Promotion of Smart Agriculture
Issues in agriculture of Japan

Facing a severe problem of labor shortage by decrease and aging of farmers

Enlarging average cultivated acreage per farm demands innovations to break the limit of work area per person


Age structure of occupied population in agriculture (2015)

- Agriculture occupied population: 2.1M
- Average age: 66.4

Ratios of accumulated cultivated acreage of each rank of farm scale

- Average cultivated acreage per management body (farm) has been steadily enlarged (1.6 ha in 1995 → 2.5 ha in 2015)

From Census of Agriculture and Forestry (MAFF)

= The largest rank in 1995 is ≥ 10 ha because of lack of detailed classification data.
= Values in parentheses are numbers of management bodies (farms) in the rank.

From 2015 Census of Agriculture and Forestry (MAFF)

Agriculture occupied population:
Persons engaged only in agriculture and those engaged in agriculture for more days that other businesses (age ≥ 15) during the one-year survey

Agriculture occupied population: 2.1M
Average age: 66.4

Less than age 50: 251K (12.0%)
Age 50-64: 1.04M (50.7%)
≥ age 65: 1.33M (63.5%)
Issues in agriculture, forestry and fisheries and food industries of Japan

- There are many procedures dependent on manpower, particularly that of skillful persons in agriculture, forestry and fisheries. Labor reduction and ensuring manpower become important issues.

- Dangerous and hard work depending on manpower that can hardly be mechanized still remains in the sites of agriculture, forestry and fisheries.

- Breaking the limit of working acreage per person is desired because of decrease of agriculture occupied population.

- Ensuring manpower becomes difficult although labors such as selection of fruits and production and decoration of “bento (lunch boxes)” depend on a large number of employees.

- Procedures requiring experts such as operation of tractors disturb participation of youth and women.
Automation of operation by advanced technologies such as robot tractors and water-management system operated by smartphones enables scale-up of business.

ICT technologies enables succession of agricultural skills of expert farmers to young farmers.

Highly managed agriculture will be realized by accurate prediction of growth and diseases to utilize and analyze sensing data, etc.

Advantage of agriculture of Japan

- Expert skills corresponding to local characteristics such as climate and soil
- Delicious breeds and brands with wide variety reflecting local characteristics
- Safe and secure agriculture products matching with consumers’ needs

Effects of Smart Agriculture

- Automation of operation by advanced technologies such as robot tractors and water-management system operated by smartphones enables scale-up of business.
- ICT technologies enables succession of agricultural skills of expert farmers to young farmers.
- Highly managed agriculture will be realized by accurate prediction of growth and diseases to utilize and analyze sensing data, etc.
Agricultural Data Collaboration Platform (WAGRI) has been built as a collaboration platform of private companies which provides agricultural ICT services. Through WAGRI, data and system on climate, farmland, geographical information, etc. are provided which promote evolving new services by private companies to support farmers select and utilize advanced services.

API: Application Programming Interface. Coding conventions to relate application programs.

The agricultural data collaboration platform (WAGRI)

Public data
To provide various data such as weather, land or map (may be charged.)

Data and system providers
Private company, Private company, Private company, Private company, Private company, NARO, Government

Data and system users
Farmers, etc.

Agricultural machinery manufacture A, Agricultural machinery manufacture B, ICT vendor C, ICT vendor D

Develop new agricultural services by utilizing data and services through WAGRI
Smart Food Chain (expansion of the platform)

- WAGRI will be expanded to “Smart food chain system” which covers processing, distribution, and consumption (logistics) as well as production.
- Smart production based on needs and demands will realize food loss reduction and labor hours reduction.

The agricultural data collaboration platform (WAGRI)

Publicize the data

- Weather API
- Farmland API
- Map API
- Sensor API
- Growth prediction API
- Soil API
- Stats API

(present) production centered system

- Private company
- Private company
- NARO
- Government

Develop new agricultural services by utilizing data and services through WAGRI.

(future) expansion to processing, distribution, and consumption

Developing smart food chain targeting which covers processing, distribution, and consumption as well as production.

Private company

Government

Data of processing and distribution

Data of export

Data of marketing and consumption

ICT vendor, etc.

Manufactures

Distributor

Retailer

Agricultural machinery manufacture

ICT vendor

Farmers, etc.
Project for Accelerating Installation of Smart Agriculture

**Point of the Project**
To realize drastic increase of productivity of farmers, it is urgently requested to install smart agriculture by introduction and utilization of advanced technologies such as robots, AI, IoT, etc., which have been markedly developed recently. This project promotes optimization of the smart agriculture technology by installation and demonstration of the advanced technologies at the present time and supports the efforts including providing information to accelerate promotion of the installation.

**Target of the Project**
Almost everyone involved in agriculture will be able to practice agriculture utilizing data (until 2025).

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**Details of the Project**

1. **Installation and demonstration of advanced technologies**
   ○ To optimize the smart agriculture technologies, in cooperation with NARO, farmers, private companies, local governments, etc., the program supports installation of technologies of robots, AI, IoT, etc., which are the advanced technologies at the present time to the production sites, and efforts to demonstrate ideal smart agriculture.

2. **Provision of information to promote installation**
   ○ NARO will arrange the data and activity records thus obtained as preceding cases in the aspects of technology and management, and will provide them as information to support management decision to introduce the technologies by farmers. NARO also supports efforts to contribute consultation and technical training of farmers.

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**Image of the Project**
Instances of advanced technologies from production to shipment

- **Plowing and land grading**
- **Transplanting and sowing**
- **Cultivation management**
- **Manuring**
- **Harvest**
- **Business management**

Accelerating installation of “smart agriculture”