



# AI in Japan

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 Mahidol Univ. (online)



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# Outline

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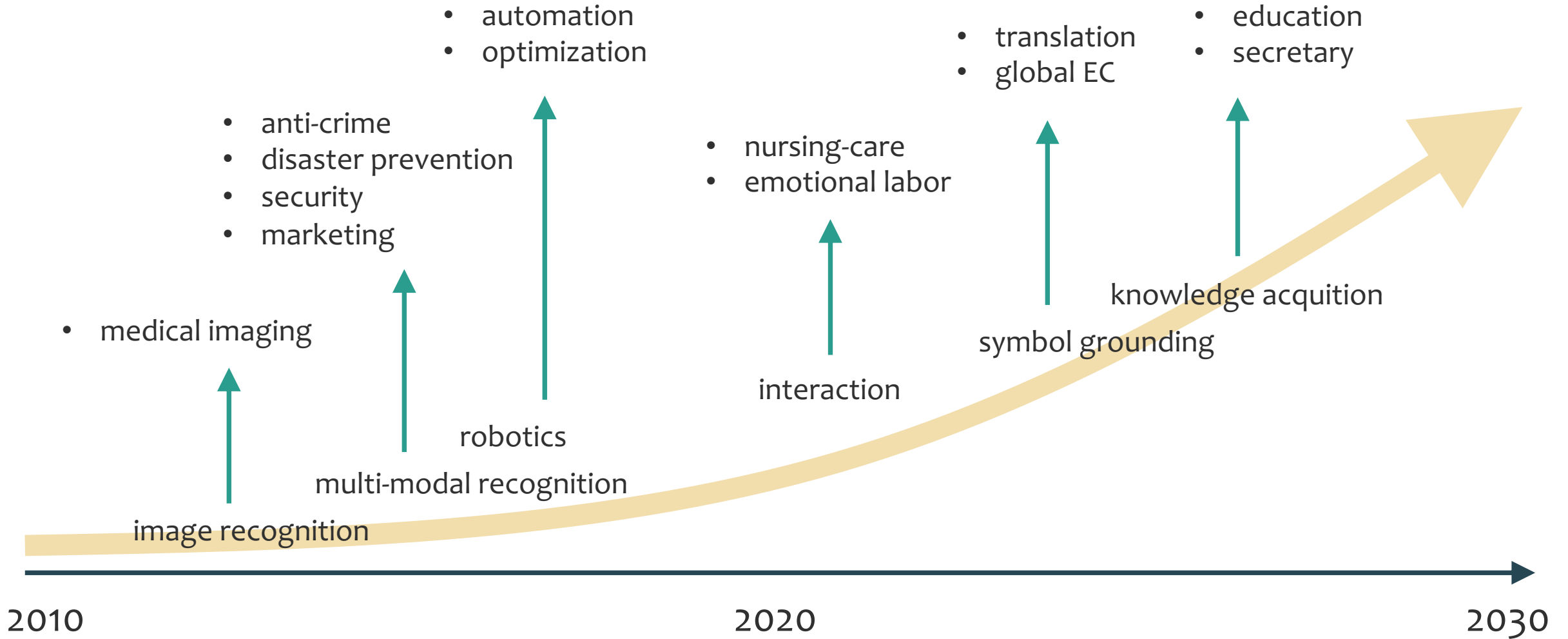


AI in Japan

Agricultural issues

Smart agriculture

# Technological developments in AI



# Manufacturing

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- malfunction prediction
- auto-restoration
- quality check
- visualization of production
- robotics

# Health care

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- genomic medicine
- diagnostic imaging
- drug development
- nursing robots

# Prevention of crimes and disasters

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- childcare
- suspicious behavior detection
- water level measuring system

# Outline

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AI in Japan



Agricultural issues

Smart agriculture



# Agriculture

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- Agriculture is an industry that uses the land to produce useful products for our life.
- Agriculture has roles in land conservation, landscape formation, maintenance of biodiversity, and succession of traditional culture.



# Agricultural Issues

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aging

labor shortage

abandoned  
farmland

climate changes

# Agricultural Issues

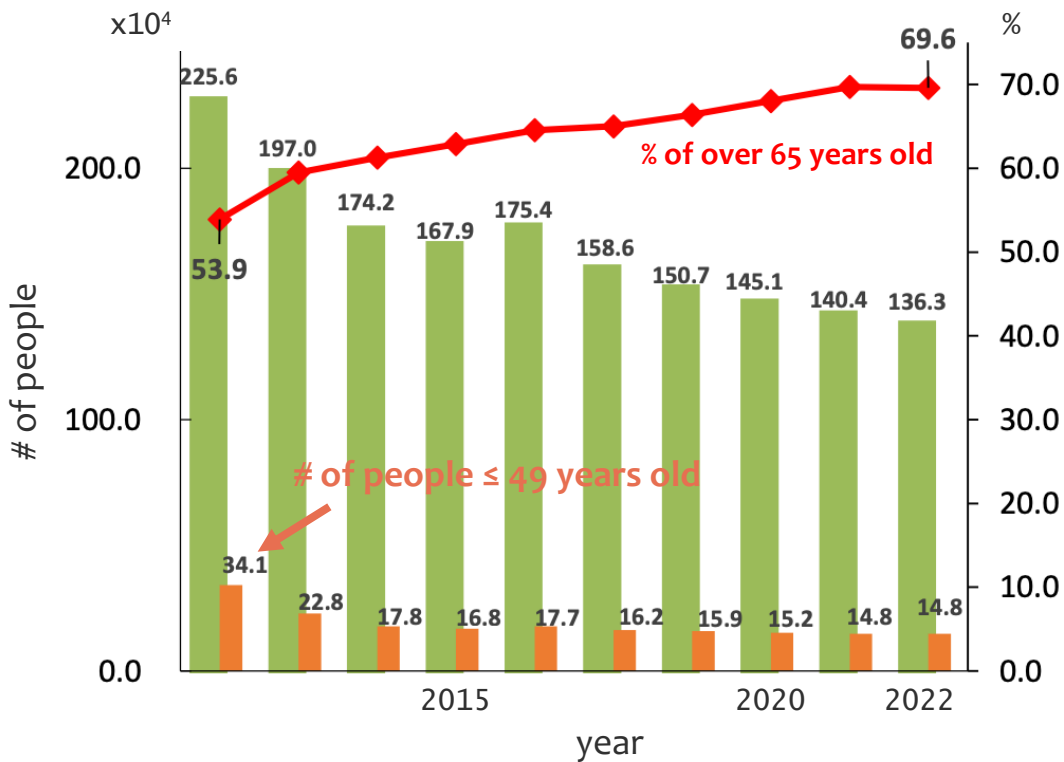
aging

labor shortage

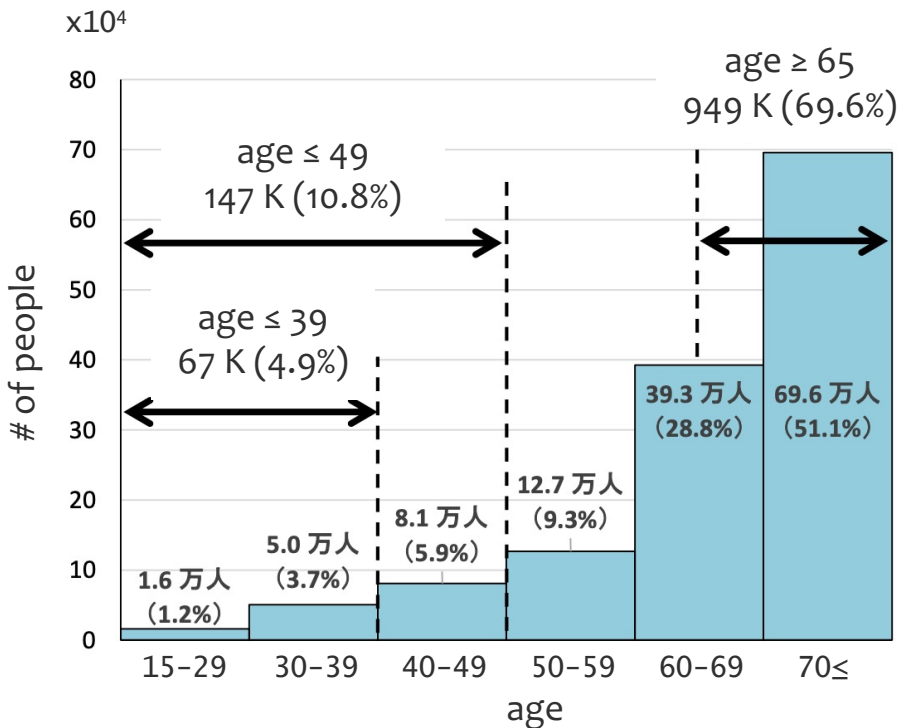
abandoned  
farmland

climate changes

primary farmers



age distribution of primary farmers



# Agricultural Issues

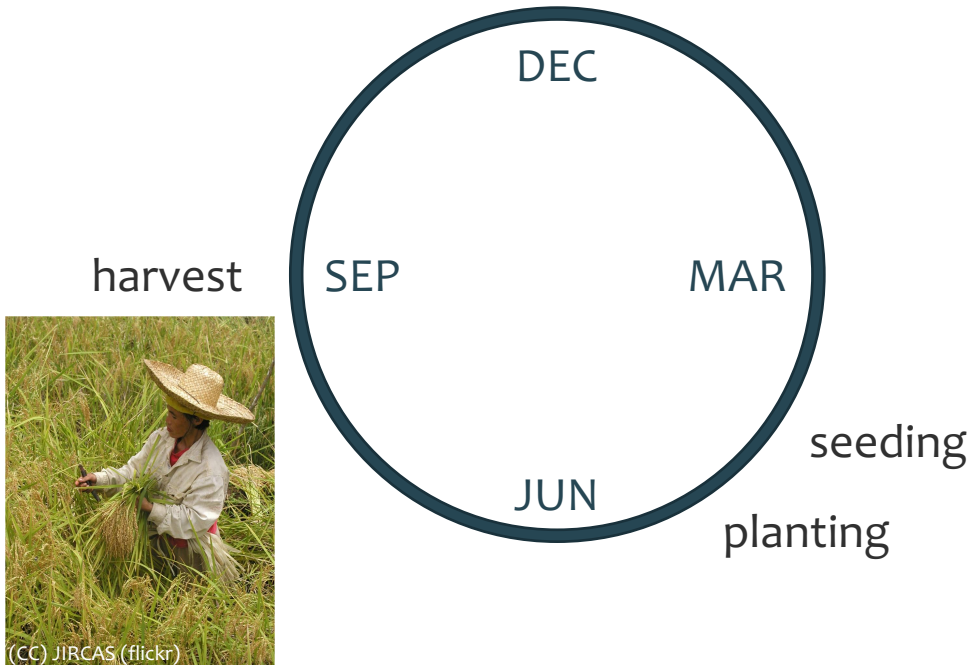
aging

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## Cultivation schedule of rice



- Agricultural work is concentrated at certain times of the year
- Availability of labor is essential for yield and quality



# Agricultural Issues

aging

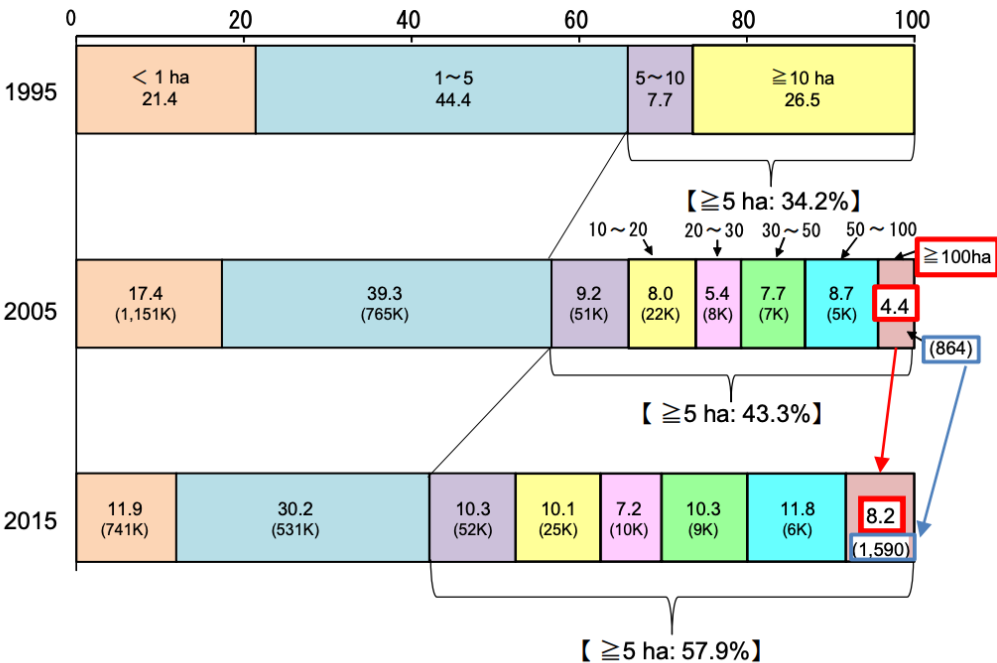
labor shortage

abandoned  
farmland

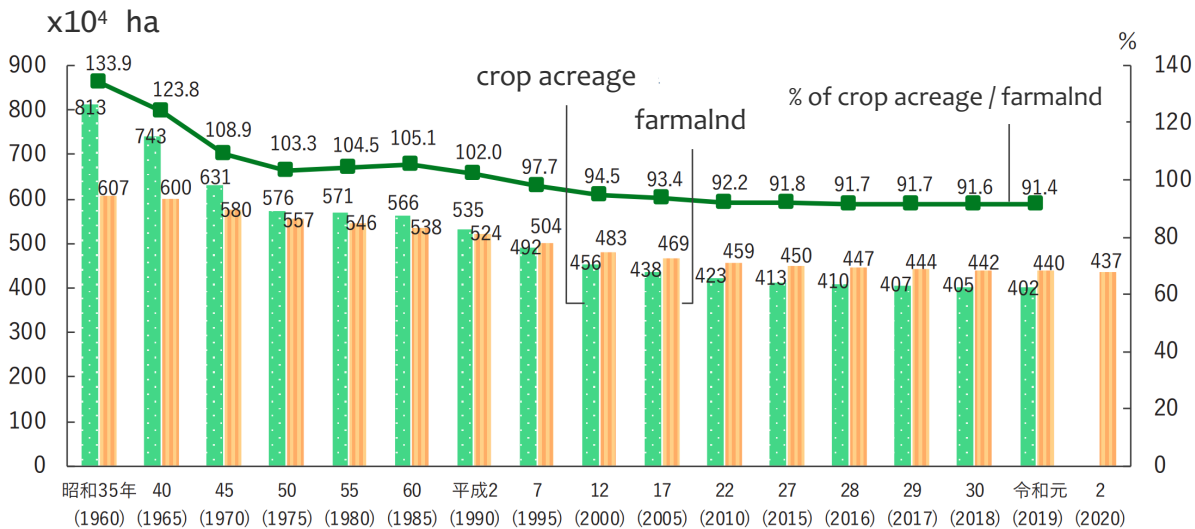
climate changes

ratios of accumulated cultivated acreage

1 ha = 10,000 m<sup>2</sup>



changes of crop acreage



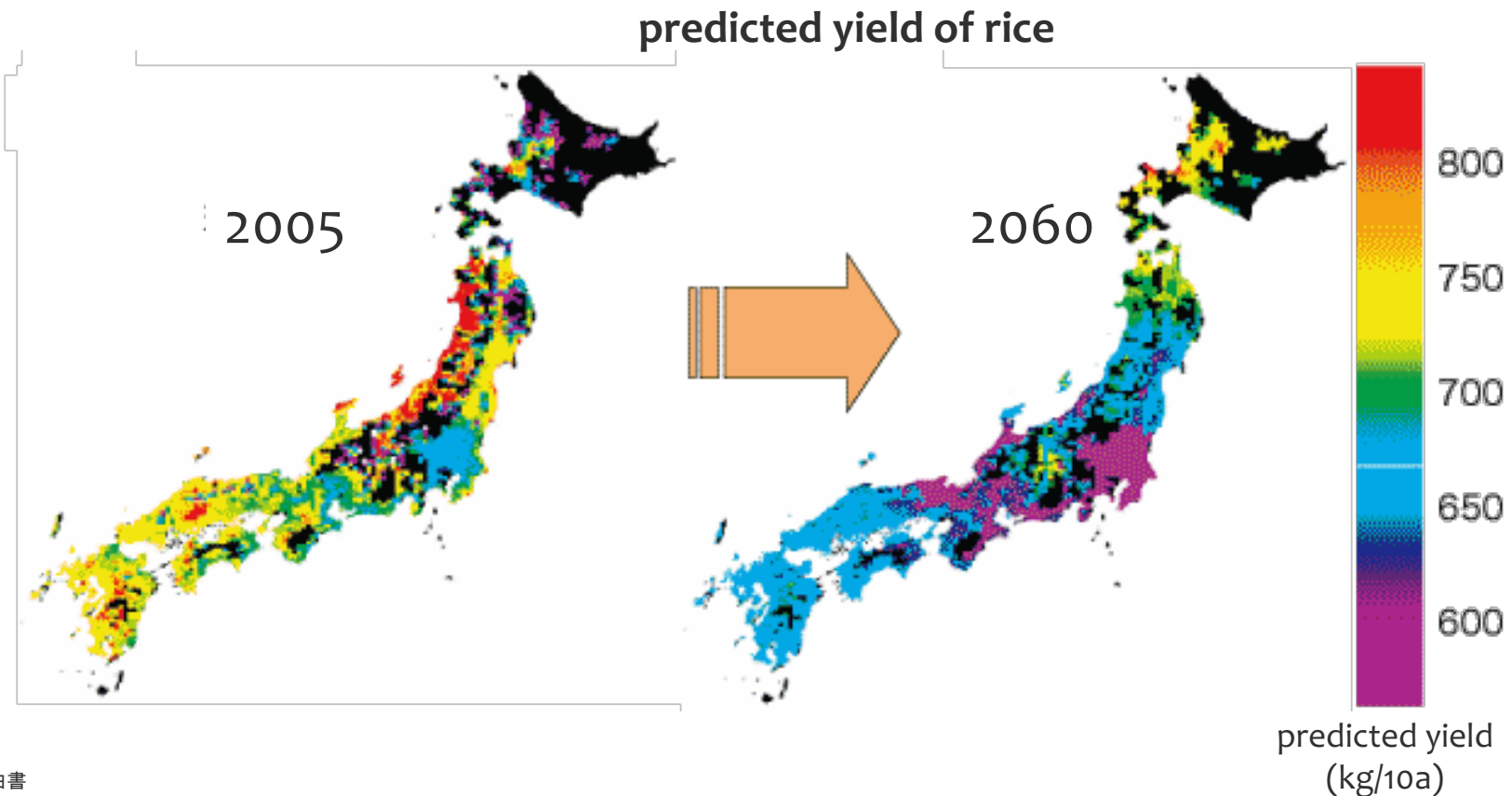
# Agricultural Issues

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# Outline

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Smart agriculture

# Smart Agriculture

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aging

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climate changes

Solutions

Smart Agriculture

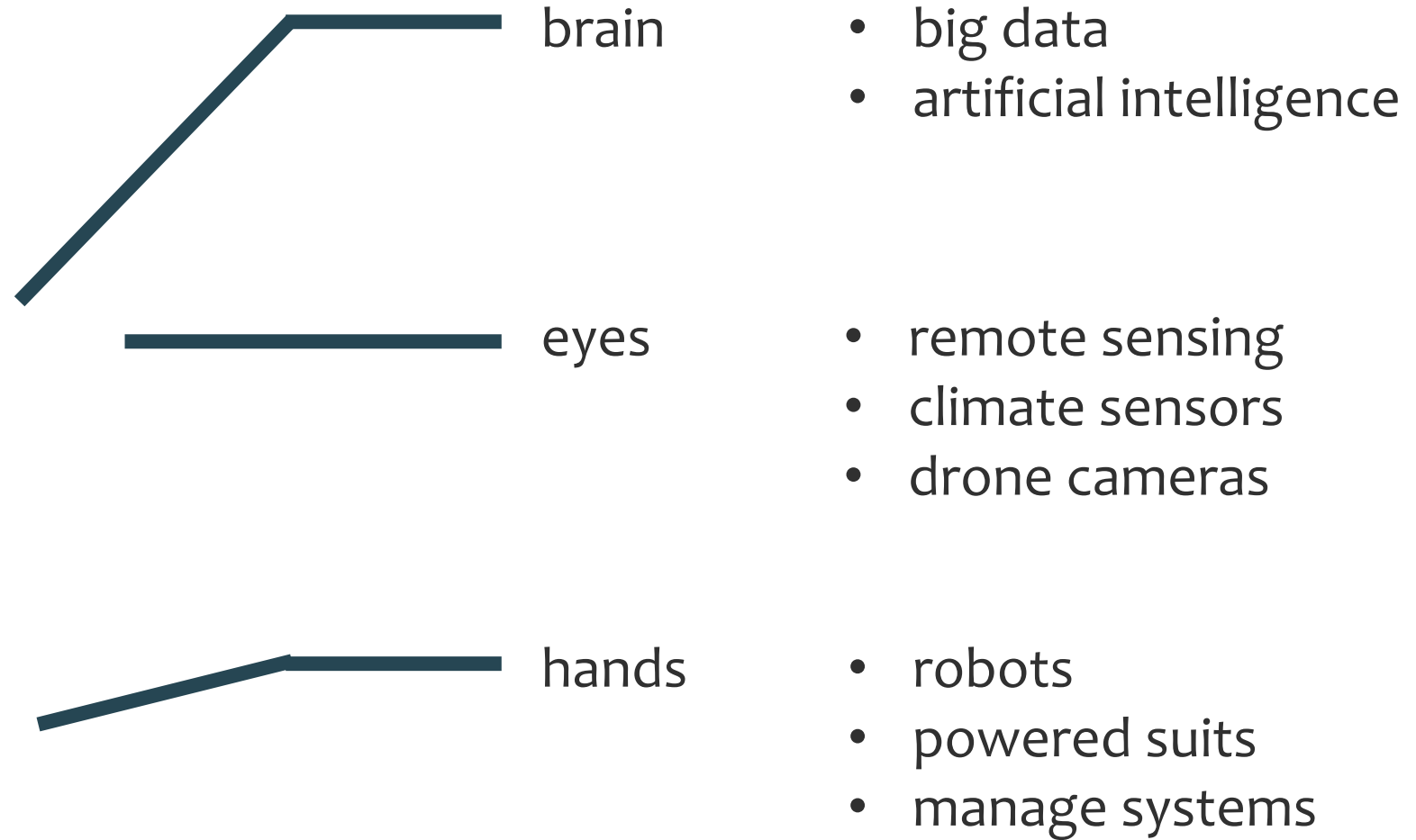
Agriculture



Advanced technology

# Smart Agriculture

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# Smart Agriculture

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## Agriculture issues

- aging
- labor shortage
- abandoned farmland
- climate changes



- technical capabilities
- existing skills
- judgment capabilities



solutions

- IoT/ICT
- artificial intelligence
- robots

# Approaches to Smart Agriculture

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## Problem definition

- increase crop yields?
- decrease labor cost?
- keep quality?

## Information organization

- any related technologies?
- need new tools or use the existed tools?
- need machine learning?
- need big data?
- realizable with current technologies?

## evaluation of effects and costs

- deployment costs?
- operational costs?
- incomes?
- easy-to-use? acceptable by farmers?

## Technology development

- tools development
- algorithms development



# strengths and weaknesses of Smart Agriculture

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	strengths	weaknesses	comments
auto tractor	automation, efficient	high cost need at least one person	need GPS signals
drone secing	large-scales	cost need image analysis battery (cannot fly too far) weather	need permission to fly
manage system	efficient low cost	cost (installation, maintenance)	also need check the plant condition to on/off treatment

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# Thank you for listening

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Solutions

Smart Agriculture

Agriculture



Advanced technology