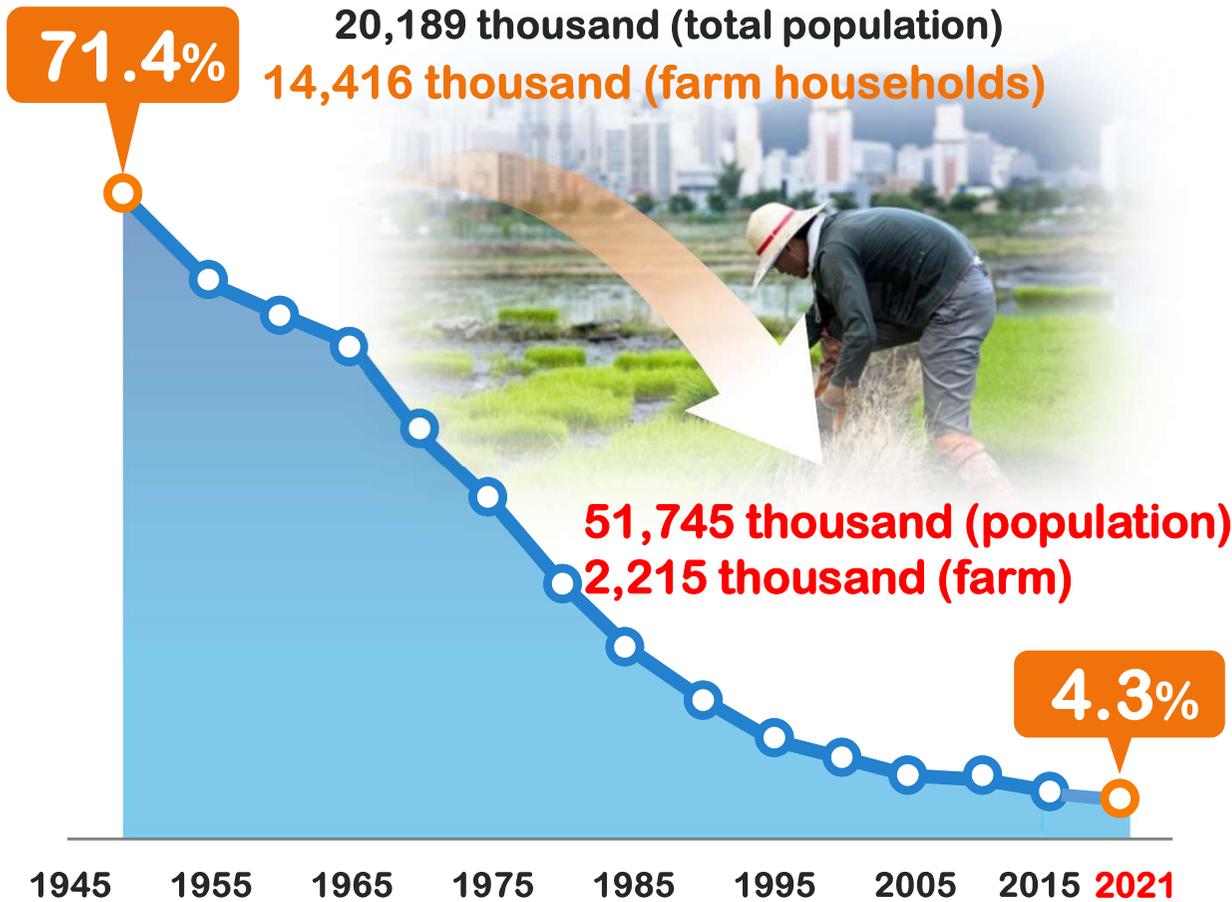




# Current state of agriculture of Korea

## Ratio of farm households (%)



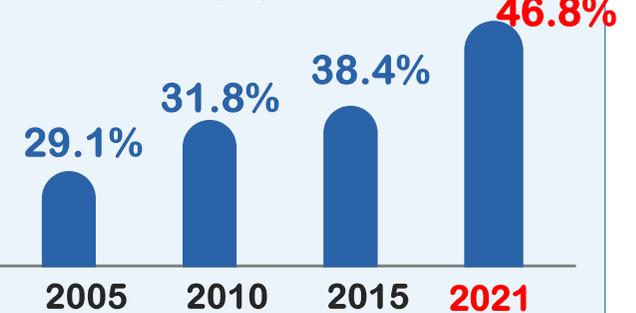
## Avg. age of farmer

※ avg. age of workers 42.6 years



## Ratio of 65 years old

※ based on the population 14.9%



# Smart Farm Promotional Strategy of Korea

**Strategy**

**Securing global expansion capabilities through the development of Korean smart farm**

**Suggestion**

**Improvement of farmhouse productivity and expansion of overseas markets by developing a global-level Korean style smart farm**

**STEP I**

**Development and distribution of Korean smart farm configuration modules (`15~`16)**

**STEP II**

**Advancement and commercialization of smart farm technology suitable for our soil and climate (`16~`17)**

**STEP III**

**Entering and expanding the global market of Korean smart farms (`17)**

# Smart Farm Innovation Valley of Korea

## Gimjae

- **Size** 21.3 ha
- **Crops** Lettuce, Eggplant, Asparagus, Cucumber
- **Specialization Strategy**
  - Functional crops
  - ICT technology
  - New seed varieties

## Goheong

- **Size** 33 ha
- **Crops** Strawberry, Tomato, Melon, Tangor
- **Specialization Strategy**
  - Subtropical crops
  - Korean Smart farm
  - Resident participation complex

## Sangju

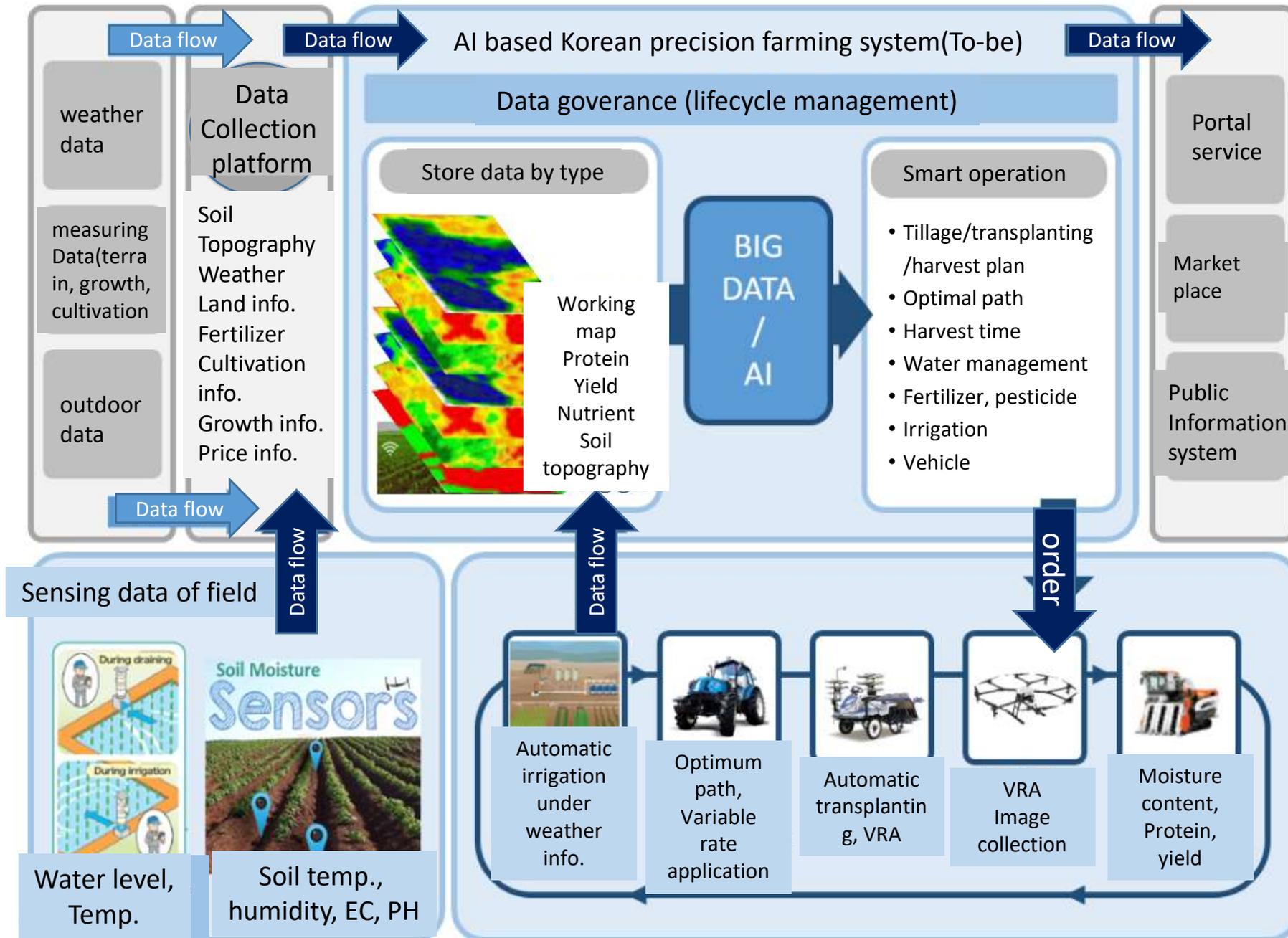
- **Size** 42.7 ha
- **Crops** Strawberry, Tomato, Melon, Cucumber
- **Specialization Strategy**
  - Ag. Robot,
  - Pest research
  - Plant export

## Milyang

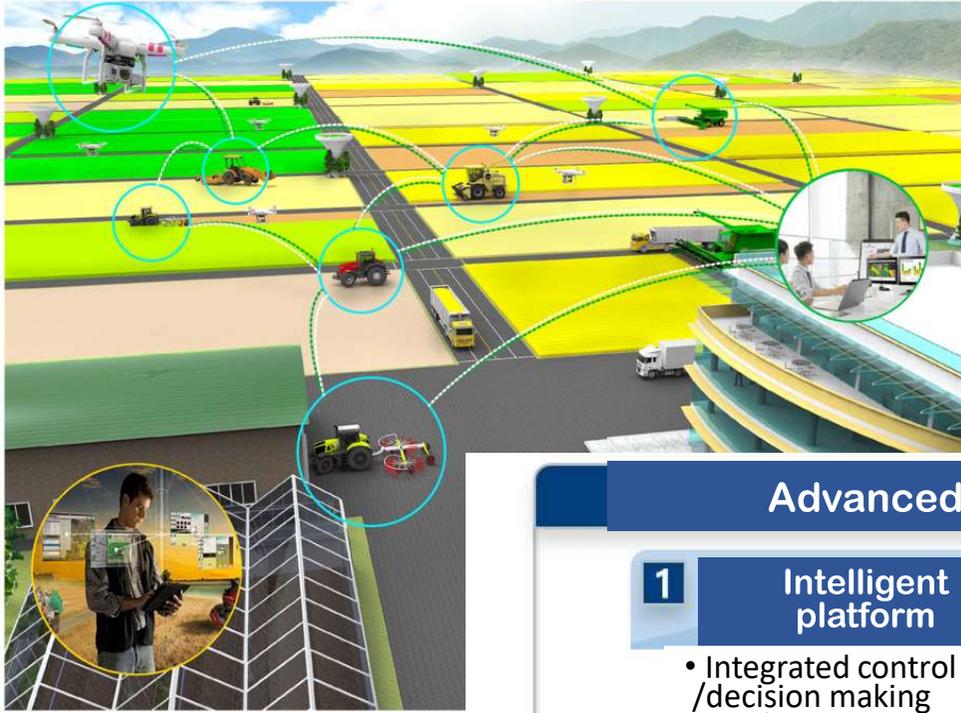
- **Size** 22.1 ha
- **Crops** Paprika, Tomato, Banana, Papaya
- **Specialization Strategy**
  - Nano industry integration
  - Export strategic items
  - Energy saving



# Advanced unmanned automation demonstration complex(1/2)



# Advanced unmanned automation demonstration complex(2/2)



## Advanced unmanned automation demonstration complex

### 1 Intelligent platform

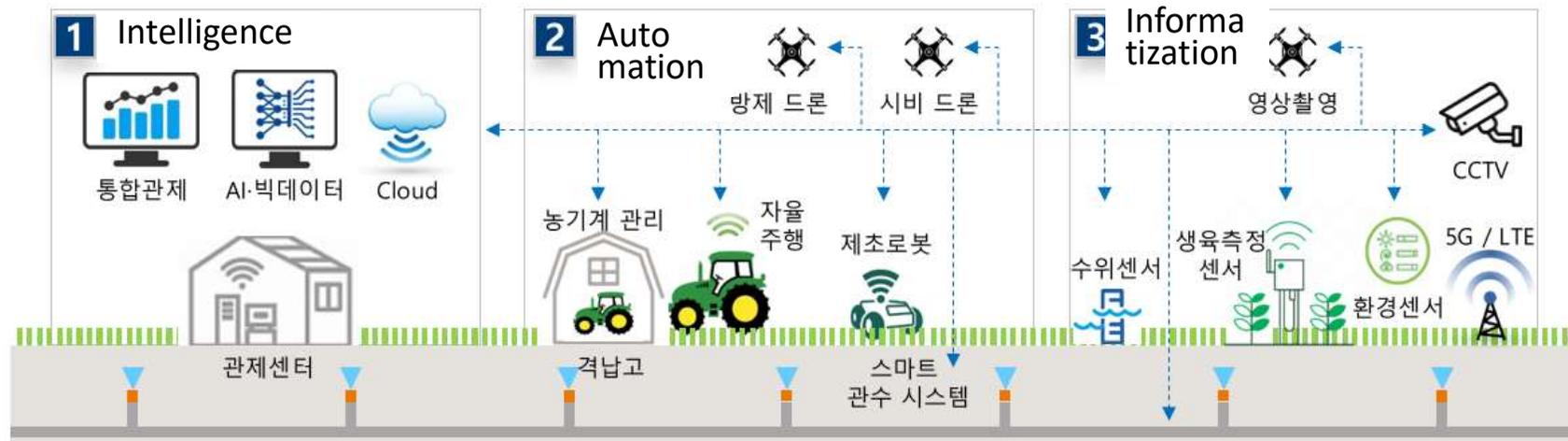
- Integrated control /decision making
- Productivity improvement

### 2 Unmanned automated agri. equipment

- Auto driving/control
- Labor saving

### 3 Build data foundation

- Standardization system
- Intelligent data dam
- Intelligence/automation/informatization



# I . 4<sup>th</sup> Industrial Revolution and Agriculture

## Digital Transformation based on Data·AI

### Intensifying Competition

as national and corporate competitiveness depends on utilization of data



### Transition to Digital Economy

'National AI Strategy(2019)', 'Activation of Data and AI Economy (2019)', 'Korea New Deal (2020)'



## Global Transition to Digital Agriculture

### Multinational Company

Google, Bayer

### Growing investment

\* Global investors put \$6.4 billion in Agtech('19)

### Japan, Europe

Developing data-based technology for each sector

## Current Issues



Climate Change

Growing damages by abnormal weather

Agricultural loss

:('15) 67.8 billion won → ('17) 362.5 → ('19) 1140.8



Rural Community

Low birth rate & population aging

Rural population:( '14) 2.75million →('19) 2.25million  
45% of city/county facing extinction(Statistics Korea)  
Young farmer under 40:( '14) 9,947 → ('19) 6,859 households



Self-sufficiency

Countries reinforcing policies for food security

FAO warns a new virus, 'starvation virus', would threaten humanity(2021)

Big Data & AI as an alternative for Sustainable Agriculture

# II. Vision & Goal

Vision

**Sustainable Agriculture by Data-based Digital Agriculture**

Goal

Improve agricultural productivity, convenience and environment by digital agriculture

Strategy



**Build data ecosystem**

for collecting, utilizing and sharing data



**Digital innovation**

in production by automation & AI



**Support supply chain,  
consumption and policies  
through digital agriculture**

Programs

**Data Ecosystem**

- Collect and manage data
- Build AI service platform
- Open and share data

**Digital Innovation in  
Production Tech.**

- Base tech. for automation & AI
- Digital tech. for breeding
- Digital tech. for grain production
- Digital tech. for horticultural crops
- Digital feed management tech.

**Support Distribution &  
Consumption & Policy**

- Support decision-making on crop selection, distribution & consumption
- Support rural & agricultural policies

# 1. Data Collection & Management

## Goal

- Increase collection, standardization and quality management for research & on-farm data

## Data type

- Production** Soil, Climate, Disease/Pest, Cropping
- Distribution** Traceability, Wholesale price, Export statistics
- Consumption** Consumption, Brand, Food & Nutrition, Public health

Agricultural data have various factors (weather, region, variety), so standardization and systematic management are important!

**The Government must play a proactive role.**



Collection

- Increase data collection

**Research** ('21) 20 → ('25) 250 (accumulative)

**On-farm** ('21) 14 items 406 farm households  
→ ('25) 30items 1,000 farm households



Standardization

- Standardization of agricultural research data & ICT devices

\* Standardized a registration form for research data on green-bio (with Ministry of Science & Technology)

**Statistics (accumulative)**

\* ('20) Standards of private sectors (SPS) 8 cases, Korean industrial standard (KS) 2 case → ('21) SPS 10, KS 4 cases



Quality Management

- Quality Management for the entire data lifecycle

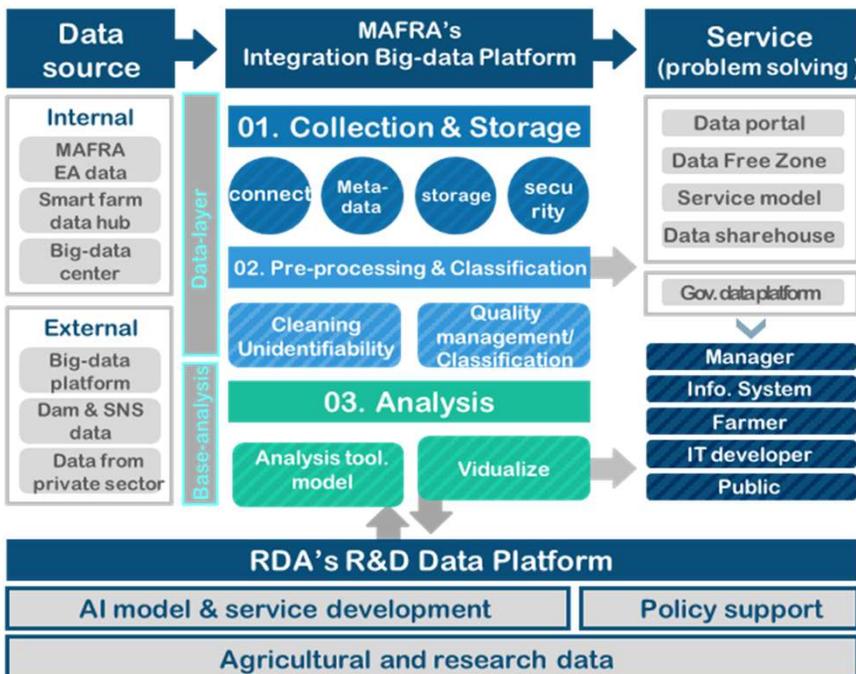
\* Agricultural research services, technology centers operating a day for data management

# 2. AI Service

## Goal

- Support farmer's decision-making through AI service

## AI Service Platform Structure



**Growth management**

- Further apply AI models for productivity and growth management to crops in open fields and livestock sector

### Greenhouse

\* ('20) Tomato → ('21~) Strawberry, Paprika, Melon, Cucumber, Watermelon, Chrysanthemum

### Open field/Livestock

\* ('21~'23) rice, wheat, soybean, onion, cabbage  
→ ('24~) 5 including apple, Korean native cattle, milk cow

**Decision-making support**

- Decision-making support model for crop/site selection and shipment

Support to select crops and build marketing plan by connecting bigdata on soil, weather and consumption



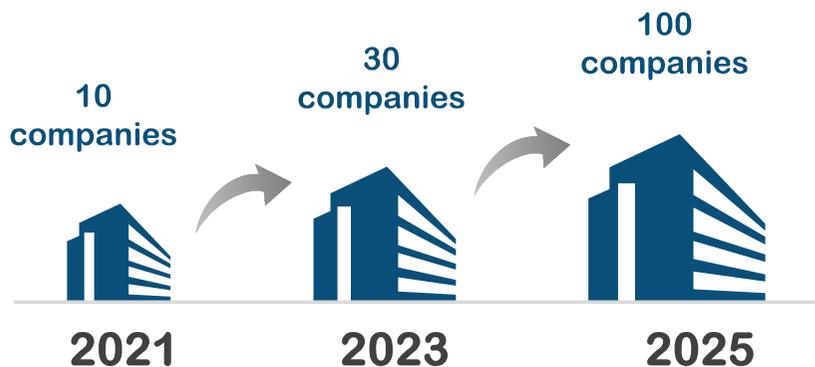
# 3. Data opening, sharing & utilization

## Goal

- Support start-ups & cooperate with other organizations

## Current agri. start-ups in Korea

Farm8 (plant factory), nThing (smart farm), AIS (growth management), etc.



Open & share

- Support start-ups and cooperate with relevant organizations by opening and sharing data
  - \* Open bigdata on weather, soil, disease, pest : ('20) 143 cases → ('21) 241 cases
  - \* Data for AI learning in the agricultural and livestock : build image database of pest/disease, etc.

Data Center

- Data Center for systematically storing, managing & sharing
  - \* (Phase 1) Field Data Center → (Phase 2) Research Data Center
  - (Phase 3) Integrated Platform

Regional hub

- To promote local agricultural research services/technology centers as a regional hub for collecting and sharing data



# 1. Digital Technology for Grain Production

## Goal

Enhance food self-sufficiency and save labor

## Field application



Apply field trial test to counties/cities first, and then spread across the nationwide



Rice

- Drone seeding/disease control, and self-driving machinery for labor saving
- Precision tech. for stable production to respond to abnormal weather



Wheat

- Recommend a flour variety (for noodle) based on weather/soil data
- Precise management of each growth phase for improving productivity and self-sufficiency  
\*('22~) 20% yield increase model



Soybean

- Precision fertilizer recommendation and water management for each growth stage to improve productivity
- Early warning service for abnormal weather



# 1. Decision-making on Crop & Distribution & Consumption

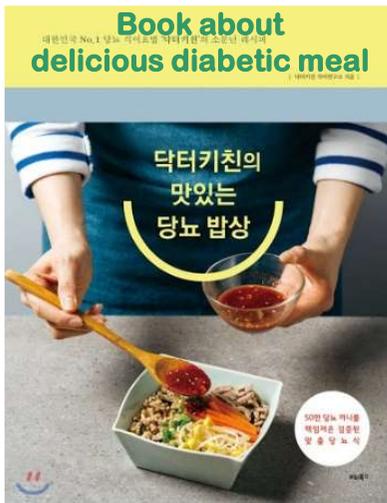
## Goal

- Replace oversupplied crops with profitable introduced crops
- Support consumer choose agricultural products

## Field Application



- Recommend profitable crops for each region by linking data on soil, climate and profitability



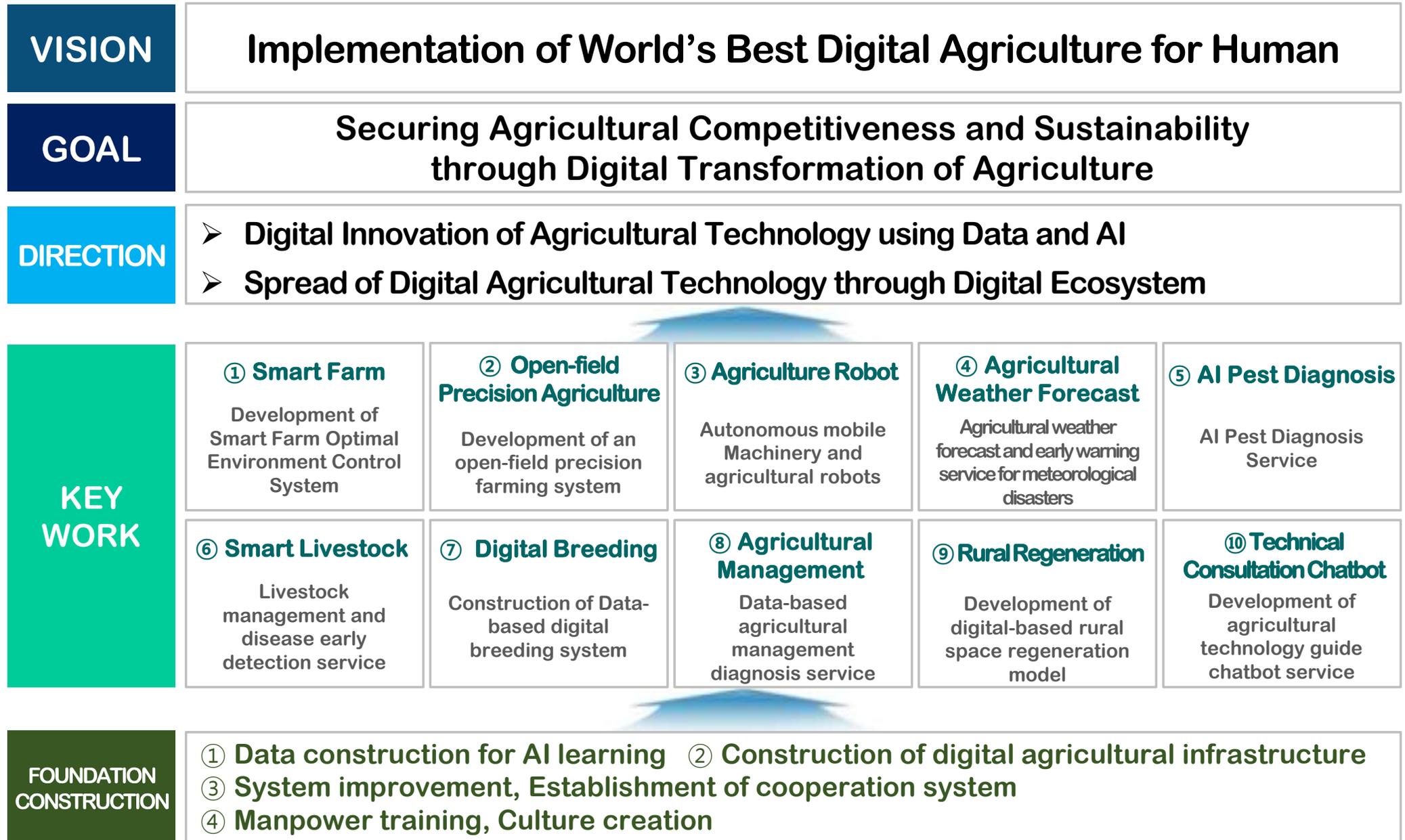
- Personalized healthy diet



- Research on the relation between food, health and genetic factors (with MOHW)



# IV. Implementation Plan

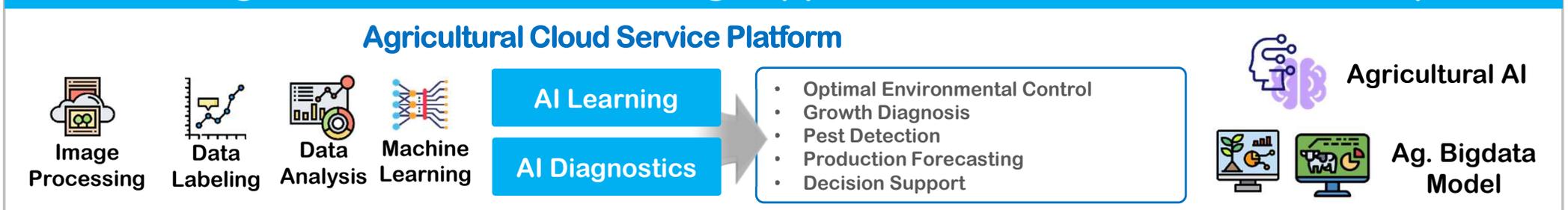


# Digital Transformation of Korean Agriculture

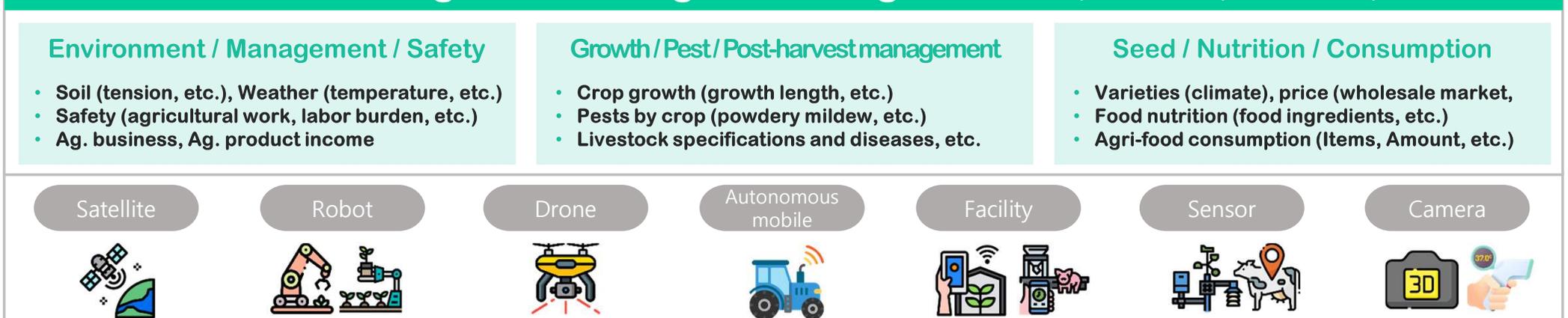
## Securing AI-based agricultural sustainability and leading future agriculture



## AI-based agricultural decision-making support and related industries development



## Construction of agricultural big data using satellites, robots, drones, etc.



# V. Expected Outcomes

## Farmer

Transition from experience and intuition-based decision-making to

### Data-based Tech.

- Help ICT-savvy young or beginning farmers start new business and successfully settle in rural life
- Increase farmer's income by enhancing productivity/quality and assisting marketing

Realizing sustainable agriculture rural community by increasing convenience, productivity and income



## Consumer

Promote Consumption through price stabilization & traceability system

- Contribute to stabilizing price by reducing price fluctuation of agricultural commodities (e.g., vegetables)
- Make reliable and trustworthy production and distribution system for agricultural products

Promote the consumption of domestic farm produce



## Corporate

Innovate Technology by linking data on production, distribution & consumption

- Create new business model by opening and using agricultural data
- Create jobs to revitalize rural community

Promote the innovative growth of relevant industries by linking data in value chain



# VI. Recommendations for other countries

## 1. Establishment of government-level basic plan

- Divided into fields such as vegetables, food crops, fruit trees, and livestock etc.
- Developing the necessary skills for each step for the approach

## 2. Creating a trial complex

- Smart farm technology demonstration (equipment, sensor etc.)
- Farmhouse education and test (pilot project)
- (if necessary) rental business for a certain period