From the Expansion of WAGRI, Japan's Agricultural Data Collaboration Platform, into a Smart Food Chain to Discuss Smart Measures in Responding to the Pandemic

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I. Introduction

For the past few years, Taiwan has been progressively developing smart agriculture. During this process, general agricultural enterprises and farmers are challenged with and discouraged by expensive equipment installations and maintenance costs. The creation of a new business model which facilitates the circulation and application of agricultural data may lower the threshold of intellectualization acquisition, and become the key to the popularization and implementation of smart agriculture. This article shall analyze the strategy of promoting the use of data circulation for smart agriculture in Japan, which has a similar agricultural paradigm as Taiwan, and provide a reference for the development of smart agriculture in Taiwan.

Japan is facing the same problems as Taiwan, in terms of the aging farmers and low birth rates, that lead to the lack of successors. The Japanese government proposed the concept of Society 5.0 in 2016, expecting to use information and communication technology (ICT) to drive the development of various fields of society[1]. In the agricultural field, the use of ICT in agriculture can facilitate the transmission of experience by turning the tacit knowledge of experienced farmers into externalized data.

At that time, there were many ICT system service technologies developed by private companies In Japan, but the system services provided by various companies were not compatible with each other due to the lack of collaboration, and the data formats and standards produced by ICT system providers were varied; furthermore, the data in the public sector (research and administrative agencies) was also divided and managed independently. To facilitate the integration, management, and circulation of agricultural data, the Japanese Agricultural Data Collaboration Platform (WAGRI[2]) was born.

II. The Development of WAGRI

1. Japan's Prime Minister directed the construction of a data platform

The Japanese government held the 6th Future Investment Conference[3] on March 24, 2017, chaired by Prime Minister Shinzo Abe, who mentioned that in order to cultivate safe and tasty crops, the government and the private sector should provide each other with updated information on crop growth conditions, climate, maps, etc., and build an information collaboration platform that can be easily used by anyone by mid-2017, with all the necessary data fully disclosed. The project was handed over to the IT General Strategy Headquarters[4] to realize the above-mentioned platform.

At the 10th Future Investment Conference, held on June 9, 2017, the Future Investment Strategy 2017[5] was announced with the goal of realizing "Society 5.0". During the conference, it was mentioned that the "Japanese Agricultural Data Collaboration Platform (hereinafter referred to as WAGRI), which is based on publicly available information from the agriculture, forestry, and water industries, such as agricultural, topographical, and meteorological data held by the public sector, that can be shared and used for a variety of purposes, would be constructed in 2017.

2. The Trial Run of WAGRI

WAGRI is supported by the Cabinet Office's Phase 1 of the Strategic Innovation Promotion Program (SIP), under one of the 11 projects entitled "Next Generation Innovation Technologies for Agriculture, Forestry and Water Industries"17[6] (which is managed by The National Agriculture and Food Research Organization [NARO]17[7]). The platform was constructed by the SFC Research Institute of Keio University17[8] in collaboration with an alliance of 23 organizations that participate in SIP research, including agricultural production corporations, agricultural machinery manufacturers, ICT providers, universities, and research institutions (e.g., Japanese IT companies NTT - Nippon Telegraph and Telephone Corporation, Fujitsu Limited, major agricultural machinery manufacturer- Kubota Corporation, Yanmar Holdings Co., Ltd.)17[9]. WAGRI has three major functions: "cooperation" (breaking down the barriers between different systems so that data is compatible and interchangeable), "sharing" (data is shared in a way chosen by the providers, so as to facilitate the establishment of a business model for data exchange and use), and "provision" (soil and meteorological data are provided by public and private sectors to help facilitate data acquisition and subsequent circulation). During the trial run, there were practical cases that demonstrated that after the implementation of WAGRI, the costs of labor and time spent on data collection and utilization had been significantly reduced17[10].

3. The Independent Operation of WAGRI

In April 2019, WAGRI, which was originally supported by the SIP program, was transferred to NARO to be the main operating body and officially start the operation.

With the updated use of the information required to operate the WAGRI platform independently, starting in April 2020, the original no-fee approach has been changed. Organizations wishing to use WAGRI are required to pay variable fees according to the following two methods of using the platform [11]:

(1)Data users (those who use WAGRI data), data users-and-providers (those who use WAGRI data and provide data to WAGRI)
·Monthly fee of 50,000 yen for platform use.
·If fee-based data is accessed, a separate data usage fee must be paid.
(2)Data providers (those who provide data to WAGRI)
·Monthly fee of 30,000 yen for platform use.

·Proviso: If the data provided is free of charge, in principle, there is no requirement to pay the platform utilization fee.

III. Application of WAGRI's Expansion in Response to the Pandemic

The Smart Food Chain Alliance[13], which is supported by one of the 12 projects of the SIP Phase 2 program - "Smart bio industry / basic agricultural technology[12]", will expand WAGRI, which was established with the support of the SIP Phase 1 program, to build a smart food chain platform (WAGRI-dev for short).The main mission of the Smart Food Chain Alliance is to build a smart food chain (commercialized services are expected to begin in 2025) that enables the interoperability of data related to food processing, distribution, sales, and exports, to serve as a basis for fresh food logistics in Japan. This platform is built on the framework of WAGRI, and expanded to WAGRI-dev.

In response to the pandemic, the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO) jointly issued the "Interim guidance for COVID-19 and Food Safety for competent authorities responsible for national food safety control systems[14]" on April 7, 2020. Based on these guidelines, the Smart Food Chain Alliance of the Japanese SIP program "Smart bio industry / basic agricultural technology" has developed "Guidelines for the Novel Coronavirus (COVID-19) Countermeasures". As part of the above-mentioned program, the "Japanese Food Guidelines Collaboration System (WAGRI.info, in short)"[15] developed countermeasure applications to respond to the pandemic.

WAGRI.info opened its website on July 13, 2020 to accept food safety registrations from food and agricultural product related companies. This registration is not limited to those who meet the COVID-19 countermeasure guidelines, but also those who meet the existing quality and safety management guidelines (e.g. Hazard Analysis and Critical Control Points (HACCP), etc.). It also provides a corporate search function for general public use.

WAGRI.info is a part of WAGRI-dev, and will add various data collaboration functions and measures in the future to prevent data manipulation and unauthorized access. The Japanese government originally expected to build the world's first smart food chain platform that includes data from production to processing, distribution, sales and exporting by expanding WAGRI; in response to the pandemic, related functions were added to create a food safety information network.

In Taiwan, there are also data platforms related to smart agriculture that provide OPEN DATA interface functions[16], and the development of food safety traceability integrated application systems to provide information on the flow of school lunch ingredients. In addition to Japan's WAGRI model of data integration and sharing that, can be used as a model for the development of smart agriculture in Taiwan, WAGRI.info's approach can also be used as a reference for domestic food safety policies, in response to the pandemic.

[1]"The Science and Technology Basic Plan", Cabinet Office of Government of Japan website: https://www8.cao.go.jp/cstp/kihonkeikaku/index5.html (last viewed on 07/12/2021).

[2]WAGRI is a data platform that consists of a variety of data and services connected to form a wheel that coordinates various communities and promotes "harmony", with the anticipation of leading innovation in the field of agriculture. The word is formed by the combination of WA + AGRI (WA is the Japanese word for harmony + AGRI for agriculture). WAGRI website, https://wagri.net/ja-jp/ (last visited on 07/12/2021).

[3]As the command headquarters of the Japanese government for implementing economic policies and realizing growth strategies, the Headquarters for Japan's Economic Revitalization has been holding a "Future Investment Conference" session approximately every month since 2016, to discuss growth strategies and accelerate social structural reforms, so as to expand future investment. "Headquarters for Japan's Economic Revitalization", Prime Minister of Japan and His Cabinet website, http://www.kantei.go.jp/jp/singi/keizaisaisei/ (last visited on 07/12/2021).

[4]The Japanese government has been actively promoting the use of IT as a means of helping to solve social issues in various fields. In 2000, the IT Basic Act (Basic Act on the Formation of an Advanced Information and Telecommunications Network Society) was enacted in Japan, and in the following year, the IT Strategy Headquarters (Strategic Headquarters for the Promotion of an Advanced Information and Telecommunications Network Society) was established in accordance with the said laws. In 2013, in accordance with the Government Chief Information Officer (CIO) Act, the Cabinet Secretariat established the position of Deputy Chief Cabinet Secretary for Information Technology Policy (Government CIO, in short), and IT Strategic Headquarters was integrated with the GCIO to be the IT Comprehensive Strategy Headquarters (Strategic Headquarters for the Promotion of an Advanced Information and Telecommunications Network Society, IT Comprehensive Strategy Headquarters) to rapidly promote the key policies for an advanced telecommunications network society, and to break the vertical gap of the ministries and departments, and to connect the entire government horizontally. "Strategic Headquarters for the Promotion of an Advanced Information and Telecommunications Network Society" (IT Comprehensive Strategy Headquarters), Prime Minister of Japan and His Cabinet website, https://www.kantei.go.jp/jp/singi/it2/ (last visited on 07/12/2021).

[5]Hsu, Yu-Ning, "The 10th Future Investment Conference, held at the Prime Minister's Residence of Japan, proposing Japan's "Future Investment Strategy 2017", to realize "Society 5.0" as its goal", Science & Technology Law Institute website, https://stli.iii.org.tw/article-detail.aspx?no=64&tp=1&i=72&d=7844, (last visited on 07/12/2021).

[6]Focusing on the important issues of "Society 5.0" in conjunction with the key areas of governance of the Future Investment Conference, the Cabinet Office set up an annual budget for science and technology to help create and promote the "Strategic Innovation Promotion Program (SIP)". The first phase of the SIP is a five-year program running from FY2014 to FY2018. "Strategic Innovation Promotion Program (SIP)", Cabinet Office website, https://www8.cao.go.jp/cstp/gaiyo/sip/index.html (last visited on 07/12/2021). Qiu, Jin-Tien (2017), "Technology Innovation Strategy for Realizing the Super Smart Society (Society 5.0) in Japan", National Applied Research Laboratories website, https://portal.stpi.narl.org.tw/index/article/10358 (last visited on 07/12/2021)

[7]The National Agriculture and Food Research Organization, NARO in short, is a national research and development corporation for agricultural and food industry technology.

[8]The SFC Research Institute, located on the Shonan-Fujisawa campus of Keio University, is a research institute affiliated with the Graduate

School of Policy and Media Studies, the Department of General Policy, and the Department of Environmental Intelligence, and is an important research institute involved in the development of smart agriculture in Japan. Professor Atsushi Shinjo is the research director of WAGRI, and he is also the Deputy Government CIO of the Cabinet Secretariat and the Acting Director of the IT Strategy Office, contributing to the creation of the "Agricultural Information Creation and Distribution Promotion Strategy". He also serves as the President of the WAGRI Council and the Director of NARO's Agricultural Data Collaboration, and facilitates the coordination between WAGRI and Japan's smart agriculture empirical Project. He is a key player in the Japanese government's efforts to promote the flow of agricultural data, and is committed to promoting the development of smart agriculture in Japan. Keio Research Institute at SFC website, https://www.kri.sfc.keio.ac.jp/ (last visited on 07/12/2021).

[9]IoTNEWS, Building an 'Agricultural Data Collaboration Platform' Using Microsoft Azure Through Industry-government-academia Collaboration to Realize Digital Agriculture" 05/15/2017, https://iotnews.jp/archives/56366 (last visited on 07/12/2021).

[10]Shinjo, Atsushi, "ICT changes society: Development of agricultural data collaboration platform and future plans, Technology and Promotion : Journal of the National Council of Agricultural Promotion and Staff Council Organization, December, pp. 24-26 (2017); Technology Policy Office, Ministry of Agriculture, Forestry and Fisheries, "Construction of agricultural data collaboration platform", 2018/09，http://www.affrc.maff.go.jp/docs/smart_agri_pro/attach/pdf/smart_agri_pro-15.pdf .(last visited on 07/12/2021).

[11]"The Use of the Agricultural Data Collaboration Platform (WAGRI) Since FY2019", NARO website https://www.naro.go.jp/project/results/juten_fukyu/2018/juten01.html (last visited on 07/12/2021). , NARO website https://www.naro.affrc.go.jp/laboratory/rcait/wagri (last visited on 07/12/2021).

[12]Same as Note 6; The SIP Phase 2 plan runs for a total of approximately five years, from the end of FY2017 to FY2022.

[13]The construction of a smart food chain is one of the main research topics of the project. The members of the Smart Food Chain Alliance include: the Cabinet Secretariat, the Cabinet Office, the Ministry of Agriculture, Forestry and Fisheries, and other government organizations as observers, and more than 70 organizations as participants, including local governments, academic and research institutions, agricultural production corporations, wholesale markets, mid-marketers, logistics industries, retail businesses, manufacturers, and ICT providers (The representative of the Alliance is the Keio Research Institute at SFC), reference Note 13. SIP vol. 2, [Symposium on "Smart Bio-industry and Agricultural Technology" 2020 - Aiming to build a new smart food chain] 03/10/2020, WAGRI website, https://wagri.net/ja-jp/News/generalnews/2020/20200310 (last visited on 07/12/2021).

[14]See FOOD AND AGRICULTURE ORGANIZASTION OF THE UNITED NATIONS [FAO], COVID-19 and Food Safety: Guidance for Food Businesses: Interim guidance (Apr. 7, 2020), http://www.fao.org/family-farming/detail/en/c/1275311/ (last visited Oct. 8, 2020). Food and Agriculture Organization of the United Nations and World Health Organization jointly issued Interim guidance for COVID-19 and Food Safety for competent authorities responsible for national food safety control systems, Chinese Academy of Inspection and Quarantine, http://www.caiq.org.cn/kydt/902625.shtml (last visited 07/12/2021).

[15]WAGRI.info Office, "WAGRI.info (Food Guideline Collaboration System) website launched and began accepting business registration", 07/13/2020, https://kyodonewsprwire.jp/release/202007131927 (last visited on 07/12/2021). Japanese Food Guideline Collaboration System WAGRI.info website, https://www.wagri.info/ (last visited on 07/12/2021).

[16]Smart Agriculture Common Information Platform Website, https://agriinfo.tari.gov.tw/ (last visited 07/12/2021); "Smart Agriculture 4.0 Common Information Platform Construction (Phase II) Results Presentation", 12/12/2019, Smart Agriculture Website, https://www.intelligentagri.com.tw/xmdoc/cont?xsmsid=0J141518566276623429&sid=0J338358950611186512, (last visited on 07/12/2021).

Links

- The Science and Technology Basic Plan
- WAGRI
- Headquarters for Japan's Economic Revitalization
- Strategic Headquarters for the Promotion of an Advanced Information and Telecommunications Network Society (IT Comprehensive Strategy Headquarters)
- The 10th Future Investment Conference, held at the Prime Minister
- Strategic Innovation Promotion Program (SIP)
- Technology Innovation Strategy for Realizing the Super Smart Society (Society 5.0) in Japan
- Keio Research Institute
- Building an 'Agricultural Data Collaboration Platform' Using Microsoft Azure Through Industry-government-academia Collaboration to Realize Digital Agriculture
- The Use of the Agricultural Data Collaboration Platform (WAGRI) Since FY2019
- Application for using WAGRI
- Symposium on "Smart Bio-industry and Agricultural Technology" 2020 - Aiming to build a new smart food chain
- COVID-19 and Food Safety: Guidance for Food Businesses: Interim guidance
-
  Food and Agriculture Organization of the United Nations and World Health Organization jointly issued Interim guidance for COVID-19 and Food Safety for competent authorities responsible for national food safety control systems
- WAGRI.info (Food Guideline Collaboration System) website launched and began accepting business registration
- Japanese Food Guideline Collaboration System WAGRI.info website
- Smart Agriculture Common Information Platform Website
- Smart Agriculture 4.0 Common Information Platform Construction (Phase II) Results Presentation

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