APEC Workshop on Leveraging Innovation-Driven Public-Private Partnerships to Enhance Food System Resilience

Summary Report

APEC Policy Partnership on Food Security

May 2026

Asia-Pacific Economic Cooperation

Asia-Pacific
Economic Cooperation

APEC Workshop on Leveraging Innovation-Driven Public-Private Partnerships to Enhance Food System Resilience

Summary Report

APEC Policy Partnership on Food Security

May 2026

APEC Project: PPFS 05 2025S

Produced by
Authors
Mr. LIU Jianlei (ljl@ags.ac.cn)
Mr. LI Tiantian (ltt@ags.ac.cn)
Mr. SUN Ruohao (srh@ags.ac.cn)
Ms. CHEN Wenya (cwy@ags.ac.cn)
Ms. SUN Hui (sh@ags.ac.cn)
Ms. LI Jinyan (lijy@ags.ac.cn)
Academy of National Food and Strategic Reserves Administration
Beijing, China

For
Asia-Pacific Economic Cooperation Secretariat
35 Heng Mui Keng Terrace
Singapore 119616
Tel: (65) 68919 600
Fax: (65) 68919 690
Email: info@apec.org
Website: www.apec.org

APEC#226-PP-04.3

Table of contents

APEC Workshop on Leveraging Innovation-Driven Public-Private Partnerships to Enhance Food System Resilience

Guangzhou, China

February 3, 2026

Workshop Summary Report

I. Introduction

On 3 February 2026, the "***APEC Workshop on Leveraging Innovation-Driven Public-Private Partnerships to Enhance Food System Resilience***" was held by the Academy of National Food and Strategic Reserves Administration (Academy of NAFRA) in Guangzhou, China. The project was proposed by China and co-sponsored by Australia and New Zealand under the APEC Policy Partnership on Food Security (PPFS) (Project Number: PPFS 05 2025S).

Approximately 90 government officials, experts, scholars, and business representatives from 12 APEC member economies—including Australia; China; Japan; Korea; Malaysia; Mexico; New Zealand; the Philippines; Singapore; Chinese Taipei; Thailand; and the United States—as well as representatives from international organizations such as the United Nations World Food Programme (WFP), participated in the workshop in person. The workshop brought together 10 distinguished speakers from 6 economies (Australia; China; Korea; Singapore; Thailand; and the United States) to share their expertise.

The objective of the project was to enhance food system resilience in the Asia-Pacific region by leveraging innovation-driven public-private partnerships (PPPs). Through expert presentations and interactive panel discussions, the workshop aimed to: 1) share successful PPP models and governance frameworks; 2) explore the role of innovative technologies and financing mechanisms; 3) foster dialogue on regional coordination and supply-demand integration; and 4) build the capacity of APEC member economies to design and implement collaborative initiatives. The outcomes

have directly supported the *APEC Putrajaya Vision 2040*, including through the implementation of the *Aotearoa Plan of Action*, and the *Food Security Roadmap Towards 2030*.

II. Background

The Asia-Pacific region faces increasing food security challenges due to factors such as supply chain disruptions, environmental challenges, demographic shifts, and rapid technological changes. As highlighted by speakers and the project proposal, facing such complex uncertainties and risks, food systems must be resilient—possessing the ability to withstand or absorb disturbances and ensure lasting food security.

Public-Private Partnerships (PPPs) play an indispensable role as both a catalyst and stabilizer in ensuring food security. Innovative approaches to collaboration, technological solutions, and governance frameworks can provide strong impetus for stakeholders in the food system to collectively tackle complex challenges. When effectively designed, PPPs can leverage the strategic vision of the public sector with the dynamism, efficiency, and innovation capacity of the private sector. The workshop demonstrated that PPPs can take many forms—from legislated levy systems and platform-based innovation clusters to credit guarantee funds and multi-stakeholder improvement projects—each adapted to the specific economic, social, and institutional context of individual economies.

The project contributed to the *Implementation Plan of the Food Security Roadmap Towards 2030*, specifically under Key Action Areas 8f) promoting public-private investment in innovative technologies, 8g) modernizing food storage and logistics capacity, and 18a) enhancing public-private dialogue. It also aligned with the 2025 APEC Food Security Ministerial Statement's call to enhance resilience through innovative approaches and promote PPPs.

The discussions were structured around three core thematic sessions, followed by a multi-stakeholder panel discussion, providing a comprehensive overview of the policies, technologies, and collaborative models needed to build more resilient food systems in the APEC region.

III. Key Issues

1. Session 1: Innovative Public-Private Collaboration Models and Governance Frameworks

1.1 "Strengthening Food Security through Robust Legal and Regulatory Frameworks"

Dr. HAN Jizhi, Director General, Department of Storage and Science & Technology, National Food and Strategic Reserves Administration (NAFRA), China

Dr. Han provided a comprehensive overview of China's first-ever Food Security Law, which came into force in June 2024. He explained that the law's formulation was driven by the imperative for China to maintain control over its own food supply, viewing food not only as an economic issue but also as a political issue that underpins economic development, social stability, and domestic security. He emphasized that China must always have control over its own food supply and keep the initiative in food security firmly in its own hands, relying mainly on its own food supply chain rather than counting on others. The law's purpose is to guarantee effective food supply, ensure domestic food security, improve the capacity to prevent and resist food security risks, and maintain economic and social stability and domestic security.

The law establishes a clear responsibility system with "dual accountability" for both Party committees and governments, ensuring that local administrations are responsible for food security within their administrative areas. This represents a fundamental shift from policy-based to law-based governance of food security, providing long-term stability and predictability. Dr. Han noted that the law covers 11 chapters, including general provisions, farmland protection, food production, food reserves, food circulation, food processing, food emergency, food conservation, supervision and administration, legal liability and supplementary provisions.

Dr. Han elaborated on the mechanisms established under the law to ensure food security. First, it adheres to the food production strategy based on farmland management and application of technology, improving the capacity for food

production, reserves, circulation, and processing, thereby ensuring basic self-sufficiency of grains and absolute security of staple food. Second, the law promotes an “all-encompassing approach to food,” which recognizes that food security encompasses not just grains but a diversified food supply system including meats, vegetables, fruits, and aquatic products. This approach aims to meet the population’s evolving nutritional needs and consumption preferences for food that is rich in variety and nutritious.

Third, the law strengthens the macro regulation of food by optimizing the structure and regional layout of food varieties, making overall use of domestic and international markets and resources, and building a science-based, reasonable, safe, and efficient food supply guarantee system. It also strengthens international cooperation on food security, giving full play to international food trade. Fourth, the law mandates that people’s governments at or above the county level incorporate food security into their economic and social development plans, with relevant departments formulating and implementing special plans related to food security accordingly.

The law also establishes and improves the investment mechanism for maintaining food security, adopting fiscal, financial, and other supportive policies to strengthen food security. It builds a coordinated guarantee mechanism for food production, purchase, storage, transportation, processing, and sale, and establishes domestic food security industrial belts. These provisions aim to mobilize the enthusiasm of food producers and local governments in protecting farmland, growing food crops, and effectively carrying out food security work.

Additionally, the law strengthens scientific and technological innovation capacity for food security, supporting basic research, key technology R&D, and standardization work. It promotes the transformation of scientific and technological innovation achievements and the popularization and use of advanced technologies and equipment across the food supply chain. Finally, the law emphasizes the importance of public awareness, requiring governments at all levels to strengthen publicity and education on food security, raise societal awareness, and guide the development of a culture that cherishes and saves food.

1.2 “Australia’s Research and Development Model - a Unique, World Leading System of Public-Private Partnership”

Ms. Julie Bird, Chair of Hort Innovation; Director of the Cotton Research and Development Corporation, Australia

Ms. Bird presented Australia’s Rural Research and Development Corporation (RDC) model, a 35-year-old system described as one of the most enduring examples of public-private partnership in Australian agriculture. She explained that the model places producers, growers, or farmers at the center and amplifies their investment impact through co-investment with government and other co-investors. Australia does not heavily rely on direct subsidies; instead, its agri-food system has focused on building innovation capability by investing in research, development, extension, and adoption in a structured long-term way.

The core of the RDC model is a levy system where producers collectively decide on a levy to be collected from their industry. The government considers this recommendation, legislates for the collection, and then matches the funds for eligible research and development activities, generally up to 0.5% of an industry’s gross value of production. This creates a formal mechanism for industry and government to co-invest in innovation. Services such as marketing are funded solely by industry but are also collected under compulsory arrangements in the same way that research and development levies are collected. The levy system ensures that investment priorities are grounded in what producers actually need, creating strong industry buy-in.

Ms. Bird emphasized that governance under the RDC system is independent, transparent, and designed to put levy payers’ needs at the center of decision-making. RDC investments take a balanced portfolio approach, supporting both short-term and long-term investments, as well as strategic and adaptive research aligned with issues of regional importance. There are now 15 RDCs across Australian agriculture, fisheries, and forestry, each structured to suit the needs of its sector. Crucially, these RDCs operate together as a network, sharing insights, data, and tools while collaborating on cross-industry priorities such as climate adaptation, sustainability, biosecurity, technology, and workforce development. This network approach

enables the transfer of knowledge and solutions from one sector to another, amplifying the impact of individual RDC investments.

Ms. Bird highlighted several case studies demonstrating the impact of this model. In the macadamia industry, decades of levy-funded investment built a world-class breeding pipeline, developing higher-yield, disease-resistant varieties, with royalties reinvested to create a self-reinforcing cycle of innovation. In vegetable mechanization, precision sprayer trials reduced chemical use from 142 liters to just 7 liters per crop cycle, saving growers thousands of dollars while improving crop quality. For fall armyworm, targeted research into region-specific pheromone blends is developing smarter pest control methods that reduce reliance on chemicals. In cotton, longstanding programs have delivered gains in water-use efficiency, strengthened integrated pest management, and lifted both productivity and environmental performance—demonstrating how a flexible model can achieve different outcomes while creating shared value across sectors.

Ms. Bird noted that the model is evolving, with several RDCs now exploring venture capital approaches. This evolution reflects the model's flexibility and its capacity to adapt to changing industry needs. The Hort Innovation Venture Fund, delivered with Artesian Venture Partners, works alongside other investment programs to accelerate promising technologies through the system faster. One early example is BioScout, an Australian platform using autonomous air sampling and artificial intelligence (AI) to give growers near real-time disease risk data, enabling earlier action and more precise chemical application. With BioScout, growers can receive field intelligence within six to 24 hours, instead of waiting days or weeks for laboratory results.

Ms. Bird concluded that the RDC model works regardless of crop type or industry structure because the framework is flexible, stable, and clear. The model's success lies in its ability to provide long-term certainty while remaining adaptable to the unique needs of each sector.

1.3 “Strengthening the Global Competitiveness of K-Food: Platform-Based Public-Private Partnership (PPP) Models and Governance Framework Cases”

Dr. Min-Jung Bae, General Manager, Food Industry Promotion Agency of Korea (FOODPOLIS), Korea

Dr. Bae introduced Korea’s strategic shift from short-term direct financial support for individual firms to building a public-led innovation platform—the National Food Cluster (FOODPOLIS)—to foster a sustainable industrial ecosystem. She explained that the government views the food industry not just as a food business but as a strategic industry that will drive the future of its economy. This 2.32 million square meter cluster, built with an investment of approximately USD 416.8 million, integrates research and development (R&D), manufacturing, logistics, and marketing to accelerate corporate growth.

The core PPP model at FOODPOLIS is an “asset-light” strategy that allows private companies, particularly small and medium enterprises (SMEs) and startups, to access public infrastructure as if it were their own. Dr. Bae outlined four key strategies underpinning this approach.

- First, opening public infrastructure: 12 support facilities equipped with advanced machinery and specialized experts provide comprehensive solutions across the entire manufacturing lifecycle, from R&D to test beds and mass production. This delivers a “single package solution” including process design, standardization, and quality certification.
- Second, shared factories allow for immediate commercialization with no investment in manufacturing plants. Even without manufacturing experience, companies can access expert assistance in production processes, breaking down entry barriers and reducing investment costs to almost zero.
- Third, FOODPOLIS is building a digital twin-based virtual manufacturing environment called “Mirror World,” which simulates real-world infrastructure and processes. This enables remote access to virtual instruments for manufacturing testing and allows AI-driven product development that simulates raw material formulations to predict optimal taste, nutrition, and quality. This digital approach

reduces product development and validation time by about 50% and costs by more than 30%.

- Fourth, FOODPOLIS offers an integrated support hub for next-generation entrepreneurs through a three-step optimization program: optimizing business models using AI, prototyping and testing market response using cluster infrastructure, and linking products to distribution platforms for early-stage exports through the Export Junior Program.

Dr. Bae presented the governance framework that supports these strategies, encompassing four distinct models. A “Mutual Cooperation Alliance” brings together three key groups to connect demand and supply through portfolio technology coordination, guiding SMEs to overcome technical limitations and meet the standards of major buyers. An “Ultra-Wide Food Convergence Cluster” connects nine regional food clusters across Korea to the central hub, creating a spoke-and-hub system that reduces mutual gaps by allowing any food enterprise to utilize high-quality public infrastructure regardless of location. A “Global Export Support Center” operates as a dedicated control tower for overseas market entry, focusing on market-driven acquisition, regulation and certification, education, and custom insights. Complementing these three models, a “Digital Transformation Based Governance” framework marks the evolution from a physical cluster to a digital one, building an “invisible infrastructure” on 290 million data points and enabling AI-driven support that analyzes global market data to predict product-market fit, allowing enterprises to access the cluster’s resources without geographical restriction.

Dr. Bae illustrated the practical impact of these strategies with two case studies. The first involved a startup with an innovative idea for an energy drink called Permax. Lacking production infrastructure, technical expertise, and facing regulatory barriers, the company utilized FOODPOLIS’s shared factory and technical guidance to successfully launch its product, overcoming the initial hurdles to commercialization. The second case study featured Company M, a venture company that sought to develop a new functional ingredient. Through FOODPOLIS’s full-cycle support—including R&D collaboration with alliance partners to validate efficacy, production optimization using shared infrastructure, and strategic product diversification—the

company successfully expanded from a health supplement (Cephona) into the high-value cosmetics market (cepoLAB). Beyond Asian markets such as Hong Kong, China and Singapore, the company is now actively pursuing entry into US and European markets, demonstrating the platform's ability to accelerate growth and global expansion.

1.4 "Case Study: Fishery Improvement Project in Gulf of Thailand"

Ms. Sukanya Chaichuen (presented by Mr. Chusak Chuenprayoth), Vice Chair of Value Added on Agricultural Product Committee, Thai Chamber of Commerce; Manager of Trade Rules and Regulations Office, CPF (Thailand) Public Company Limited

Mr. Chusak presented this case study on behalf of Ms. Chaichuen, detailing a multi-stakeholder effort to address sustainability challenges in Thailand's fishery sector. He explained that approximately 10 years ago, the Thai shrimp industry, as a top exporter to the European Union (EU), faced serious challenges regarding illegal, unreported, and unregulated (IUU) fishing. The EU's strict standards on sustainability and traceability created an urgent need for action, as no single stakeholder could answer the market's demands alone. The demand from consumers for sustainable seafood products became critical, and the private sector worried about how to maintain its business. The situation prompted industry leaders to recognize that the entire sector's future was at stake, as the EU market represented a significant portion of Thailand's seafood exports.

The response was the formation of the Thai Sustainable Fisheries Roundtable (TSFR), bringing together eight associations across the fisheries value chain, namely the Fisheries Association of Thailand, the Thai Fisheries Producers' Association, the Thai Fishmeal Producers Association, the Thai Feed Mill Association, the Thai Shrimp Association, the Thai Frozen Foods Association, the Thai Food Processors' Association, the Thai Tuna Industry Association, and the Department of Fisheries.

This collaboration marked an unprecedented departure from the traditional independent operations of these associations. The private sector assumed a

leadership role, recognizing that without a coordinated solution, the entire industry's export capacity was at risk. The TSFR became the central platform for dialogue and action, uniting stakeholders who had previously operated in silos.

The project followed a structured four-step Fishery Improvement Project (FIP) framework. Step one involved meeting with the steering committee to kick off the project. Step two focused on fishery assessment against international standards, with funding support from the Agricultural Research Development Agency (ARDA) to conduct multi-species assessments. These assessments involved rigorous scientific evaluation of fishing practices, stock status, and environmental impacts across multiple species in the Gulf of Thailand. Step three involved developing a detailed Fishery Action Plan (FAP) with clear workplans and responsible partners, which was submitted to MarinTrust for approval. Step four, currently underway, involves implementing the action plan and conducting further research to close identified gaps. The research component includes studies on variation analysis and resource assessment of trawl catches, the effects of trawl fishing on biological resources and the marine environment, and analysis of trawl fishing grounds in the Gulf of Thailand.

The project timeline reflects its long-term commitment to sustainability. Initiated in 2016, the TSFR conducted fishery assessments against MarinTrust Multi-Species criteria in 2018, developed the Fishery Action Plan in 2020, and has been in the implementation phase since 2021. Throughout this period, the project has maintained active engagement with MarinTrust, the international standard-setting body, to ensure alignment with global best practices.

The Gulf of Thailand Mixed-Trawl FIP was the first in the world approved by MarinTrust for a multi-species fishery. MarinTrust's Executive Director noted that the project was the first in the world to apply the newly developed multispecies fisheries criteria as part of the MarinTrust Improver Programme, highlighting its pioneering nature. This achievement demonstrated the effectiveness of public-private collaboration in addressing complex sustainability challenges. The project's success has been recognized internationally, with the Gulf of Thailand FIP listed among accepted FIPs on the MarinTrust Improver Programme website.

The experience underscored three critical elements for the project's success. First, active stakeholder participation was essential, with 45 fishmeal plants and 12 feedmill factories joining the FIP, representing a significant portion of the industry. Second, strong commitment proved equally important, as all parties recognized they were "in the same boat"—if the issue could not be solved, it would affect everybody. This shared recognition drove sustained engagement even when progress was slow or challenges arose. Third, communication emerged as a foundational element. The project required countless meetings, seminars, and discussions to ensure all stakeholders understood the same goals and spoke the same language. Progress was regularly communicated through public relations efforts, including participation in international events such as VIV Asia 2023, to build awareness and confidence among international buyers. The TSFR also established an official website to provide transparent information about the project's progress, activities, and achievements. A dedicated website was also established to answer questions regarding sustainable fishery farming in Thailand.

2. Session 2: Innovative Technology and Financing for Resilient Food Systems

2.1 "Empower Resilience of Food Systems through Innovation of Post-harvest Technology"

Professor SUN Hui, Chief Engineer, Academy of NAFRA, China

Professor Sun provided a detailed overview of how technological innovation in post-harvest sectors—storage, processing, and packaging—can significantly enhance food system resilience. She explained that the resilience of food systems is mainly influenced by production, supply chain efficiency, market dynamics, policy regulation, and risk resistance capacity. Technological innovation plays a pivotal role by being integrated throughout the entire supply chain.

In storage technology, Professor Sun described two approaches in China. For large-scale storage, the "*Five-in-One* Green Grain Storage Technology System" integrates five key components: upgrading granary performance through new granary types, new materials, and new infrastructure; achieving efficient and eco-friendly grain in-

out operations through automation and intelligent facilities; using sensors and digital technologies to monitor grain conditions, pests, mold, temperature, and relative humidity; implementing integrated green management to control temperature, pests, and grain moisture; and establishing comprehensive management and evaluation systems. This system has helped reduce storage losses to about 3%.

For household storage, which used to be the main source of food loss in China, a range of solutions has been developed for smallholder farmers. Mini silos—small-scale granaries capable of storing one ton of grain—were designed specifically for smallholder farmers. From 2007 to 2017, about 10 million sets of mini silos were provided, helping farmers reduce food loss from 8% to 2% in recent years. Timely drying of grain after harvest was identified as another critical issue. To address this, small mobile dryers have been introduced through rental or shared service models. In addition, power-free air-drying bins have been developed, which can be used both with and without electricity in open-air settings, offering a low-cost drying solution that can also be accessed through shared service arrangements. Complementing these hardware solutions, socialized service models through Grain Post-harvest Service Centers provide cleaning, drying, storage, and processing services, allowing farmers to access these essential services without investing heavily in expensive facilities.

In processing technology, Professor Sun highlighted innovations that balance quality, nutrition, and efficiency. She noted that whole grain food has become increasingly popular due to its rich dietary fiber and micronutrients. Technologies including extrusion, superfine grinding, biological enzyme, fermentation, and hydrothermal conditioning treatment have been developed to improve sensory quality and shelf life. Moderate milling technology for paddy reduces mass loss by more than 3%, minimizes broken rice by 3%-4%, and saves over 10% of electricity. Wash-free rice technology reduces power consumption by more than 30% and cuts down water use compared to traditional polished rice processing. As for wheat flour processing, the Smart Mill Intelligent Flour Mill in Guangdong was presented as a lighthouse factory example. This facility integrates over 15 000 data points from sensor networks, uses four intelligent inspection systems, and achieves 100% online quality control through

a “monitoring-analysis-feedback” mechanism. It saves 40% of electricity and has driven the industry’s transformation from experience-driven to data-driven operations.

Deep processing of grains was also emphasized as a means to expand the product value chain, diversify market risks, and improve resource utilization efficiency. Wheat can be processed into a wide array of products beyond staple flour, including wheat gluten, high-fiber products, and wheat starch, which serve as ingredients for a variety of food applications. Corn deep processing yields corn syrup, corn oil, corn starch, and amino acids, which are widely used in the food industry. Moreover, byproducts can be used to produce germ oil, bran oil, dietary supplements, bioactive peptides, and materials for chemical and cosmetic products. This diversification not only adds value to raw grains but also provides multiple market outlets, reducing the vulnerability of the food system to price fluctuations or demand shocks in any single sector.

For emergency situations, mobile processing equipment can be flexibly deployed for on-site processing. A single wheat processing unit can meet the stable food needs of 30,000 people daily, while a rice processing unit serves 40,000 people. These units are equipped with generators, enabling them to operate during disasters that cause traffic disruption and power outages, thereby enhancing the risk resistance capacity of the food system.

In packaging technology, Professor Sun introduced an innovative active packaging material that efficiently blocks external oxygen while dynamically absorbing internal oxygen. Since oxidation is the main reaction causing quality deterioration of many foods during distribution, this technology significantly extends shelf life.

Looking ahead, Professor Sun outlined several future directions for post-harvest technology. Technologies such as AI and Internet of Things (IoT)-driven automation, data-driven supply chains, and sustainable & green solutions will continue to make breakthroughs, significantly enhancing the resilience of food systems. Equally important is the need to strengthen collaboration and technology inclusiveness, bridging the gap in the application of innovative technologies and ensuring that lightweight, low-cost solutions reach smallholder farmers. Through these advances, food systems will transition from passive response to proactive defense, rapid

recovery, and continuous optimization, ultimately achieving the overarching goals of adequate production, low loss, sustainability, and strong risk resistance.

2.2 “ADBC Practices in Serving China’s Food Security”

Mr. LING Tao, Deputy General Manager, Grain, Cotton and Edible Oil Department, Agricultural Development Bank of China (ADBC)

Mr. Ling presented the role of ADBC, China’s only agricultural policy bank established in 1994, in serving China’s food security. The bank’s mission is to support agriculture for the benefit of China and build the bank for the interests of the people. ADBC delivers sound performance in funding policy-based purchase and storage as well as market-oriented purchase of agricultural products. It is also extending credit along agricultural industrial chains, and accelerating digital transformation.

Mr. Ling outlined ADBC’s “four bank” strategy: as a grain bank, a water conservancy bank, a farmland bank, and a green bank. In the grain sector alone, loans related to grain, cotton, and edible oil reached RMB 2 trillion in balance with about RMB 800 billion issued in 2025. He emphasized ADBC’s strong cooperation with the National Food and Strategic Reserves Administration (NAFRA), which has been formalized through a strategic cooperation agreement.

Mr. Ling noted that ADBC is also implementing the “all-encompassing approach to food” concept by expanding credit support beyond traditional grains to include a broader range of food products. This includes supporting the development of whole grain and food industry chains with a focus on planting, processing, and leading grain-processors whose businesses span the entire industrial chain. A case example was ADBC’s support for Sinograin Oils & Fats Industrial Dongguan Co., Ltd., which received financing over three years to support the purchase of soybeans and other edible oil raw materials for processing.

A key innovation highlighted was the Grain Credit Guarantee Fund, which addresses the financing challenges faced by small and micro-sized grain enterprises. Mr. Ling explained that in China’s agricultural sector, many operating entities are small in scale and face natural disadvantages compared to large enterprises when seeking

financing. The Credit Guarantee Fund model brings together government, banks, and small clients to form a shared risk community, enabling these smaller entities to access financial resources beyond what they could normally obtain. While this mechanism started with small and medium-sized trading enterprises, it has now expanded to cover new types of agricultural operators engaged in grain production.

In supporting high-standard farmland development, ADBC has directed significant efforts toward improving agricultural land quality and productivity. This includes financing for high-standard farmland construction, black soil protection, saline-alkali land reclamation, and water conservancy projects. One example is a project in Sichuan Province, where ADBC supported an integrated initiative encompassing infrastructure improvement and services related to planting, management, harvesting, processing, and sales. The project helps improve rural land utilization and increase rural collective income.

In supporting agricultural technology, ADBC focuses on seed industry revitalization, modern agricultural machinery, smart agriculture, and agricultural technology innovation platforms. Mr. Ling presented a case study of the “AI Factory for Fish+Vegetable Farming” demonstration project in Chongqing, which transforms the Fish+Vegetable Farming concept into production practice. This project demonstrates a green and intensive production model that improves quality, returns, and competitiveness while stimulating innovation and entrepreneurship among local farmers.

ADBC also supports the import of grains and other key agricultural products, promoting smooth domestic and international flows. In international cooperation, Mr. Ling noted ADBC’s role as the chair unit of the Asia-Pacific Rural and Agricultural Credit Association (APRACA), utilizing this network to conduct dialogues on green finance, poverty alleviation, and sustainable development of agriculture and rural areas.

Looking ahead, ADBC outlined its future strategy under four overarching principles. The “Whole Food” approach expands credit support beyond traditional grains to include a broader range of food products, reflecting the “all-encompassing approach to food.” The “Whole Chain” approach extends financing along the entire food supply

chain, covering production, acquisition, storage, processing, and sales, as well as key inputs such as water, land, seeds, agricultural materials, and technology. The “Whole Bank” approach mobilizes the full resources of ADBC as a major financial institution to serve food security. The “Whole Effort” approach strengthens policy support and resource guarantees for China’s food security, mobilizing the bank’s policy tools, financial resources, and institutional mechanisms to serve the development of the grain industry.

2.3 “Importance of Innovative Technology and Financing for Resilient Food Systems”

Professor Matthew Tan, Member of Investment Committee, Asia Food Sustainability Fund, Singapore

Professor Tan delivered a compelling presentation framed as a call to action, emphasizing the urgent need for innovative technology and financing in the face of accelerating environmental degradation. He opened with a video of melting icebergs in the Bay of Fundy, illustrating that environmental degradation is no longer a distant risk but is actively reshaping global food production today. He noted that 93% of the heat generated by human activity—from air conditioning and industry—is being absorbed by the ocean, with dramatic effects on marine life.

Professor Tan explained that fish have only a two-degree thermal tolerance, and any water warmer than that causes fish to migrate deeper or toward the poles. This trend is already impacting fisheries, with tuna catches in some Asian fisheries dropping by as much as 90%. He cited examples of algae blooms affecting salmon farms in both Norway and Chile, causing millions of dollars in losses, with algae blooms now occurring even in temperate economies where they were not previously observed.

Citing a World Meteorological Organization (WMO) report from less than a month before the workshop, Professor Tan confirmed that 2025 was one of the warmest years on record. He presented forecasts indicating that due to global warming, agricultural production could drop by 50% by 2050. Looking ahead, demand will continue to rise while natural capital continues to degrade and climate volatility creates increasing farming uncertainty.

Professor Tan argued that to address these challenges, innovative technologies must be deployed to decouple economic progress from further environmental degradation. He presented several examples of such technologies. Selective genetic breeding has reduced the time needed to grow a model prawn from nine months to one hundred days, and genetic selection now enables prawns to grow in warmer water. AI-driven water monitoring systems provide not just real-time water quality data but also risk assessment, digital surveillance, and bioremediation solutions. Climate-smart urban farming systems with small footprints can produce 2 million kilograms of fish per hectare—58 times more than traditional farms—while using 1.5 kilowatts per kilogram of fish compared to 25-30 kilowatts with older technology.

Professor Tan emphasized that while the technology exists, the challenge lies in scaling up funding, particularly for small stakeholders. He introduced the concept of "Venture Capital as a Service" (VCaaS), where public capital plays a catalytic role in anchoring funds that enable professional venture capitalists to operate in the agri-food sector. This model does not aim to make governments venture capitalists but rather uses public funds to de-risk and attract private co-investment.

Professor Tan presented the GrainInnovate fund as a case study. Established by Australia's Grains Research & Development Corporation (GRDC) in 2019, GrainInnovate is a venture capital fund backing early-stage startups addressing critical challenges in the grains sector. Within five years, the fund deployed USD 32 million into 22 startups across software, hardware, biologicals, genetics, and enabling platforms. Independent analysis confirmed that 50% of portfolio companies are commercially deployed, and for every dollar invested, USD 4.80 in on-farm value has been created. Including equity returns, the total benefit reaches USD 6.70 per dollar invested. Professor Tan concluded that this demonstrates how strategic public-private venture models, anchored by catalytic public capital, can unlock innovative solutions that deliver both financial returns and tangible contributions to building a more resilient food system.

3. Session 3: Innovative Regional Coordination and Supply–Demand Integration

3.1 "Building a Solid Foundation through Collaboration, Empowering Development with Innovation — Jointly Safeguarding the Resilient Development of Regional Food Security"

Mr. WANG Zhikai, Chairman of the Board, Shenzhen Cereals Holdings Co., Ltd., China

Mr. Wang presented the "Shenzhen Model" for ensuring food security in a major consumption hub. He explained that Shenzhen, as a megacity with about 18 million people and a high degree of external dependence on food, faces significant food security challenges. As a publicly listed grain enterprise with 77 years of history, Shenzhen Cereals Holdings Co., Ltd. (SZCH) has built a resilient system through four types of coordination.

In terms of hub coordination, Mr. Wang described how the company has built a multi-modal logistics network connecting production areas to the Guangdong-Hong Kong-Macao Greater Bay Area (GBA). This includes investing in a logistics node in Dongguan—a key grain processing town. The company has also established cooperation in grain transit and distribution in the Bohai Gulf, the Yangtze River Delta, the Pearl River Delta, the Beibu Gulf and other regions, opening up the major eastern coastal logistics corridor from grain-producing areas to grain-consuming areas, enhancing grain transportation and allocation capacity. In addition, the company creates an emergency response system ensuring one-hour delivery within the city and two-hour delivery to surrounding areas, connecting all links from production bases to port nodes to urban districts to thousands of households.

In terms of industrial chain coordination, Mr. Wang explained that the company actively engages both domestic and international resources. Internationally, it collaborates with partners in Myanmar; Pakistan; Thailand; and Viet Nam for rice, and with Australia; Canada; Russia; and the United States for wheat and sorghum. In the last three years, trade between SZCH and APEC member economies has maintained steady growth. Domestically, the company uses an "origin procurement

plus off-site storage" model, building processing bases and partnering with leading companies in major production provinces to secure high-quality grain.

In terms of innovation empowerment, Mr. Wang highlighted both technology and pattern innovations. In technology innovation, the company has developed the "SZCH·GLS" logistics information system for end-to-end digital management, covering acquisition, warehousing, processing, trade, and distribution. It promotes green storage technologies including radio frequency identification (RFID)-based warehouse flow systems, robotic palletizers, and intelligent temperature control systems. The company has also built an online grain trading platform covering 75 grain and oil varieties.

In terms of pattern innovation, Mr. Wang described how the company has developed a product matrix of over 350 items spanning rice, flour, oil, tea, and alcohol, creating a trusted brand system. It follows consumer trends toward healthy and diversified food, developing products such as low glycemic index (GI) rice and diacylglycerol cooking oil. The company also innovates in new business models including "One-Stop Kitchen Distribution" and a business-to-consumer (B2C) online platform called "Duoximi."

In terms of standard coordination, Mr. Wang emphasized that the sustainability of production-sales collaboration depends on unified quality standards. The company has built a full-chain, digitalized, traceable quality control system. It operates one of Guangdong's first enterprise-level quality supervision stations with China Metrology Accreditation (CMA) and China Agricultural Testing Laboratory (CATL) dual certification. It has established a digital laboratory with quality information archives enabling traceability from field to table. Mr. Wang noted that the company was honored with the Nomination Award of the 8th Guangdong Provincial Government Quality Award, the first grain enterprise to receive this recognition.

Mr. Wang concluded that the practices of SZCH demonstrate how regional coordination and supply-demand integration can be effectively achieved through collaboration and innovation. These approaches—encompassing channel coordination, standard harmonization, innovation cooperation, and mechanism development—reflect the value of openness, inclusiveness, and mutual benefit in

strengthening the resilience of regional food systems. Such efforts, he noted, contribute meaningfully to the shared goals of building more robust and adaptive food systems across the Asia-Pacific region.

3.2 "Innovative Regional Coordination and Supply–Demand Integration: Case Studies from Thailand"

Mr. Chusak Chuenprayoth, Vice Chair of the Thai Chamber of Commerce, Chair of the Committee on Quality Agricultural Products, Thailand

Mr. Chusak presented a series of practical case studies demonstrating how the Thai Chamber of Commerce acts as a key intermediary to facilitate supply-demand integration, address market failures, and support smallholder farmers. He began by referencing the Trujillo Principles for Preventing and Reducing Food Loss and Waste, which emphasize strengthening institutional frameworks, promoting PPPs, fostering research and innovation, improving data collection and knowledge management, creating enabling environments for investment, and promoting food rescue and donation.

In Thailand, Mr. Chusak explained that the public and private sectors collaborated to establish a baseline data for food loss across the supply chain. A technical working group identified 13 commodities across 5 main groups based on significant economic value, environmental impacts, and high food loss percentage. The economy's food loss baseline was established at 3.79%. A Food Loss Reduction Action Plan for 2023-2027 was subsequently developed. The plan is structured through a multi-level mechanism: the Economy's Food Board provides overarching direction, the Food Loss Reduction Sub-Committee oversees implementation, and a Technical Working Group for Food Loss Reduction carries out the detailed work. The plan aims to reduce food loss by 5% annually from the established baseline through actions taken across the supply chain, with progress reviewed and refined to ensure continuous improvement.

The Thai Chamber of Commerce then initiated a surplus food redistribution project, mobilizing members from modern trade, food and beverage manufacturing, restaurant chains, and food service industries to donate surplus food to the Scholars

of Sustenance Foundation. From March 2023 to December 2025, this project redistributed surplus food equivalent to over 12.43 million meals, reducing carbon dioxide emissions by 7.49 million kilograms CO2e.

Mr. Chusak described the establishment of the Agriculture and Food Coordination Center (AFC) to address oversupply and falling prices. The AFC coordinates a network of 28 public and private organizations, collecting data on surplus products and connecting farmers with processors and distributors. In 2024, the AFC helped purchase 218 356 tons of products worth 14.17 billion Baht. The AFC uses a simple but effective communication channel—a Line platform—where “Mr. and Ms. AFC” officers share real-time information on supply and demand, enabling quick action to alleviate crises.

Mr. Chusak presented several examples of the AFC’s work. When barramundi prices fell in Chachoengsao Province, the AFC organized a “Barramundi Purchasing Caravan” to provide direct assistance to farmers, promoting the consumption of high-quality, safe-standard barramundi delivered directly from farms to consumers. When lime prices dropped severely, the AFC coordinated campaigns to promote consumption, working with leading retailers such as Lotus and CP to launch promotions including “buy one get one” offers to help farmers recover some income. During fruit seasons, the AFC organized promotions through leading retail and wholesale networks and fresh market networks to encourage the consumption of seasonal fruits such as durian, dragon fruit, and banana. The AFC also facilitated agricultural trade through contract farming and contract markets, utilizing standard form contracts from the Department of Internal Trade to help link farmers with processors and distributors.

Another case study focused on promoting the cultivation of high-quality Robusta coffee in Northern Thailand. The Ministry of Agriculture and Cooperatives established a policy to promote coffee as a key economic crop for the economy. However, domestic production remained insufficient to meet consumption demand, resulting in a significant need for coffee imports. To drive the promotion of coffee cultivation in a systematic and sustainable manner, a Memorandum of Understanding (MOU) was established for the promotion of quality coffee production,

research, and sustainable coffee supply chain development. This agreement brought together the Thai Chamber of Commerce, the Department of Agricultural Extension, and various public and private sectors, associations, educational institutions, farmer organizations, and related networks, totaling more than 36 organizations.

Under this framework, the Thai Chamber of Commerce engaged the demand side by holding discussions with major coffee business operators to assess demand. On the supply side, the Chamber coordinated with provincial chambers to survey local interest and land readiness, identifying over 1,500 farmers interested in participating across approximately 800 hectares. The Chamber also collaborated with local educational institutions to develop training curricula for Robusta coffee production focusing on international standards, environmental friendliness, and digitalization. The project aims to increase farmer income significantly within three years of planting, demonstrating the potential of public-private collaboration to create new economic opportunities for smallholders.

In conclusion, Mr. Chusak emphasized that the case studies from Thailand demonstrate the importance of public-private partnership in addressing food system challenges. He encouraged APEC economies to strengthen institutional frameworks, foster innovation and digitalization, enhance data collection, and promote investment in physical infrastructure and capacity building. He noted that joint efforts through public-private collaboration, supported by expert working groups, can provide efficient frameworks to help economies build more resilient food systems.

3.3 “Global Grain Trade - Introduction to How Grain Moves from Areas of Surplus to Deficit”

Mr. Manuel Sanchez, Chief Representative and China Director, U.S. Grains & BioProducts Council

Mr. Sanchez provided an overview of global grain trade dynamics, explaining how grains move from areas of surplus to areas of deficit—a process essential for global food security. He introduced his organization, the U.S. Grains & BioProducts Council (USGBC), as a public-private partnership itself, established in 1960 and representing over 150 private businesses. The Council works with the U.S. Department of

Agriculture's Foreign Agricultural Service (FAS) through market access programs, allowing it to promote products, develop markets, and enable trade for U.S. coarse grains including corn, barley, sorghum, and their byproducts such as distiller's dried grains with solubles (DDGS) and ethanol.

Mr. Sanchez explained that there are four key net-exporting regions globally: North America, South America, the Black Sea region, and Oceania. Other regions, including much of Asia, are net importers. Using corn as an example, he noted that global corn trade has grown substantially, reflecting increasing integration and demand across international markets. This trade encompasses both traditional and genetically modified organism (GMO) corn varieties, and Mr. Sanchez noted that GMO is not a limitation in many regions, as sufficient data supports the safety of these technologies.

Mr. Sanchez described the movement of grains from farm to market. Most grain is consumed domestically in producing countries, with only the surplus exported. In North America, corn goes primarily into animal feed, livestock, biofuels, and malting industries. The grain moves from farm to on-farm storage or regional elevators, then either directly to domestic facilities or through subterminal elevators via rail or truck. For exports, which represent only 20%-25% of total U.S. corn production, the most cost-effective international transport method is by ship.

Mr. Sanchez introduced the concept of fungibility—the interchangeability of a good or asset with other individual goods or assets of the same type. He explained that this simplifies the exchange and trade process, as interchangeability assumes that everyone values all goods of that class equally. Using the example of No. 2 yellow corn, he noted that it does not matter where the corn was grown—all corn designated as No. 2 yellow is worth the same amount. This fungibility is essential for building a functioning global market.

Mr. Sanchez concluded that the movement of grain from surplus to deficit areas is essential for global food security. This process begins with production in regions with favorable agricultural conditions, followed by transportation via truck, rail, and ship. Market dynamics driven by supply and demand influence grain imports to stabilize prices in deficit areas, while trade policies and agreements shape these flows.

Proper storage facilities and distribution networks are crucial for maintaining grain quality, and technological advances continue to improve efficiency throughout the supply chain. Overall, this interconnected system ensures the availability of food worldwide.

IV. Discussion, Recommendations, and Conclusions

1. Outcomes of the Panel Discussion

The panel discussion, moderated by Ms. ZHANG Yi, brought together five experts: Ms. Julie Bird, Mr. LING Tao, Professor Matthew Tan, Mr. Chusak Chuenprayoth, and Mr. Manuel Sanchez. The discussion focused on the key themes of the workshop: synergy in public-private partnerships, financing models, and the meaning of resilience, and how to build partnerships across diverse stakeholders.

1.1 On the Meaning of Resilience

A key point of discussion was the definition of resilience itself. The panelists agreed that while a dictionary definition is straightforward, its practical interpretation is multi-faceted and context-dependent.

Mr. Sanchez viewed resilience through the lens of long-term commitment and perseverance. He cited the example of US corn farmers who, 43 years ago, made the decision to invest in the Chinese market despite facing difficult economic conditions at home, with high interest rates and many farms going under. For him, resilience is “showing up, being here” and maintaining the “bridge” between markets even during challenging times. He also pointed to the Chinese swine market’s recovery from African Swine Fever as an example of resilience, noting that the market bounced back and is stronger than ever today. On the consumption side, he noted the dramatic shift to online ordering and home delivery during COVID-19 as further evidence of resilience.

Mr. Chusak emphasized that resilience requires a network built on trust with an honest broker that has no conflict of interest. He explained that the Thai Chamber of Commerce plays this role, bringing together supply and demand sides to facilitate communication and joint problem-solving. Without this trusted intermediary,

coordination among diverse stakeholders becomes nearly impossible. He noted that the Chamber's success in linking partners comes from being a neutral middle person.

Mr. LING Tao broke down the sources of stress on food system resilience into four categories. The first comes from nature, including climate and natural disasters that have historically been major factors affecting resilience in China. The second comes from industry operations, including changes in demand for food as direct consumption, animal feed, or other uses, with globalization amplifying the impact of these demand shifts. The third comes from technological change, which can disrupt existing balances in the food system. The fourth comes from market volatility, where sharp price fluctuations in spot and futures markets—both domestic and international—significantly affect resilience, particularly for grain-importing economies.

Mr. Matthew Tan shared a personal observation about a demographic threat to resilience: the aging farming population and the difficulty in attracting young people to join the industry. He noted that many farmers he works with are first or second generation, and they have trouble finding third generation farmers to take over. For Mr. Tan, resilience means "cannot be knocked down"—the ability to withstand shocks like earthquakes, fires, and typhoons regardless of financial circumstances. He argued that investment in automation and robotics is a key preventive step to build resilience against the coming labor shortage, citing a project in Singapore where automation reduced the workforce needed for feeding and harvesting from 12-15 workers to just three.

1.2 On Keeping Synergy in Public-Private Partnerships

Ms. Bird explained that synergy is maintained by having an overarching framework that provides opportunities for people to build relationships of trust and identify common areas of interest. She noted that interests are always changing, so there will always be areas of differing perspectives. The key is to focus on areas of common interest and separate those where collaboration is not possible. In the RDC model, where growers and businesses are also competitors, the focus is on investments that work for the greater good, such as food security or productivity improvements, while leaving purely commercial competitive matters at the door.

1.3 On Adapting PPP Models for Smallholders

Ms. Bird noted that the RDC model's strength is its flexibility. It must evolve to meet the needs of all operators, from very large to very small. The emergence of the RDC venture capital (VC) model is an example of this evolution, using a more agile framework to bring public and private priorities together.

Mr. Chusak emphasized that for smallholders, a "one-size-fits-all" approach does not work. In Thailand, the Chamber of Commerce helps by aggregating smallholders into groups, providing production planning, and connecting them with financial support. By grouping smallholders together, they become bankable as a collective rather than as risky individuals. The Chamber also provides training and capacity building to help smallholders understand costs and benefits.

Mr. LING Tao explained that ADBC's Credit Guarantee Fund was initially designed for small trading enterprises but has expanded to serve new types of agricultural operators engaged in planting and production. The key is that an effective mechanism can be adapted and broadened to cover the entire food chain. With government guidance, all financial institutions are now participating in this approach, gradually improving the financing environment for small operators.

1.4 On Attracting Venture Capital to Agriculture

Professor Tan clarified that the VC model he advocates—Venture Capital as a Service—is different from traditional venture capital (VC). Traditional VC chases high-risk, high-return unicorns. In the VCaaS model, public capital plays a catalytic role, anchoring a fund that then enables professional VCs to operate in the agri-food sector. The fund invests not in one company but in building a whole ecosystem. The success of GrainInnovate, with a return of USD 6.70 per USD 1 invested, proves this model can work.

1.5 On Building Trust

Mr. Sanchez elaborated on the importance of fungibility and trust. He explained that consistency and standardization are essential for building trust in the global supply chain. For a major importer, trust that a shipment of No. 2 yellow corn will meet

expectations regardless of its origin is essential for food security. This requires all exporting players to work together to align and provide a similar product.

Mr. Chusak added that trust requires showing that there is no conflict of interest among stakeholders. The Chamber of Commerce acts as a middle person, bringing supply and demand together without pursuing its own interests, which is why it has been successful in linking partners.

2. Recommendations and Conclusions

Through the expert presentations, panel discussion, and Q&A sessions, the workshop reached a strong consensus that innovation-driven Public-Private Partnerships are not just beneficial but essential for building resilient food systems in the APEC region. The discussions highlighted that effective PPPs are adaptive, built on trust, and capable of integrating diverse stakeholders from smallholders to large corporations.

Based on the rich exchange of experiences and ideas, the following recommendations for APEC member economies are proposed:

2.1 Strengthen Institutional and Governance Frameworks for PPPs

Establish clear legal and regulatory frameworks that define roles, responsibilities, and long-term goals for public and private sectors. Develop flexible governance models that can adapt to the specific needs of different sectors and include both large and small operators. Empower intermediary organizations—such as chambers of commerce and industry associations—to act as honest brokers that can build trust, facilitate communication, and coordinate collective action among diverse stakeholders. Ensure that these frameworks provide long-term stability while remaining adaptable to changing conditions.

2.2 Foster Innovation Through Catalytic Financing and Technology Sharing

Promote the Venture Capital as a Service model where public funds are used to de-risk and catalyze private investment in agri-food tech startups, scaling solutions for the entire ecosystem rather than individual firms. Develop innovative financing instruments such as credit guarantee funds to address the specific needs of

smallholders and SMEs, enabling them to access the capital needed to invest in resilience. Invest in and openly share post-harvest technologies, from low-cost solutions for smallholders to advanced green storage technologies. Promote open-access, platform-based innovation hubs that provide shared infrastructure, R&D support, and market access for food enterprises of all sizes, particularly startups and SMEs.

2.3 Enhance Regional Coordination and Supply-Demand Integration

Strengthen the role of public-private intermediaries in monitoring supply and demand to anticipate and mitigate market disruptions. Develop mechanisms for real-time information sharing on supply and demand conditions to enable rapid response to oversupply or shortage situations. Promote the development and mutual recognition of consistent quality and safety standards to build trust and facilitate smoother regional and global trade. Encourage long-term, trust-based relationships between trading partners that provide stability and market intelligence even during periods of economic uncertainty. Facilitate cross-border collaboration on climate adaptation and sustainable practices, sharing data and experiences to build collective resilience against shared environmental threats.

2.4 Prioritize Capacity Building and Inclusivity

Develop targeted programs that link demand directly with supply while providing necessary training and support to help smallholders meet market standards and improve their livelihoods. Invest in education and training to attract and prepare the next generation of farmers and agri-food professionals, leveraging digital tools and automation to make the sector more appealing and resilient. Ensure that PPPs are designed to benefit all stakeholders, including women, youth, and MSMEs, by creating specific pathways for their participation and addressing their unique challenges. Provide capacity building in digital literacy and skills for all supply chain actors to enhance the soft power of resilience management.

In conclusion, the path to a more food-secure future in the Asia-Pacific lies in forging stronger, more innovative partnerships. The workshop demonstrated that by combining the strategic vision of the public sector with the dynamism and efficiency

of the private sector, APEC economies can build food systems that are not only productive but also robust, adaptable, and capable of adapting to the evolving challenges of the 21st century. The examples shared across the three thematic sessions—from Australia's RDC model and Korea's FOODPOLIS platform to Thailand's Fishery Improvement Project and China's credit guarantee funds—provide a rich repository of practical approaches that can be adapted and scaled across the region.