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Current status and challenges of Japanese greenhouse horticulture: Latest developments in smart agriculture and regional energy utilization

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Scale expansion and corporatization are going on in Japanese agriculture

Increase in the numbers of corporations and lease schemes with the deregulation by the Ministry of Agriculture, Forestry and Fisheries (MAFF) of Japan

- Amendment of the "Cropland Act" in December 2009
 ⇒ Full deregulation of participation under cropland lease scheme
- "Corporation qualified to own cropland" that can acquire cropland must be a corporation
- "Partial Amendments to the Act on Reinforcement of the Agricultural Management Framework (2018)"
 - Even if the ground is covered with concrete, greenhouses may be constructed on cropland
 - There are examples of not only plant factories with solar light, but also those with artificial light constructed on "cropland"

	As of 1 Jan. 2010 (for the year 2009)	As of 1 Jan. 2019 (for the year 2018)
Number of corporations qualified to own cropland (Former Agricultural production corporations)	11,829 companies	19,213 companies
Cropland lease schemes by general corporations	427 companies	3,286 companies

Next-generation greenhouse horticulture model



Source: "Participation status of corporations qualified to own cropland", Ministry of Agriculture, Forestry and Fisheries of Japan (2019)

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Smart agriculture that supports the scale expansion and sophistication of Japanese agriculture

Harvesting robot



Yield forecast software





An example of smart agriculture acceleration demonstration project promoted by the MAFF



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For smart agriculture, Right ta Analysis

Data



Right data and analysis promote the automation, introduction of robots, and Al.

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What are the challenges for smart agriculture in Japan? Data are not standardized

Data	Challenges	If the challenges remain unsolved
Area, light transmittance, span pitch, thickness and number of aggregates of greenhouse	 Specifications differ by each order. Data cleansing requires much effort. BIG DATA are not formed. 	Analysis of greenhouse specifications requires much efforts, and growers are not able to address the data utilization.
Temperature measurement conditions	As a large number of manufacturers do not measure the temperature with "Assman aspiration psychrometer", which is internationally used as a standard, the measured data are unusable.	 Temperatures differ by up to 10°C between with and without aspiration. Growers are not able to conduct right analysis. National yield cannot be increased.
Communication network	 Termination of 3G network. A large number of manufacturers use 3G. Need to shift to 4G promptly. 	 Equipment for 3G network will become unusable. Unfruitful investment will be made. Growers' willingness to invest will be reduced.
Robots	Conditions of farms that require robots are not determined.	 Improvement in efficiency at a low yield will not lead to profits. Growers will not purchase expensive robots. Manufacturers will withdraw.
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To promote smart agriculture in Japan

Greenhouses



Environment measurement equipment

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Communication network

Need to determine the standard specifications!



Matters that JGHA wants to tackle with

Development of Japanese 1-ha greenhouse model

Cooperation of greenhouse manufacturers is necessary.

Standardization of environment measuring instruments to obtain data

- Cooperation of environment measuring instrument manufacturers is necessary.
- Open API initiative by the MAFF.



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For your information,

We introduced a European-style cucumber cultivation model developed by DELPHY of the Netherland. Demonstration experiment of the Dutch cultivation model has started in Japan.



Other challenges for Japanese agriculture with the scale expansion and corporatization going on



All the growers should be conscious of the utilization of resources and energy! Improvement of efficiency in distribution through the sophistication of IoT for kerosene / heavy-oil tanks







In some areas, planned and efficient distribution has started. (e.g.) Miyazaki Prefecture: Efficiency in distribution has improved by no less than 20%.

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Aims of JGHA

Standardization of greenhouses

Standardization of environment measuring instruments

JGHA aims at further development of Japanese greenhouse horticulture, while being in conscious of SDGs!

Improvement of efficiency in energy distribution

Promotion of smart agriculture





Thank you for your attention.

Japan Greenhouse Horticulture Association

