

Smart Agriculture in the world and its application to Asian smallholders

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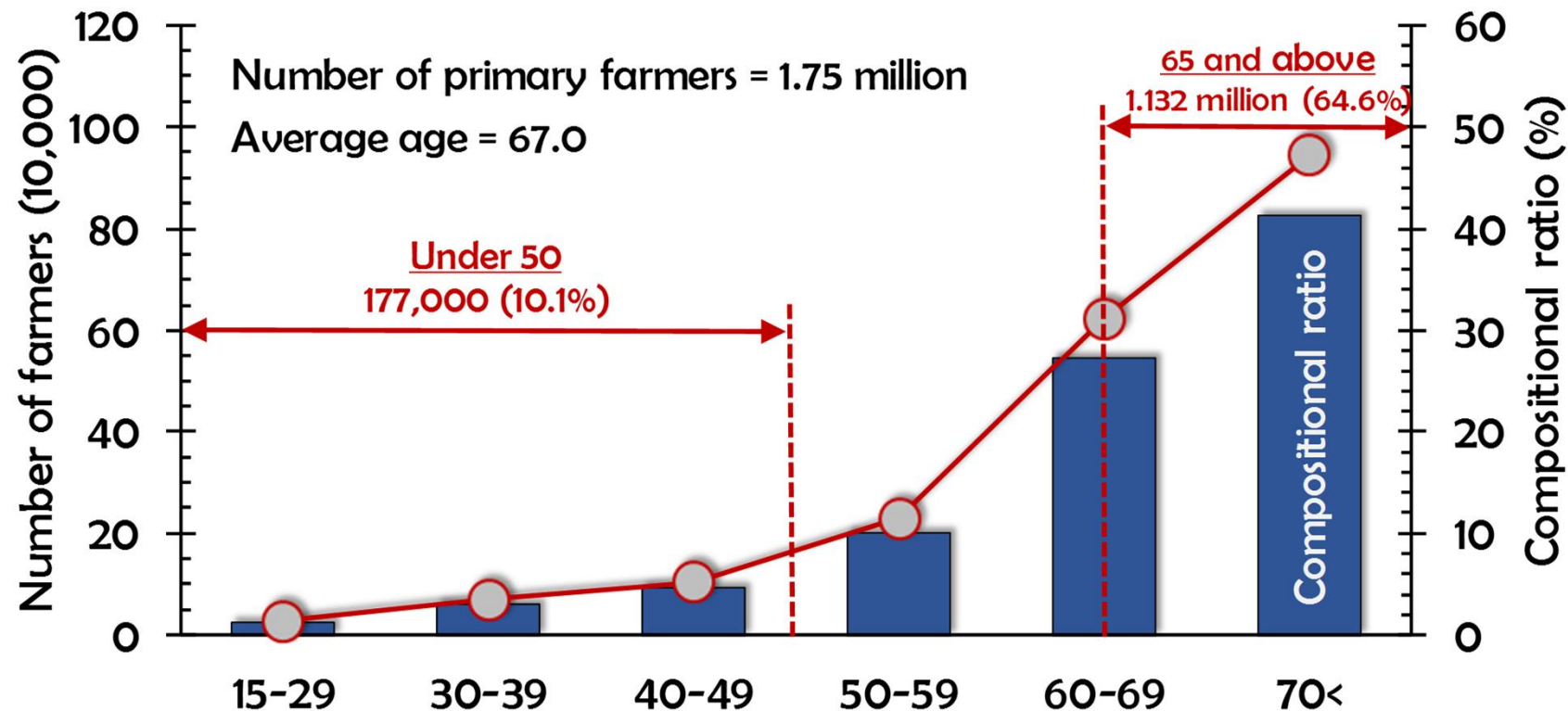
Institute of Agricultural Machinery

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Current State of Agriculture in Japan



1. Aging and lack of labor force
2. Sum is large but scattered farmland
3. Loss of experience due to retirement of elderly farmers



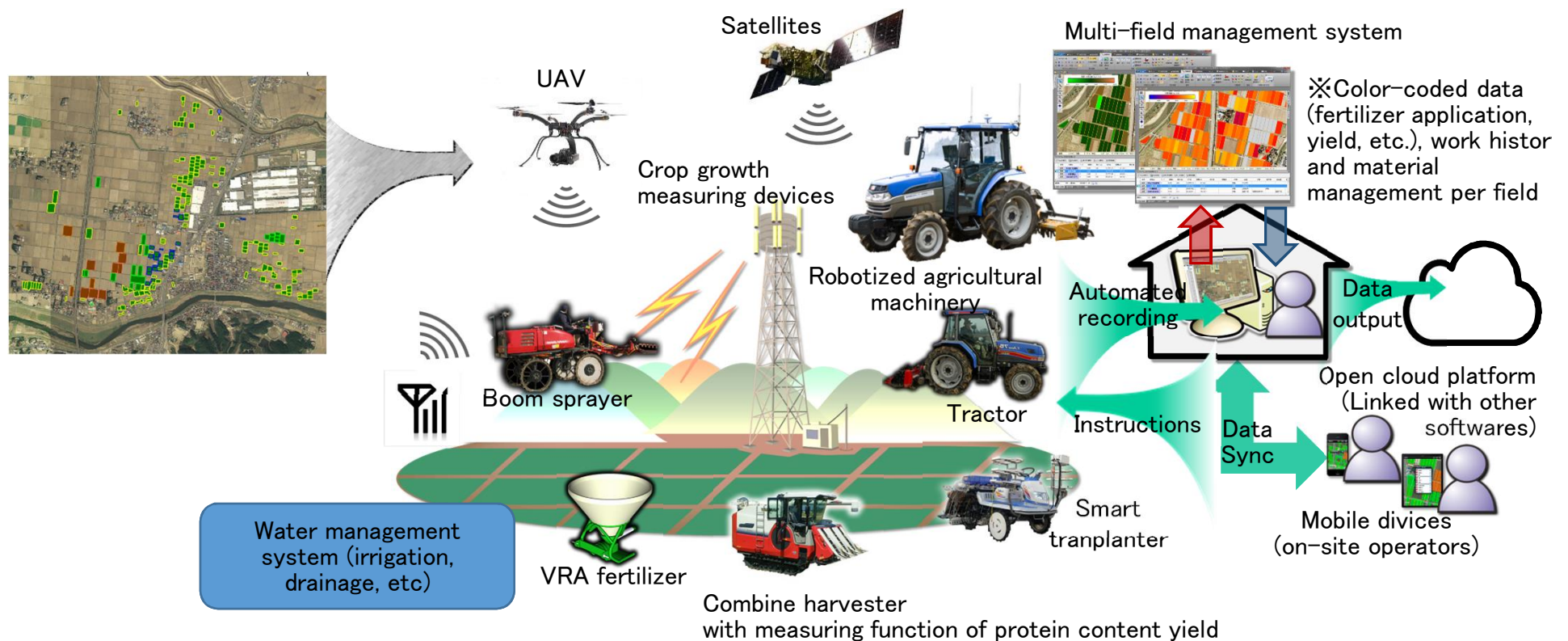
Overview of Smart Domestic Agriculture

: in the case of land-based farming



Mechanization of paddy and land farming, adaptation for larger-scale operations

Improvement in efficiency of multi-field farm management



Current State of Smart Agriculture in Europe



Motivation for Smart Agriculture
➡ Environmental issues
Cost reduction

Target for Smart Agriculture in Japan



Robot agricultural machinery initial cost



\$80,000~



\$34,000~



Running cost

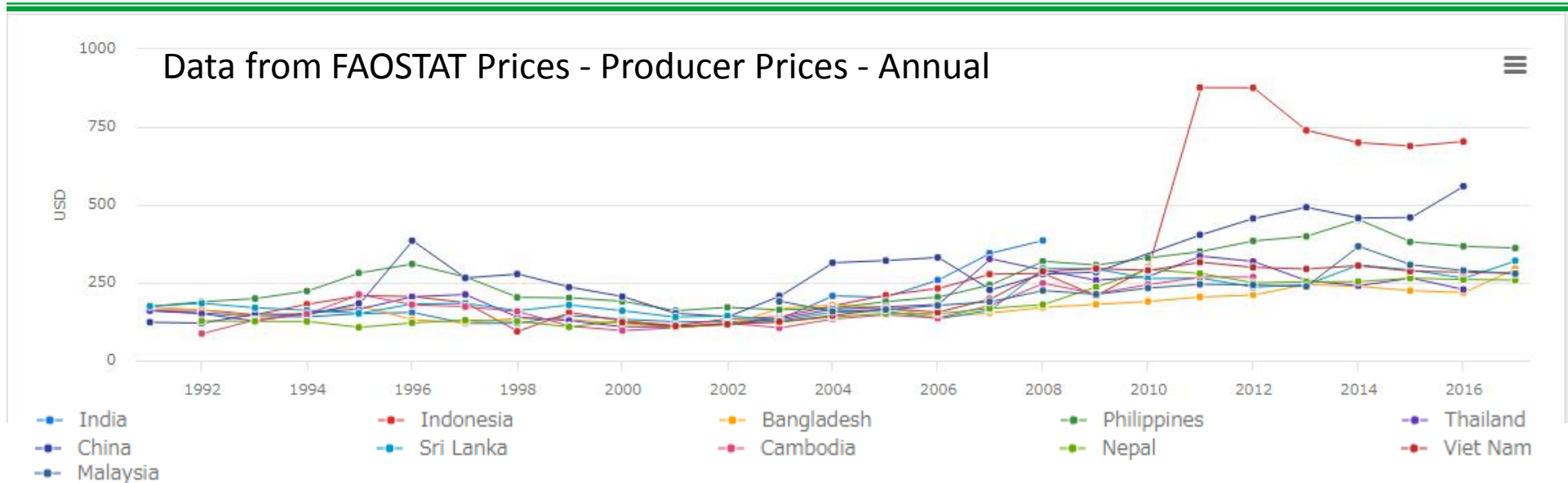


\$140,000 ~



Target for Smart Agriculture in Japan
Farmers cultivating more than 10ha

Rice Price in Asia



Annual income of Rice(paddy)

$$500(\text{USD/tonne}) \times 50,000(\text{hg/ha}) = \$2,500$$

Introducing Smart Agriculture to Asia
At what cost?

Agricultural mechanization for
Sustainable Agricultural production
by Smallholders

- ” **Affordable initial cost**
- ” **Affordable running cost**
- ” **Maintenance support network**



Is Smart Agriculture cost effective
for Smallholders in Asia?

Utilization of AI in Agriculture



Development of Disease and Pest Diagnostic Technology Utilizing AI

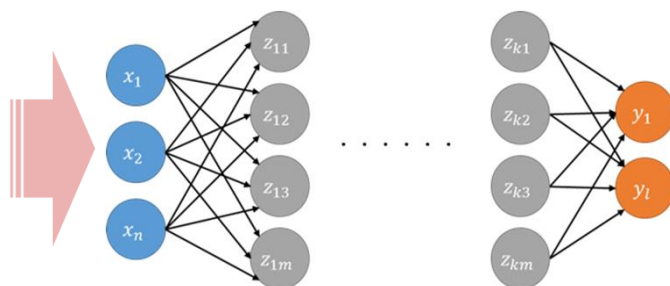
Diagnostic AI

Establishment of AI and Diagnostic Server for the Diseases and Pests Determination

Development of Disease Diagnostic AI

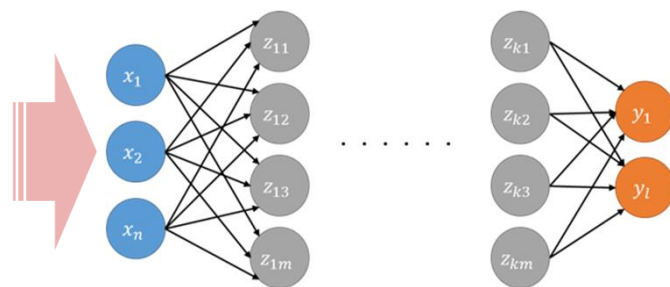


Downy Mildew <http://gaityuu.com/index.htm>



Disease
Diagnostic AI

Development of Pest Diagnostic AI



Pest
Diagnostic AI

Disease and Pest
diagnostic Server



Open to the public

Established and made available to the public a server that enables cross-sectional use of the Disease and Pest Diagnostic AI

Utilization of AI in Agriculture



Development of Disease and Pest Diagnostic Technology Utilizing AI

Diagnostic AI Commercial deployment of applications (image)

Free application for smartphones



- Free of charge to anyone
- Only identification of pests

Paid Smart Glass and Apps.



- Providing Smart Glass and Applications for a fee
- In addition identification of diseases and pests, methods of disinfection pesticides, etc. are provided.
- Collaboration with the authorities and companies about the detailed countermeasures

Provision of automated support system for agricultural work



- Early detection of diseases and pests by Drone patrol
- Pinpoint pesticide application at the detected spots of diseases and pests



Supporting mechanization systems and postharvest

Business models for contract service provision

Most machines are too expensive for individual farmers in particular if they only farm a few hectares. IRRI is developing pilot business models for contract service provision to enable small farmers to benefit from machinery or postharvest equipment through service provision. We are also developing ICT tools like [EasyHarvest](#) to facilitate machinery usage scheduling.

