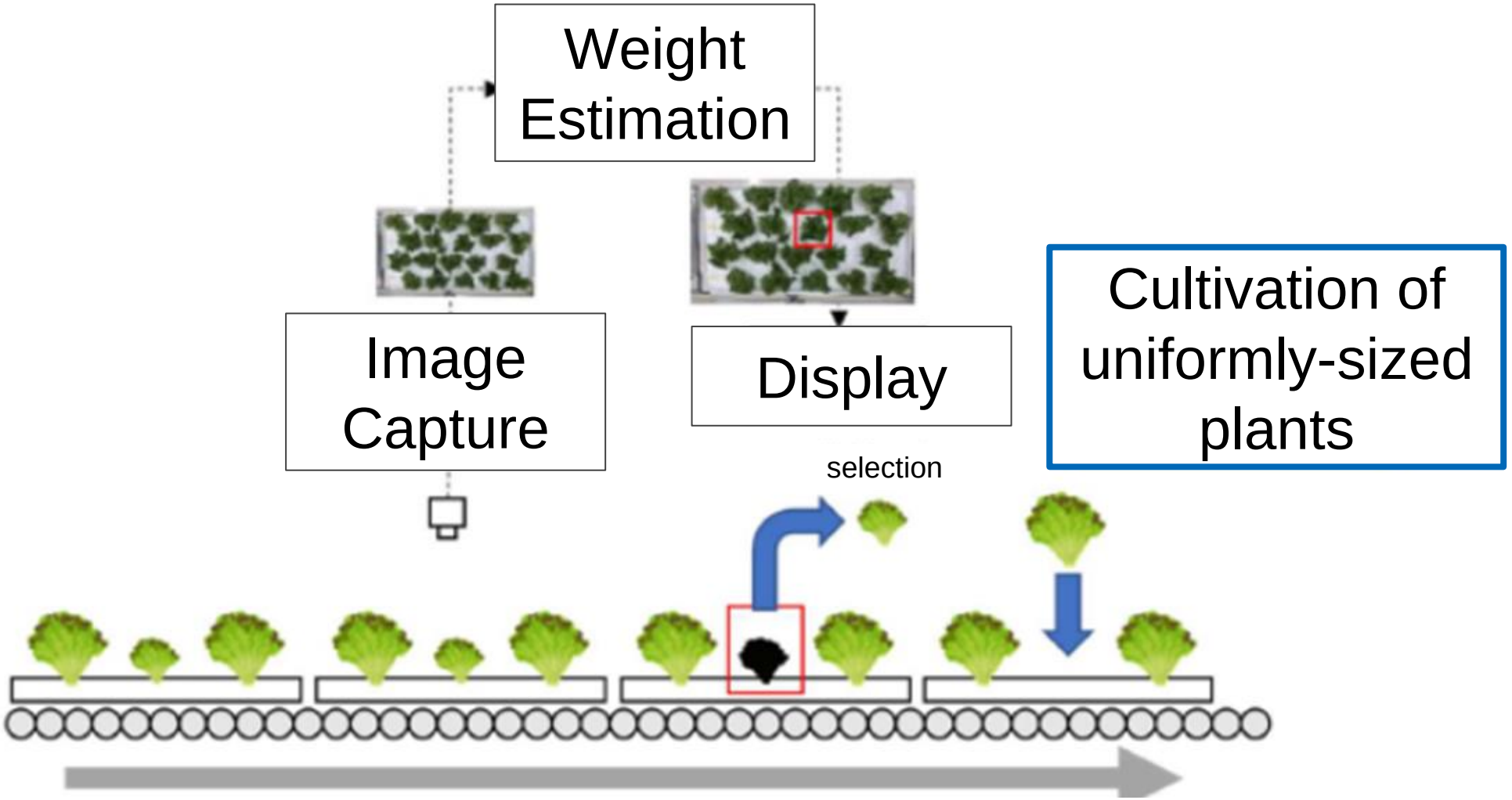
4. Increasing Efficiency in Agriculture Using AI

AI-based service to predict market prices of lettuce.



4. Increasing Efficiency in Agriculture Using AI

AI-driven system for analyzing lettuce growth conditions

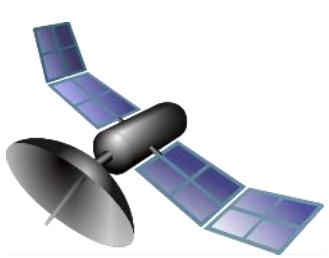


Agenda

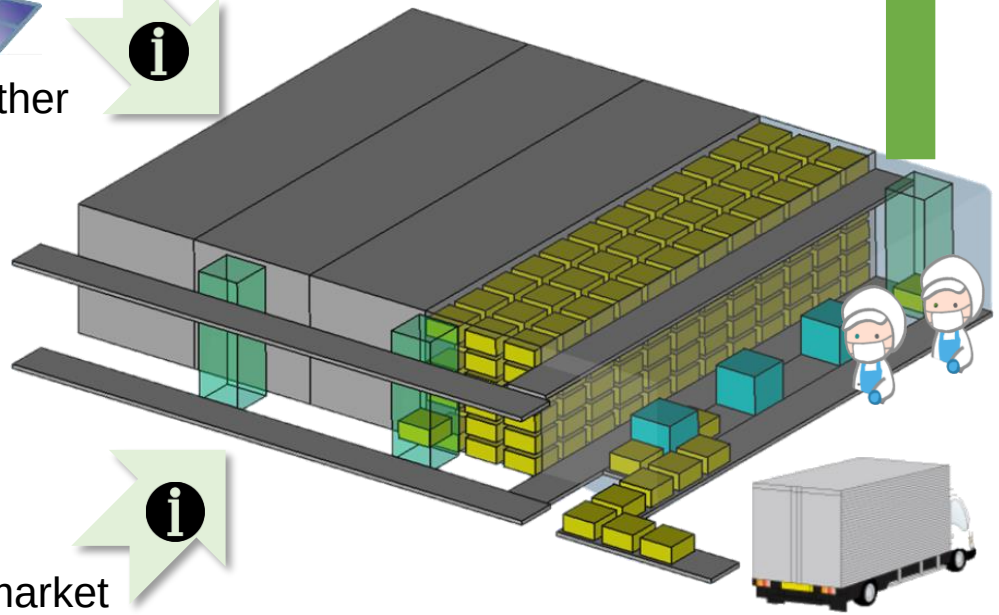
1. About Farmship
2. Global Agricultural Challenges
3. Environmentally Friendly Plant Factories
4. Increasing Efficiency in Agriculture Using AI
5. **Future Prospects and Vision**

Next Generation Agricultural Revolution

Carbon Negative !!



Weather



market

vegetable

market

consuming

FARMSHIP

FARMSHIP

Create a future of agriculture and food

3 ton/day
newest plant factory
in Shizuoka, Japan

Part of this decarbonization technology is based on results obtained from a project subsidized by the New Energy and Industrial Technology Development Organization (NEDO).