Workshop on Digital Agricultural Technologies for Climate Change Adaptation and Enhancement of Food Productivity

APEC Agricultural Technical Cooperation Working Group

December 2025

Asia-Pacific
Economic Cooperation

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I. Introduction

Globally, the impacts of climate change such as rising temperatures, altered rainfall patterns, more frequent extreme heat and droughts, and the increasing incidence of extreme weather events pose critical challenges to agricultural productivity and crop stability. Especially, developing economies and rural areas, which are particularly vulnerable to climate change, face heightened exposure to these shocks, and the resulting uncertainty and fragility of food supply chains lead to sharp increases in food prices, worsening malnutrition, and widening social inequalities. To overcome these crises and secure sustainable food provision and resilient agricultural systems, digital technologies are no longer optional but essential. Recent reports from international organizations underscore this imperative, noting that "climate technologies are a key enabler to support climate action and the sustainable transition of agrifood systems" (FAO, 2024) and that "digital technologies in agriculture and rural areas… to offer greater food security, profitability and sustainability" (FAO, 2019). The joint FAO–UNFCCC report '*Climate Technologies for Agrifood Systems Transformation'* (2024) further highlights the critical role of technology in transforming agrifood systems under the vision of placing food security, climate change and poverty reduction at the forefront. According to this report, many climate-related technologies already exist, some are still emerging, and they must be adapted and applied in line with specific local contexts and conditions. Numerous academic studies also show that the adoption of digital agriculture can significantly contribute to greenhouse gas emissions mitigation, increased agricultural productivity, and enhanced adaptive capacity to climate change. Recognizing digital agriculture as a key element in addressing climate change and ensuring food security, this project was implemented with funding from the APEC Support Fund (ASF): Digital Innovation.

Conducted over two days in Incheon, Republic of Korea, the project consisted of a first-day in-person workshop and a second-day field trip and wrap-up discussion. Through this project, APEC member economies shared experiences on digital technologies and greenhouse gas–reducing practices applied from crop production to distribution, and exchanged views on the challenges of adopting smart farming and digital solutions as well as the policy and regulatory requirements necessary for their stable diffusion. These outcomes are consistent with the priority areas and key performance indicators of the APEC Agricultural Technical Cooperation Working Group (ATCWG) Strategic Plan 2021–2025 and will contribute to the realization of the Food Security Roadmap Towards 2030, the Putrajaya Vision 2040, and the Bangkok Goals.

II. Pre-workshop Study

We analyzed the agricultural economy and digital infrastructure of each economy using primary data sources such as the FAO database and economy's domestic statistics, and examined digital agriculture policies and technology adoption cases by reviewing research and policy reports, academic papers, and other relevant literature, as well as information gathered through online searches.

○ Australia has expanded on-farm trials of data-driven agricultural technologies under the Ag2030 Strategy. Autonomous robots developed by SwarmFarm and the AgriWebb farm management app have been applied. While startup support and R&D investment have been encouraged, challenges remain due to the wide spacing between farms, underdeveloped telecommunications infrastructure, and the concentration of adoption among large-scale commercial farms.

○ Brunei Darussalam; Hong Kong, China; and Singapore have small agricultural sectors but apply digital technologies to food distribution and safety management by leveraging their advanced ICT infrastructure. Urban high-value agriculture and vertical farming have shown promising results in specific domains.

○ People's Republic of China has promoted digital agriculture through the Digital Agriculture and Rural Development Plan (2019− 2025), focusing on technologies such as unmanned agricultural machinery, smart greenhouses, and AI-based pest control. A coordinated model between central and local governments and private companies has been adopted, including the operation of pilot zones. Still, technology adoption is constrained by low acceptance among farmers, a lack of standardization, and regional digital infrastructure gaps.

○ Indonesia has implemented the Digital Farming Initiative, expanding the use of precision farming platforms, remote diagnostic systems, and smart farming apps. Start-up participation among young farmers has been active, but digital infrastructure disparities, regulatory gaps, and affordability issues among low-income farmers remain significant challenges.

○ Japan has implemented the Smart Agriculture Implementation Strategy and the Green Food System Strategy, establishing a public-private partnership structure to promote digital agriculture. Through the WAGRI platform, the integration and use of agricultural data have been pursued, and technologies such as autonomous tractors, drones, smart greenhouses, and AI-based pest detection have been deployed. However, the high proportion of elderly farmers, fragmented farmland structure, and data privacy regulations have posed major limitations.

○ Republic of Korea is promoting a development strategy for third-generation smart farm technologies aimed at systemizing and unmanned automating the entire agricultural process. The goal is to establish smart greenhouses that can collect environmental information through multiple sensors and control operations based on data analyzed with big data and artificial intelligence technologies. Currently, digital technologies under development include image-based pest and disease diagnosis, automated image analysis systems for crop growth monitoring, and unmanned robots, which are being applied on a pilot basis. However, due to high costs and the limited acceptance of technology among farmers, the diffusion of these technologies remains at an early stage.

○ Latin American economies such as Chile; Mexico; and Peru are in the early stages of adopting smart farming, with limited use of technologies such as drones and weather prediction systems. However, expansion has been limited by financial constraints, a shortage of skilled personnel, and inadequate infrastructure.

○ Malaysia has applied IoT, AI, and blockchain technologies to agricultural production and distribution under the National Agrofood Policy. Although adoption has focused on high-value commodities, smallholder access to technology and disparities in capabilities between the public and private sectors have been barriers.

○ New Zealand has introduced IoT-based livestock monitoring and automated feeding systems, with an emphasis on digital technologies in the livestock sector. However, the limited acceptance of technology among traditional farmers, high initial investment costs, and strict environmental regulations have restricted broader adoption.

○ Thailand has pursued precision agriculture, remote sensing, and automation technologies through public-private partnerships. Despite these efforts, small-scale farm structures, limited technological awareness, and weak digital infrastructure continue to hinder widespread diffusion.

○ The Republic of the Philippines has advanced agricultural digitalization under the Philippine Development Plan (2023-2028), deploying mobile apps for pest diagnosis and climate information services. However, limitations persist due to weak communications infrastructure, limited access to high-cost equipment, and low levels of digital literacy among farmers.

○ The United States has promoted digital innovation under the USDA's Agriculture Innovation Strategy, encouraging the private-sector-led dissemination of precision farming, smart livestock management, and indoor agriculture. Technologies such as John Deere's autonomous machinery and the FieldView platform are widely applied. Nevertheless, high equipment costs, disparities in rural infrastructure, and concerns over data ownership remain key challenges.

○ Viet Nam has linked its National Digital Transformation Program with the Sustainable Agriculture Development Strategy and has introduced technologies such as drones, sensors, and mobile-based pest diagnosis. Nevertheless, poor standardization, limited data integration, and regional digital gaps present key challenges.

III. Workshop Summary

The workshop was held in Incheon, Republic of Korea on August 5–6, 2025, with 64 representatives from 16 APEC member economies in attendance. Among the participants, 36 were female (56%) and 28 were male (44%). The first day's workshop comprised three sessions: Session 1: Digital Agricultural Technologies and Applications for Enhancing Climate Change Adaptation; Session 2: Digital Agricultural Technologies and Applications for Food Security; and Session 3: Limitations and Challenges of Digital Agricultural Technology. On the second day, participants visited the National Agricultural Museum, which showcases the history and advancement of Republic of Korea's agricultural technologies, and the Genetic Resources Center of the National Institute of Agricultural Sciences, where seeds are securely duplicated using digital technologies. Through these visits, participants were able to gain a first-hand understanding of Republic of Korea's digital agriculture innovations.

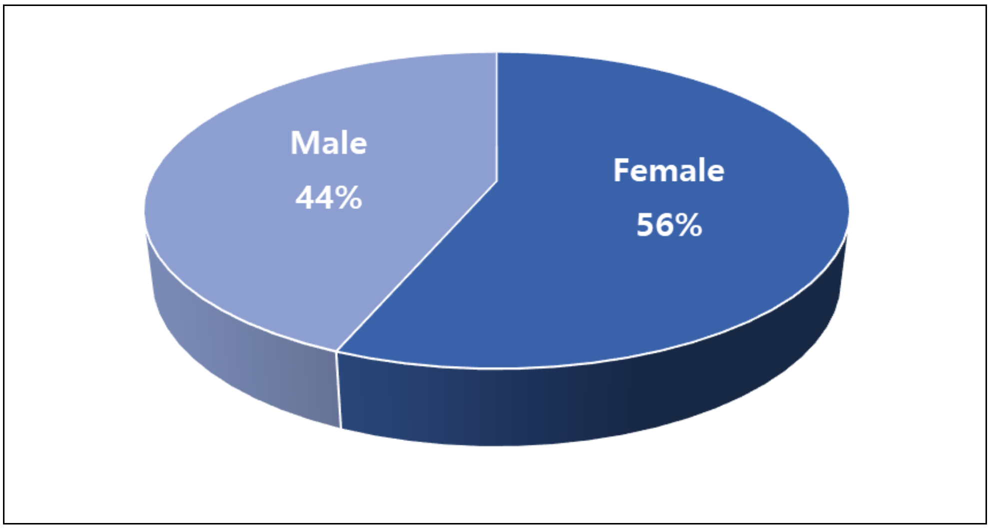

Figure 1. Participants' percentages in genders

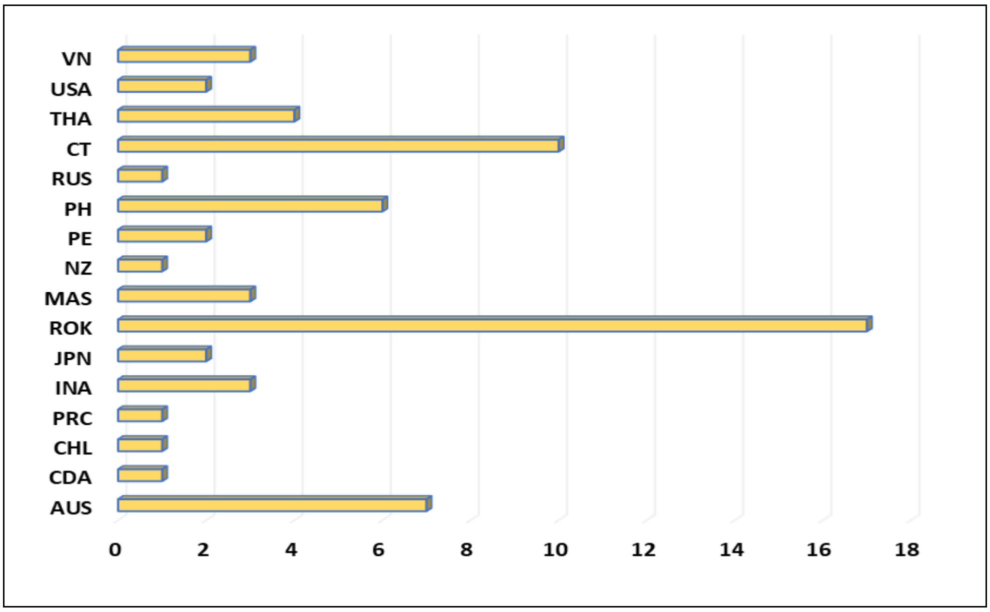

Figure 2. Number of participants by APEC economies

1. Session 1: Digital agricultural technologies and applications for enhancing climate change adaptation

1-1. Cropping Calendar Information System: Climate Smart Adaptation for Food Crop in Indonesia

Dr. Rima Purnamayani, Director, Indonesian Agroclimate and Hydrology Engineering and Testing Institute, Indonesia

Indonesia's Food Self-Sufficiency Blueprint (2024-2029)

Indonesia is implementing a comprehensive Food Self-Sufficiency Blueprint to enhance domestic agricultural productivity and food security. Through the Energy Independence program B100, the Urban Nutritious Food program, initiatives to increase milk production for improved nutrition, the Accelerating Strategic Export Commodity program, and the National Self-Sufficiency program, the government aims to raise agriculture's contribution to GDP from 0.18 percent to 4.0 percent.

Climate Resilient Food Crop Production Planning: SIAP TANAM

Indonesia has experienced declining crop yields caused by climate change, including rising temperatures, altered rainfall patterns, extreme weather events, and sea-level rise. To address these challenges, the government developed SIAP TANAM, a crop production planning system with a user-friendly interface accessible both online and offline. The system provides essential information to support stable food crop production, such as planting calendars for food crops (rice, corn, and soybean), water requirement estimates, fertilizer usage guidance, and recommendations of crop varieties suitable for specific environmental conditions.

SIAP TANAM also builds a regional crop production database to assist stakeholders in policy planning and decision-making. Implementation of the recommended planting calendars has resulted in increased production, and the system was expanded to horticultural crops in 2023. To further promote its use, the Indonesian government operates a dedicated Task Force Team to continuously gather user feedback and enhance the system.

1-2. A Field-specific Early Warning Service System for Weather Risk Management in Agricultural Sector in Korea

Dr. Kyo-Moon Shim, Senior Researcher, National Institute of Agricultural Sciences, Republic of Korea

The General introduction of Korea's early Warning System

With climate change and diverse threats increasing the need for risk management, Republic of Korea has established an early warning system designed to manage agricultural risks at the individual farm level on a 30 m by 30 m grid. The service quantifies weather conditions into crop-specific weather risk indices that correspond to the growth stages of each crop. When the risk level reaches a threshold that may damage crops, the system is activated and sends warning messages directly to farmers' mobile phones. These messages include recommended protective measures to minimize potential crop damage.

Integrated system and service

The early warning system for weather risk management is integrated with several key components, including farm-level weather data estimation, crop-specific risk indexing, and the delivery of risk warnings to farmers. As of 2025, about 40,000 farmers in 110 cities across Republic of Korea are using this service, and user feedback is continuously collected and reflected to improve system performance. The government plans to expand the service to cover the entire Korean Peninsula in the future.

Conclusion

To ensure stable crop production amid abnormal weather events driven by climate change, systems currently operated in Indonesia and Korea demonstrate the importance of generating accurate data, integrating it effectively, and providing timely, actionable information to farmers. This session highlighted that close cooperation among government agencies, academic institutions, and other stakeholders is essential to achieve these goals.

Session 2: Digital agricultural technologies and applications for food security

2-1. Digital Technologies for Measuring Farmland Infrastructure: Toward Sustainable Management

Dr. Qiangyi Yu, Professor, Chinese Academy of Agricultural Sciences (CAAS), China

The WFF construction campaign in China

Since 2019, China has carried out a farmland infrastructure development project to ensure stable food production. Known as the Well-Facilitated Farmland (WFF) campaign, this initiative includes construction activities in eight areas such as land consolidation, irrigation canal improvement, and farm road maintenance. As of 2024, investments have been made in more than half of China's total farmland area, covering approximately 150 million hectares.

While WFF initially focused on simple farmland consolidation to strengthen food security, future development requires an approach that incorporates ecological and socio-economic values. The new concept of farmland infrastructure construction integrates advanced technologies, including remote sensing for field observation and crop index evaluation using indicators such as NDVI.

Case study

① Remote sensing technology allows year-by-year monitoring of changes at the farmland level, making it possible to compare conditions before the WFF campaign in 2017 with those in 2022.

② AI technology has been used to predict the status of irrigation pivots in conflict zone, revealing a decrease in irrigated areas compared to the pre-conflict period.

③ Solar power installation that takes into account factors such as latitude, land cover type, and crop type contribute to improved land-use efficiency, ecological enhancement, and the creation of new tourism models.

2-2. The Philippines digital transformation (DX) towards food sovereignty (Agriculture 5.0)

Dr. HONORIO C. FLAMEÑO, Director, Information and Communications Technology Service Department of Agriculture, The Philippines

The Philippines digital agriculture status and transformation (DX) plan

The Philippines aims to strengthen science- and information-based decision-making in agriculture by integrating and consolidating its fragmented digital platforms. Through the National Information Network (NIN) mobilization plan, data will be unified and centrally managed to enhance monitoring and data management systems. This initiative is designed to establish the digital transformation of the food value chain and, in the long term, achieve digital innovation that combines IoT, AI, and other advanced technologies.

PH digitalization programs for food security

The government is implementing digital programs across the entire agricultural process, from crop cultivation to distribution. These include e-voucher issuance, an online monitoring system for participating farmers, operation of online market platforms, integration of weather forecasting solutions to improve water-use efficiency, application of remote sensing and drones, big data integration, and smart greenhouses. In addition, a phased strategy has been developed to guide the gradual application of AI, divided into four stages.

Nevertheless, limited budgets, insufficient manpower, and diverse market conditions pose challenges to digital transformation. To overcome these barriers, stronger cooperation among APEC member economies is essential, including regular discussions and the sharing of best practices.

Conclusion

To strengthen food security, APEC member economies are establishing domestic strategies and implementing various policies and programs, supported by smart agricultural technologies. Although digital technologies such as remote sensing and big data analysis are increasingly applied in agriculture, integration with AI remains limited. Moving forward, the digital transformation of agriculture will require the standardization and effective management of collected data, along with integration of next-generation technologies.

Session 3: Limitations and challenges of digital agricultural technology

3-1. Empowering Climate Adaptation and Food Security through Smart Farming Innovations

Dr. Yusuke KAKEI, Senior Scientist, National Agriculture and Food Research Organization (NARO), Japan

Japan's 2050 Strategy for a Sustainable Food System

To mitigate climate change, Japan is implementing the Green Food System Strategy known as "MIDORI" alongside the "Smart Farming Program." Through these initiatives, Japan has recently succeeded in reducing overall greenhouse gas emissions by lowering energy consumption. However, the agricultural sector continues to lag behind in emission reductions. Among agricultural activities, horticultural crop cultivation is the largest source of greenhouse gas emissions, primarily due to the burning of fossil fuels. To achieve net-zero carbon dioxide emissions from horticultural production by 2050, Japan plans to reduce fossil fuel use in all greenhouses through the adoption of advanced technologies.

Fossil Fuel Substitution Technologies

To reduce energy consumption in greenhouses, heat pumps are being introduced as an alternative to fossil-fuel-based heating. Renewable energy generation is also promoted through the use of wood chips and wood pellets. In addition, integrated renewable energy systems that combine wind, solar, and groundwater resources are being developed and applied under the concept of smart horticulture, contributing significantly to greenhouse gas reduction.

For cost efficiency, river water or groundwater is also being utilized as a heat source for water heating systems, further supporting renewable energy generation and low-carbon horticultural production. In particular, combining multiple technologies enables the calculation of yield, profit, and energy consumption, resulting in cost reductions. Several greenhouses have already begun adopting this integrated approach, demonstration its practical effectiveness in real-world settings.

3-2. Leveraging Ecosystem Operations to Promote the Further Development of Smart Agriculture in Chinese Taipei (SAiCT)

Dr. Jyh-Rong Tsay, Former Senior Researcher & Deputy Director-General, TARI), Chinese Taipei

Smart Agriculture in Chinese Taipei (SAiCT)

The SAiCT program, a new agricultural technology innovation initiative in Chinese Taipei, is structured around two themes: smart production and digital services. Three strategic approaches have been established to promote agricultural technology innovation. The first strategy is to improve the capacity for stable supply and production by adopting innovative agricultural management models in combination with the Smart Farmers Alliance (SFA). The second strategy is to integrate agricultural digital services conveniently and diversely through ICT. The third strategy is to create a new communication model between consumers and producers through user-friendly interactive technologies such as e-commerce.

Case Study

Wearable assisted equipment has been applied to improve the efficiency of farmers' fieldwork and to help relieve pain caused by excessive physical labor. In addition, mushroom packaging was mechanized, which reduced labor demand and improved farmers' income. For smart production, eleven SFAs were established by crop and livestock categories in order to jointly solve production problems, reduce farming risks, and ensure stable quality and quantity. Other applications included IoT- and AI-based smart irrigation, mobile applications for pest and disease detection and management, the operation of a traceable feeding system (Campus Food System), and the introduction of various tools and systems tailored for small-scale farmers.

Prospects – Opportunities and Challenges

Barriers to applying digital technologies include questions of cost-effectiveness for high investment, ownership issues that hinder data integration, and difficulties in utilization by untrained or small-scale farmers. To address these challenges, it is necessary to expand from production-oriented smart agriculture to ecosystem-based operations. Furthermore, incorporating sustainability considerations into smart agriculture is essential for advancing toward sustainable agriculture for the future.

3-3. Beyond the Barriers: Unlocking the Value of Emissions Tech in Agriculture

Mr. Will Onus, COO, Ruminati, Australia

Greenhouse Gas Emissions from Livestock in Australia

Australia estimates domestic greenhouse gas emissions using a bottom-up approach, collecting reports directly from farmers through an online system. However, limited access to the software and the complexity of the reporting system makes it difficult for farmers to use effectively. To address this, Ruminati has developed and is providing an online platform designed from the farmer's perspective, enabling easy, fast, and flexible reporting of greenhouse gas emissions.

The Way Forward for Sustainable Agriculture

To broaden farmer participation and obtain accurate data, the government needs to develop simplified tools that are farmer-centered. In addition, instead of focusing solely on obligations, programs should also incorporate incentives, thereby fostering trust through transparency. Farmers should also be educated on the benefits of compliance in order to encourage active participation.

Conclusion

To expand the adoption of digital technologies and promote their use across all sectors, government support is essential. First, the government should collect accurate data through digital technologies, standardize it, and ensure easy access for stakeholders. In addition, programs must be developed to enable the participation of small-scale farmers, accompanied by training opportunities. For example, incentive schemes related to climate change adaptation can be introduced to encourage farmer participation, while support for the establishment of cooperatives can help smallholders apply smart farming technologies.

For the development, application, and dissemination of digital agricultural technologies to address climate change and food security, collaboration among government, academia, industry, and farmers is essential, along with the establishment of information and knowledge-sharing programs among APEC member economies.

4. Field Trip

Workshop participants visited the National Agricultural Science Museum and the National Agrobiodiversity Center under the Rural Development Administration (RDA).

The National Agricultural Science Museum presented Korea's agricultural heritage and the development of agricultural science. It showcased fundamental studies such as crop physiology and soil science, while also demonstrating applications of AI, big data, and smart farming technologies, highlighting the transition of agriculture from traditional practices to science-based innovation. The National Agrobiodiversity Center introduced Korea's system for the long-term preservation and characterization of crops, microorganisms, and insects. It also highlighted its support for breeding and biotechnology research, as well as international cooperation for the safe exchange of genetic resources, emphasizing its critical role in food security and global research.

5. Discuss key takeaways

All participants agreed that innovation and capacity building through public–private collaboration are essential for the transition to digital agriculture. In response to the question of what policy or regulatory frameworks are required, participants emphasized the establishment of accessible data governance. In particular, the importance of data standardization and the development of a joint public–private framework for standardization was strongly highlighted. Participants also pointed out the lack of clear guidelines for the use of collected data, noting the need for economy or cross-economy guidance and regulations on digital data in the future.

Regarding the integration and application of AI in agriculture, most participants recognized its necessity but stressed that R&D collaboration with the private sector and academia would be required to ensure effective utilization.

Finally, participants agreed that in order to promote the development and adoption of digital agricultural technologies, it will be important to strengthen knowledge-sharing and capacity-building programs among APEC member economies, while also advancing joint R&D initiatives.

IV. Summary of Post Workshop Survey

Of the 64 participants in the workshop, 29 completed the survey. Among the respondents, 48 percent identified as female, 45 percent as male, while 7 percent chose not to disclose their gender.

Q1. How relevant was this project to you and your economy?

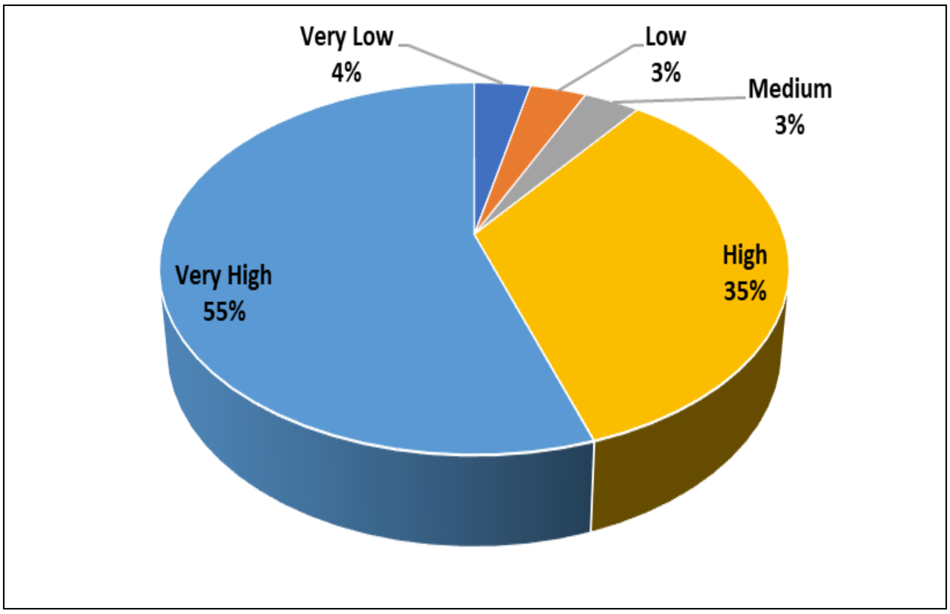

Figure 3. The relevance of this project to the member economies

The majority of participants responded that the content of this workshop is closely linked to their economies. The opinions of the respondents on the question have been summarized into five key themes, as shown in the table below.

Table 1. Components of this workshop related to the member economies

Key word	Content
Learning from Other Economies	Participants valued case studies and policies from other APEC economies, gaining insights into how digital agriculture and smart technologies are being implemented elsewhere.
Digitalization & AI in Agriculture	Many economies are prioritizing digital transformation and AI applications in farming, including AI-based crop monitoring, precision agriculture, and automation.
Climate Change & Food Security	Digital and smart agriculture technologies were highlighted as solutions for addressing climate change challenges, improving food security, and building resilience against natural disasters.
Farmer Adoption & Capacity Building	A recurring theme was the need to support farmers in adopting new technologies through training, guidelines, and practical platforms to ensure effective digital-agriculture uptake.
Implementation Strategies & Future Outlook	Participants emphasized exchanging best practices, developing strategies for IoT, solar, robotics, and remote sensing, and envisioned a future of agriculture that is "smarter" with better technological tools.

Q2. In your view what were the project's results/achievements?

According to the participants, the workshop generated the following results or achievements.

Table 2. Participants' views regarding the results of the workshop

View	Content
Knowledge Sharing & Best Practices	The project facilitated mutual learning by sharing experiences and best practices among APEC economies, allowing participants to stay aligned and gain new perspectives.
Advances in Digital & Smart Agriculture	Participants gained a better understanding of digital transformation (DT), AI development, and smart-agriculture applications, including practical solutions for productivity, sustainability, and climate resilience.
Collaboration & Regional Cooperation	The workshop created a meaningful platform for economies to exchange information, build capacity, and explore collaborative approaches across the region.

Recommendations & Solutions	The project produced actionable recommendations on spreading digital agriculture, implementing technologies, and addressing challenges through alternative solutions tailored to each economy.
Foundations for Future Work	Many participants viewed it as a fruitful first step toward continued collaboration, raising awareness of current digital initiatives and setting the stage for further joint projects.

Q3. What new skills and knowledge did you gain from this event?

Participants indicated that, through this workshop, they gained knowledge on digital & smart agriculture tools, early warning systems, best practices, etc.

Table 3. Knowledge gained by participants from the workshop

Key word	Content
Digital & Smart Agriculture Tools	Participants learned about the integration of digital tools such as IoT, AI, GIS, and geospatial systems into agriculture, including data-driven crop management and modern digital technologies.
AI Applications	Gained insights into practical applications of AI in agriculture, including AI as an emerging tool for food security, AI implementation strategies, and policy perspectives on supporting farmer adoption.
Early Warning Systems & Climate Resilience	Presentations on weather-based early warning systems, cropland fingerprinting, and monitoring technologies provided new knowledge for disaster preparedness and climate adaptation.
Knowledge Sharing & Best Practices	Participants emphasized capacity building through sharing experiences from other economies, understanding how common challenges are addressed with technology, and applying lessons from best practices.
Policy & Strategic Insights	Improved awareness of agricultural innovation status, digital transformation policies, and how to design farmer-centered solutions, helping to shape future smart agriculture strategies and regional collaboration.

Q4. Rate your level of knowledge of and skills in the topic prior to and after participating in the event.

Prior to attending the workshop, the knowledge level of most participants regarding digital agriculture technologies ranged from medium to high. After the workshop, however, participants indicated their knowledge level as high or very high, demonstrating the contribution of the workshop to capacity building.

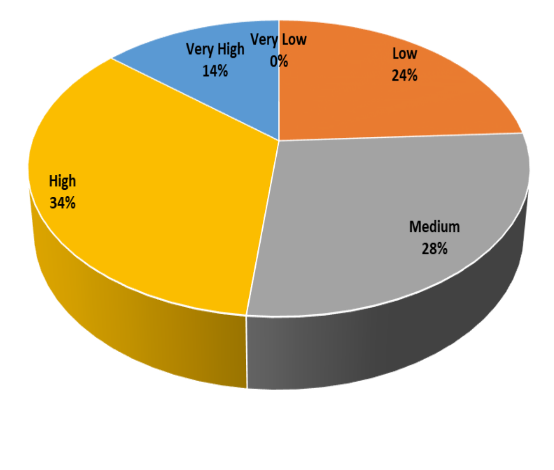

Figure 4. Rate participants' level of knowledge of and skills in the topic prior to participating in the event

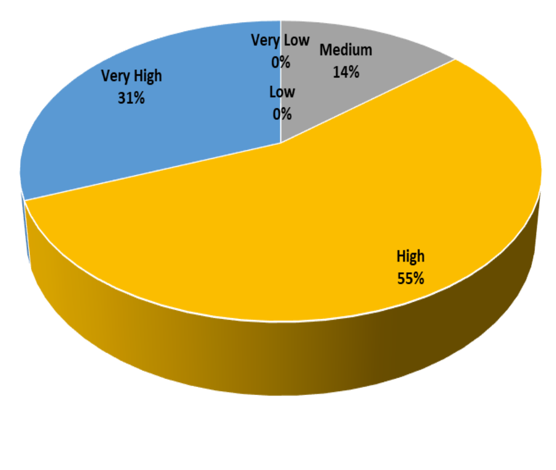

Figure 5. Rate participants' level of knowledge of and skills in the topic after participating in the event

Through this event, participants enhanced their understanding of digital and smart agriculture technologies, particularly gaining insights into the application of AI. They also recognized the importance of policies supporting digital agricultural technologies, as well as the need for cooperative frameworks and capacity-building strategies.

Q6. How will you apply the project's content and knowledge gained at your workplace?

Participants responded that they would apply the knowledge and information gained from the workshop to the following areas.

Table 4. Application areas of knowledge acquired from the event

Application area	Content
Training & Capacity Building	Many participants plan to organize internal trainings, develop new curricula for students and staff, and provide training programs for farmers and extension workers to share best practices and improve digital agriculture adoption.

Policy & Strategy Development	Several participants mentioned developing new policy initiatives, drafting regulations, and updating strategies or roadmaps to promote digital transformation, climate-smart agriculture, and AI-related applications.
Work Plans & Procedures	Responses included creating new work plans, procedures, and frameworks to guide agricultural digitalization, with emphasis on integrating climate-resilient technologies and data-driven decision-making.
Technology Dissemination & Improvement	Plans include developing strategies for disseminating digital technologies to farmers, improving agricultural engineering scopes, and enhancing technology use in monitoring, early warning systems, and pest/weather management.
Collaboration & Alignment	Some participants highlighted collaboration with other economies (e.g., Korea; Thailand), aligning with climate change policies, and promoting cross-sector cooperation to support smallholder farmers and broader agricultural development goals.

Q7. What needs to be done next by APEC? Are there plans to link the project's outcomes to subsequent collective actions by fora or individual actions by economies?

Participants emphasized that, in order to advance the application and dissemination of digital technologies for addressing climate change and ensuring food security, it is essential to implement knowledge sharing and collaborative initiatives, capacity-building and training programs, supportive policies, mobilization of budgets and resources, and programs that enable farmers to adopt and effectively utilize these technologies. In particular, participants highlighted the importance of implementing long-term capacity building programs that facilitate the sharing of best practices among member economies, fostering collaboration with other relevant fora, and establishing pilot initiatives.

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VI. Annexes

1. Agenda

Day 1. 5 August 2025

Date	Meeting	Presenter/Lead
10:00 – 10:10	Opening Ceremony	Deputy Administrator Rural Development Administration (RDA) Republic of Korea
10:10 – 10:20	Group Photo	
Session I: Digital agricultural technologies and applications for enhancing climate change adaptation Moderator : Prof. Hak jin Kim, Seoul National Univ. / Republic of Korea		
10:20 – 11:40	Cropping Calendar Information System: Climate Smart Adaptation for Food Crop in Indonesia	Dr. Rima Purnamayani Indonesia
	A Field-specific Early Warning System for Weather Risk Management in Agricultural Sector in Korea	Dr. Kyo-Moon Shim Republic of Korea
11:40 – 12:00	Audience Q&A	
12:00 – 13:00	Lunch	
Session II: Digital agricultual technologies and applications for food security Moderator : Prof. Hak jin Kim, Seoul National Univ. / Republic of Korea		
13:00 – 14:20	Digital Technologies for Measuring Farmland Infrastructure: Toward Sustainable Management	Dr. Qiangyi Yu China
	The Philippines Digital Transformation (DX) towards food sovereignty (Agriculture 5.0)	Dr. Honorio Cruz Flameño The Philippines
14:20 – 14:40	Audience Q&A	
14:40 – 15:00	Coffee Break	

Session III: Limitations and challenges of digital agricultural technology Moderator : Prof. Kyung dahm Yun, Jeonbuk National Univ. / Republic of Korea		
15:00 – 17:00	Empowering Climate Adaptation and Food Security through Smart Farming Innovations	Dr.Yusuke Kakei Japan
	Leveraging ecosystem operations to promote the future development of smart agriculture in Chinese Taipei	Dr. Jyh-Rong Tsay Chinese Taipei
	Beyond the Barriers: Unlocking the Value of Emissions Tech in Agriculture	Mr. Will Onus Australia
17:00 – 17:20	Audience Q&A	
17:20 – 17:30	Closing Remarks	
17:30 – 18:00	Post-Workshop Survey for participants	

Day 2. August 6, 2025

Date	Field Trip & Meeting	
08:30 – 09:00	ATCWG Agricultural Technical Cooperation Working Group Field Trip Participants check-in and departure for the field trip	
09:00 – 10:00	Group 1	Group 2
	Departure and arrival at the National Agricultural Museum	Departure and arrival at the National Agrobiodiversity Center
10:00 – 11:00	Visit to the National Agricultural Museum	Visit to the National Agrobiodiversity Center
11:00 – 11:10	Departure and arrival at the National Agrobiodiversity Center	Departure and arrival at the National Agricultural Museum
11:10 – 12:10	Visit to the National Agrobiodiversity Center	Visit to the National Agricultural Museum
12:10 – 13:00	Travel back to Oakwood Hotel, Songdo	
13:00 – 14:00	Lunch (Oakwood Hotel)	
14:00 – 15:45	**Wrap up: Discuss key takeaways and recommendations from the workshop**	
15:45 – 16:00	Post-Field trip survey for participants	

2. Photo

ATCWG Workshop

Figure 6. Workshop Group Photo

Figure 7. Expert Session Presentations

Field Trip

Figure 8. Group Photo at National Agrobiodiversity Center

Figure 9. Group Photo at National Agricultural Museum