Asia Pacific Perspectives

Strengthening
Comprehensive Connectivity

CTPECC
Chinese Taipei Pacific Economic Cooperation Committee

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About the CTPECC

CTPECC is a full member of Pacific Economic Cooperation Committee (PECC), which is an international organization for economic cooperation in the Asia-Pacific region and plays a key role in consultation and advice on APEC's major initiatives and plans. The participation of CTPECC is to assist the government in researching and analyzing economic cooperation plans, and to strive for greater opportunities to participate in cooperation mechanisms and dialogues.

The Free Trade Area of the Asia Pacific: Time to Move Forward?

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It has been over twenty years since the concept of a Free Trade Area of the Asia Pacific (FTAAP) was first proposed by the Asia Pacific Economic Cooperation (APEC) Business Advisory Council (ABAC).[1]

Today, APEC economies regularly reference the FTAAP concept in joint statements and leaders' declarations. Most recently, in the "2024 APEC Leaders' Machu Picchu Declaration" (the Machu Picchu Declaration), APEC leaders endorsed the "Ichma Statement on A New Look at the FTAAP agenda" (the Ichma Statement).[2] Discussions relating to the FTAAP concept are also sure to make an appearance again over the course of the APEC 2025 meetings in Korea. The Republic of Korea has set "Connect" as one of the three priorities for its year hosting APEC, a concept that includes a desire to "build on past efforts and continue discourse on the FTAAP agenda."[3]

However, observers can be forgiven if they have found progress on the FTAAP concept slow and underwhelming. To date, no FTAAP negotiations are active or have occurred between APEC economies. The FTAAP is predominantly discussed by APEC economies as a visionary goal rather than a trade liberalization project to be seized here and now. Although APEC economies do pursue related workstreams under the concept of the FTAAP agenda (discussed below) this slow pace raises questions over how realistic the pursuit of a comprehensive free trade agreement at the APEC regional level is and economies' degrees of commitment to this goal.

This article will provide a brief overview of APEC economies' aspirations for the FTAAP and conclude by drawing conclusions about the juncture at which APEC leaders now find themselves.

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1. APEC Business Advisory Council, "Bridging the Pacific: Coping with the Challenges of Globalization – Report to APEC Economic Leaders 2004", 2004 Volume 2, see: https://abac.ph/wp-content/uploads/2022/10/ABAC-2004-Report-to-Economic-Leaders-Vol.-2.pdf.
2. APEC Leaders, "2024 APEC Leaders' Machu Picchu Declaration", APEC, 16 November 2024, see: https://www.apec.org/meeting-papers/leaders-declarations/2024/2024-apec-leaders'-machu-picchu-declaration.
3. Republic of Korea, "Priorities for APEC 2025 – Policy and Discussion Paper", APEC, 10 December 2024, see: https://mddb.apec.org/Documents/2024/SOM/ISOM/24_isom_002.pdf.

A Brief Overview of the FTAAP Concept

Following ABAC raising the concept in 2004, APEC economies agreed to examine the prospect of the FTAAP in 2006. Convening in Hanoi, Ministers welcomed a joint study on the concept's feasibility by ABAC and the Pacific Economic Cooperation Council.[4] By 2010, APEC leaders issued "Pathways to FTAAP." In this document, APEC leaders agreed that "now is the time...to translate FTAAP from an aspirational to a more concrete vision." "Pathways to FTAAP" also indicated that the FTAAP should be "pursued as a comprehensive free trade agreement."[5]

In 2014, with negotiations on other regional trade agreements – the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) and the Regional Comprehensive Economic Partnership (RCEP) – involving various APEC economies firmly underway, APEC leaders adopted the "The Beijing Roadmap for APEC's Contribution to the Realization of the FTAAP" (the Beijing Roadmap). This document acknowledged that the proliferation of regional trade agreements (RTAs) and free trade agreements (FTAs) was creating liberalizing momentum. But it also expressed concerns that such RTAs and FTAs were creating "a 'spaghetti bowl' effect that poses complex new challenges to regional economic integration and to business."[6] In response to this dynamic, the Beijing Roadmap stated that economic evolution had reached a "critical point" and identified the creation of a comprehensive FTAAP as a means to minimize the negative effects of the proliferation of RTAs and FTAs. It also contained a commitment by APEC leaders "to the eventual realization of the FTAAP as early as possible."[7] In 2016, the "Lima Declaration on FTAAP" (the Lima Declaration) reaffirmed this commitment, which was affirmed once again in the 2017 Leaders Declaration.[8]

In 2018 and 2019, APEC leaders failed to agree to joint declarations. However, in the 2020 leaders' declaration and the accompanying "Putrajaya Vision 2040" (the Putrajaya Vision), leaders began to refer to the FTAAP concept as an "FTAAP *agenda*" (emphasis added) that will "contribute to high quality and comprehensive regional undertakings."[9] As will be discussed below, this language appears to have signaled a scaling back of leaders' ambitions to conclude an FTAAP agreement.

The FTAAP Concept Today

References to the FTAAP concept also persist to this day. Last year at APEC 2024 in Peru, the APEC Ministers Responsible for Trade Joint Statement referred to "economic integration" as a "core objective of APEC," and reiterated the importance of "continuing to advance the FTAAP agenda."

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4. APEC Leaders, "2006 APEC Ministerial Meeting Statement", APEC, 15 November 2006, see: https://www.apec.org/meeting-papers/annual-ministerial-meetings/2006/2006_amm.

5. APEC Leaders, "Pathways To FTAAP", APEC, 13 November 2010, see: https://www.apec.org/meeting-papers/leaders-declarations/2010/2010_aelm/pathways-to-ftaap.

6. APEC Leaders, "Annex A – The Beijing Roadmap for APEC's Contribution to the Realization of the FTAAP", APEC, 8 November 2014, see: https://www.apec.org/meeting-papers/leaders-declarations/2014/2014_aelm/2014_aelm_annexa [Beijing Roadmap].

7. Ibid.

8. APEC Leaders, "2016 Leaders Declaration", APEC, 19 November 2016, see: https://www.apec.org/meeting-papers/leaders-declarations/2016/2016_aelm; APEC Leaders, "2017 Leaders Declaration" APEC, 11 November 2017, see: https://www.apec.org/meeting-papers/leaders-declarations/2017/2017_aelm.

9. APEC Leaders, "2020 Kuala Lumpur Leaders Declaration", APEC, 20 November 2020, see: https://www.apec.org/meeting-papers/leaders-declarations/2020/2020_aelm; APEC Leaders, "APEC Putrajaya Vision 2040", 20 November 2020, APEC, see: https://www.apec.org/meeting-papers/leaders-declarations/2020/2020_aelm/annex-a [Putrajaya Vision].

APEC leaders also endorsed, as part of the Machu Picchu Declaration, the "Ichma Statement on a New Look at the FTAAP agenda." Through this Statement, APEC leaders declared their continued collective support for "advancing, in a comprehensive and systematic manner, the FTAAP agenda as an important shared initiative." The Ichma Statement went on to assert that "it is time to assess how APEC's FTAAP agenda can address changes in the evolving international trade landscape" and states that the FTAAP agenda "should further promote regional trade and investment." [10]

The Ichma Statement instructed various initiatives to advance this FTAAP agenda. These included an updated information sharing mechanism to enhance transparency on members' FTAs, a reinforced Capacity Building Needs Initiative to assist with bridging differences in capacity between APEC economies, and an emphasis on closer collaboration with ABAC. APEC leaders also instructed the creation of a new workstream within the Committee on Trade and Investment FTAAP Agenda Work Plan to examine and analyze "areas of divergence and convergence in FTAs and RTAs in practice" in order to identify areas of focus for potential future cooperation and inclusion in FTAAP negotiations. [11]

While these initiatives are laudable, similar work has been ongoing since at least 2010 when it was called for in the "Pathways to FTAAP" document, underscoring the slow pace at which progress has occurred.

FTAAP At a Crossroads?

As we get further from the inception of the FTAAP project, APEC economies face a choice: Should they continue on their current path of muddling through, now under the aegis of the FTAAP agenda, or should they boldly pursue a concrete FTAAP agreement that has a realistic possibility of success in the near future?

Muddling through is undoubtedly the default approach for APEC economies. This is not necessarily a bad thing. Since APEC economies began exploring the FTAAP concept, significant advances have been made, motivated by the FTAAP project, in building APEC economies' capacities, enhancing transparency and information sharing, and studying potential areas for future cooperation and convergence. [12]

Additionally, continuing on this slower track appears to be intentional, at least since 2020. Looking at both foundational APEC documents, such as the Putrajaya Vision, and the more recent Ichma Statement, the tone and content have changed from earlier documents such as the 2010 "Pathways to FTAAP" and the 2014 Beijing Roadmap. Throughout both of these earlier documents, leaders discussed the pursuit of the FTAAP itself.

Fast forward to the Putrajaya Vision and more recent statements, and the language on the FTAAP has changed. Instead of discussing progress towards an FTAAP itself, APEC leaders now speak of advancing the FTAAP agenda. [13] While this may

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10. APEC Leaders, "Ichma Statement on a New Look at the FTAAP agenda", APEC, 16 November 2024, see: https://www.apec.org/meeting-papers/leaders-declarations/2024/2024-apec-leaders'-machu-picchu-declaration/ichma-statement-on-a-new-look-at-the--free-trade-area-of-the-asia-pacific-agenda [Ichma Statement].

11. Ibid.

12. For example, see APEC Leaders, "Annex C - Progress Report on Implementation of the Beijing Roadmap for APEC's Contribution to the Realization of the FTAAP", APEC, 17 November 2015, at: https://www.apec.org/meeting-papers/annual-ministerial-meetings/2015/2015_amm/annexc.

13. Putrajaya Vision.

seem like a mere semantic difference, there is no such thing for the diplomats that negotiate these statements; every word is intensely haggled over during the corresponding APEC meetings from which these statements emerge.

In this case, moving from discussing "concrete steps towards the realization of the FTAAP"[14] to discussing advancing "economic integration... including through the work on the FTAAP *agenda*" (emphasis added) is significant.[15] It is not a coincidence that the "a" in agenda is not capitalized, either. The agenda does not refer to a specific document or a precisely defined term. Rather, as stated in the Ichma Statement, it is a "shared initiative that supports enhancing information sharing, capacity building and technical cooperation efforts in support of economies' readiness to participate in high quality and comprehensive regional undertakings."[16] That is, it is a general set of workstreams and initiatives that have been connected to discussions of the FTAAP concept since its inception.

Also noteworthy here is the reference in this line of the Ichma Statement to "regional undertakings."[17] Similar statements are found in the Putrajaya Vision and the 2024 MRT Joint Statement, which both suggest that the FTAAP agenda "contributes to high standard and comprehensive regional undertakings."[18] While "regional undertakings" were referenced prior to 2020, such as in the Beijing Roadmap and the Lima Declaration, it was to suggest that the FTAAP project would build upon these

undertakings. Now, the FTAAP agenda is satisfied if related workstreams merely contribute to other comprehensive regional undertakings (such as CPTPP and RCEP). Under this formulation, satisfying the FTAAP agenda no longer requires that APEC economies actually make progress towards a new free trade area that is open to all economies of the APEC region.

This fits with the observation, made by economist Gary Clyde Hufbauer of the Peterson Institute for International Economics that "policy action on the underlying principles of [APEC's] Goals has decisively moved from APEC to the CPTPP and RCEP."[19] In other words, APEC's role as an "incubator" for discussion of a comprehensive trade agreement has been somewhat undermined by the momentum shifting from this broader regional grouping to more narrow clubs of economies.

Perhaps this is not surprising. APEC economies are diverse, encompassing a variety of political models and development levels. This creates significant challenges for finding convergence and consensus between members. Moreover, the momentum for achieving a new comprehensive RTA between APEC economies has been undermined in recent years by key APEC economies' policy choices. Some have turned against new comprehensive RTAs/FTAs themselves, while others have shown insufficient commitment to the market-based principles on which such agreements are premised. Geopolitical tensions between APEC economies and a broader

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14. Beijing Roadmap.
15. Putrajaya Vision.
16. Ichma Statement
17. Ibid.
18. Putrajaya Vision.
19. Gary Clyde Hufbauer, "Has the United States abandoned APEC's vision?", East Asia Forum, 29 August 2023, see: https://eastasiaforum.org/2023/08/29/has-the-united-states-abandoned-apecs-vision/.

fragmentation of the international trading system have also contributed to and compounded these challenges.

Nevertheless, these dynamics need not foreclose the possibility of new APEC regional agreements. Instead, APEC economies may benefit from climbing down from the FTAAP project's original lofty goals and pursuing a more narrowly-scoped agreement. This would have a more realistic chance of being concluded between APEC economies in the near future, bringing the FTAAP agenda beyond a set of supporting workstreams and towards the creation of a new agreement.

Here, the example set at the World Trade Organization can be instructive. After facing consistent challenges pursuing a broader set of negotiations under the Doha Round, WTO Members backed off their earlier goals and began to pursue a narrower approach to consensus building through plurilateral agreements such as the Joint Statement Initiatives and more narrow multilateral negotiations on issues such as the Agreement on Fisheries Subsidies.[20]

APEC economies can learn from this approach and consider what avenues are available to them to find consensus on narrower issue sets that may be more amenable to solutions at the regional level. This can be done using the ongoing work that has been achieved under the FTAAP agenda. For example, the APEC Policy Support Unit's Study on Convergences and Divergences of Free Trade Agreements in the APEC region can be used to identify areas where APEC economies may have potential room for further convergence that can lead to WTO+ obligations at the regional level.

This is not to suggest there are not drawbacks of this approach. A project of this nature remains significantly less ambitious than that originally envisioned by ABAC in 2004. Additionally, attempting to prioritize reaching an agreement at a time of geopolitical tension and fragmentation could result in a further fragmentation of international trade if the push towards an agreement is not successful. This could undermine the cooperation that currently exists at APEC, undermining its effectiveness as a forum. By contrast, muddling through may delay reaching meaningful solutions at the APEC level, but it might keep open the possibility of a grander agreement at a future time when international dynamics are more amenable to comprehensive cooperation.

Conclusion

Overall, APEC economies should be aware of the risks of both approaches, but also the potential benefits they may entail. What is important is that APEC economies, implicitly or otherwise, acknowledge the juncture that the FTAAP project has reached, over 20 years from its conception and evaluate whether old approaches fit contemporary realities. Doing so will allow APEC economies to be intentional about the goals of this project and act with a full appreciation of the challenges and opportunities entailed by different versions of the FTAAP concept.

Note

The views expressed here are those of the author and do not necessarily represent those of their employer.

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20. World Trade Organization, "Joint Initiatives", WTO, see: https://www.wto.org/english/tratop_e/jsi_e/jsi_e.htm; World Trade Organization, "Agreement on Fisheries Subsidies Overview", WTO, see: https://www.wto.org/english/tratop_e/rulesneg_e/fish_e/fish_e.htm.

Comprehensive Connectivity in APEC: Strategies and Challenges towards Sustainable Growth

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Introduction

The Asia-Pacific Economic Cooperation (APEC) is a key pillar of the global economy, accounting for 61% of the global Gross Domestic Product (GDP), 46% of global trade in goods and commercial services[1]. The 21 member economies have been the engine of global economic growth over the past decades, mainly due to its policies geared towards trade liberalisation, multilateral cooperation and strengthening connectivity infrastructures. However, despite this economic success, there are persistent challenges, such as the need to ensure equitable economic integration, promote fair competition and address sustainability challenges.

In this context, and focusing on comprehensive connectivity has become one of the main strategies to overcome innumerable obstacles within and outside APEC. This concept of connectivity within the Forum refers not only to physical infrastructure, such as roads, ports and airports, but also encompasses digital infrastructure, which enables connectivity between markets through e-commerce platforms, financial services and new technologies. In addition, connectivity must be institutional and people-to-people, meaning that there must be an effort by governments, business and civil society to work together to create an environment of cooperation and mutual understanding.

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1. APEC in charts 2024, APEC Secretariat, APEC Policy Support Unit (November, 2024). https://www.apec.org/publications/2024/11/apec-in-charts-2024
2. Building a Sustainable Tomorrow: APEC Returns to Korea After 20 Years (02 January 2025). https://www.apec.org/press/blogs/2025/building-a-sustainable-tomorrow--apec-returns-to-korea-after-20-years

Korea under the overarching APEC 2025's theme: "Building a Sustainable Tomorrow"[2], reflects the priority of strengthening connectivity in a way that is both economically inclusive and environmentally responsible. In this article, we explore how the region has addressed comprehensive connectivity through key policy and strategic frameworks, with a focus on key initiatives that have been developed, discussed and worked on the framework of the Forum's key and forward-looking strategies, such as the Bogor Goals, the APEC Putrajaya Vision 2040, the Aotearoa Plan of Action and the APEC Connectivity Blueprint for 2015-2025, and how these have influenced them over the years.

Key Initiatives in APEC Comprehensive Connectivity

As mentioned in the introduction, the key policies guiding connectivity in the Asia-Pacific region within the Forum include the Bogor Goals, the APEC Putrajaya Vision 2040, the Aotearoa Plan of Action and the APEC Connectivity Blueprint for 2015-2025. Each of these strategic frameworks has been developed to address the needs of the region, seeking not only to improve physical and digital infrastructure, but also to foster deeper cooperation among member economies.

Below, I summarise the most relevant aspects of the aforementioned initiatives, from an analytical perspective and highlighting their main objectives that has been developed to contribute and strengthen the connectivity in the Asia-Pacific region.

The Bogor Goals

The Bogor Goals were adopted in 1994 at the APEC Summit in Indonesia[3]. These goals primarily aimed to achieve free and open trade and investment in the Asia-Pacific region by reducing trade barriers, promoting the free flow of goods, services, and capital among member economies.

This liberalization was expected to be achieved in 2020; however, much work remained to be done, especially for the restrictions that remain in some sectors. However, they undoubtedly built the pathway for future cooperation and integration in the region.

According to the Final Review of APEC's Progress Towards the Bogor Goals 2020, since the adoption of the Bogor Goals, substantial progress has been made in reducing tariff rates. Between 1994 and 2019, APEC's total merchandise trade almost quintupled from USD 4.1 trillion to USD 19 trillion, an average of 6.7% per year[4].

This change has had a significant impact on intra-regional trade, which has grown steadily, consolidating APEC as one of the largest economic blocs in the world. However, over the years, it has been recognised that connectivity goes beyond simple trade liberalisation, and it is at this point that connectivity initiatives take on a central and fundamental role for the region.

The Putrajaya Vision 2040

In 2020, APEC Leaders' adopted the APEC

3. 1994 Leaders' Declaration (15 November 1994). https://www.apec.org/meeting-papers/leaders-declarations/1994/1994_aelm
4. Final Review of APEC's Progress Towards the Bogor Goals, APEC Secretariat, APEC policy Support Unit (November 2020). https://www.apec.org/publications/2020/11/final-review-of-apecs-progress-towards-the-bogor-goals
5. APEC Putrajaya Vision 2040 (November 2020). https://www.apec.org/meeting-papers/leaders-declarations/2020/2020_aelm/annex-a

Putrajaya Vision 2040[5], which sets out a roadmap for a more interconnected, sustainable and inclusive Asia-Pacific region. This vision has a particular focus on strengthening digital infrastructure and e-commerce. Notable in daily life is the impressive growth in e-commerce, which has led to a considerable expansion of digital platforms across the region. This highlights the need to continue to improve technological infrastructures, such as high-speed internet access, platform interoperability and cybersecurity.

Furthermore, the Putrajaya Vision 2040 states that, to ensure a region resilient to shocks, crises, pandemics and various emergencies, member economies must strengthen cooperation and share best practices for environmental challenges, climate change and natural disasters, integrating environmental sustainability into connectivity policies, thus maintaining the Forum as an incubator of modern, efficient and effective ideas, through key strategies to ensure that connectivity infrastructures are sustainable in the long term.

The Aotearoa Action Plan

Adopted in 2021[6], the Aotearoa Action Plan focused on improving transport infrastructure and digital trade cooperation. This plan was developed to improve physical and digital connectivity among APEC member economies. In particular, it has focused on strengthening small and medium-sized enterprises (SMEs), which are key to economic growth in the region, so special emphasis should be placed on ensuring that SMEs have access to trade networks and digital platforms to boost digital connectivity.

In terms of physical infrastructure, APEC economies have worked on various transport infrastructure projects since the adoption of the Aotearoa Plan, which has improved regional transport efficiency and reduced logistics costs.

APEC Connectivity Blueprint for 2015-2025

The APEC Connectivity Blueprint for 2015-2025 arose in 2013[7], derived from the aspiration to achieve a connected and integrated region. In 2014 the leaders approved it and established three pillars that would guide the efforts framed in physical connectivity, institutional connectivity and people-to-people connectivity.

This plan is one of the most important strategic frameworks for strengthening connectivity in the Asia-Pacific region. Through this plan, work and efforts have been developed with the clear objective of fulfilling the following:

Physical Connectivity: improving physical connectivity through improving the investment climate, financing infrastructure through public-private partnerships (PPPs) and the use of comprehensive evaluation methods in infrastructure projects. On the other hand, it seeks to develop quality infrastructure in areas such as energy, ICT and transport, with a focus

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6. Aotearoa Plan of Action (November 2021). https://www.apec.org/meeting-papers/leaders-declarations/2021/2021-leaders-declaration/annex-aotearoa-plan-of-action

7. APEC Connectivity Blueprint for 2015-2015 (November 2014). https://www.apec.org/meeting-papers/leaders-declarations/2014/2014_aelm/2014_aelm_annexd

on sustainability, energy resilience and transport connectivity.

Institutional Connectivity: working on trade facilitation, structural and regulatory reforms and improving transport and logistics infrastructure. In addition, promote better regulatory practices through the exchange of experiences and the use of online tools.

People-to-People Connectivity: seeking to facilitate the movement of people and foster cultural exchanges, through the APEC Business Travel Card (ABTC), as well as educational exchanges to strengthen regional ties.

This approach has encompassed several areas of work, with the clear objective of strengthening relations within the Forum, ranging from infrastructure and trade to education and labour.

Additional connectivity efforts

Thailand, during its 2022 presidency[8], focused its work on promoting economic connectivity, with an emphasis on post-pandemic recovery and sustainability. It also underlined the importance of digital connectivity, green infrastructure and strengthening supply chains, driving digital inclusion and e-commerce as key areas for creating a more connected region.

In 2023[9], The United States served as a key leader in promoting improved transportation infrastructure and universal access to high-

speed Internet, as well as green technologies to improve infrastructure sustainability. On the other hand, it had a specific emphasis on improving the interoperability of Single Window systems to facilitate trade.

Finally, in 2024[10], Peru has been active in promoting connectivity projects in APEC, with an emphasis on digital connectivity and e-commerce. Its 2024 chairmanship advocated for a strengthening of digital infrastructure and trade facilitation through technological innovation. He has also worked to boost sustainable trade and promoted cooperation on energy infrastructure.

The Impact of Comprehensive Connectivity on APEC 2025

As APEC approaches its 2025 goals, comprehensive connectivity is emerging as a crucial pillar to ensure that the region remains competitive in an increasingly interconnected global environment. APEC Connectivity Blueprint initiatives and other strategic policies are aimed at strengthening physical and digital infrastructure, improving labour mobility, and facilitating trade and investment among the region's economies.

In addition, the sustainable connectivity policies adopted by APEC ensure that the region not only integrates economically, but also in an environmentally responsible manner. This is essential not only to achieve the APEC 2025 goals, but also to ensure that economic growth does not

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8.2022 Leaders' Declaration (19 November 2022). https://www.apec.org/meeting-papers/leaders-declarations/2022/2022-leaders-declaration

9.2023 Leaders' Declaration (17 November 2023). https://www.apec.org/meeting-papers/leaders-declarations/2023/2023-leaders-declaration

10.2024 APEC Leaders' Machu Picchu Declaration (16 November 2024). https://www.apec.org/meeting-papers/leaders-declarations/2024/2024-apec-leaders'-machu-picchu-declaration

compromise the long-term well-being of future generations.

Conclusion

Despite this prominent economic role, the region faces persistent challenges such as the need to promote equitable economic integration, ensure fair competition and address sustainability issues in an increasingly interconnected global context. Comprehensive connectivity has emerged as a central strategy to overcome these obstacles and ensure the region's continued growth. This concept, which encompasses not only physical infrastructure (roads, ports and airports) but also digital infrastructure and institutional and people-to-people links, is essential for APEC member economies to not only integrate more deeply with each other, but also to be better prepared to meet the challenges of the 21st century.

Key policies adopted within APEC reflect a collective effort to improve physical and digital infrastructure, foster trade and cooperation, and promote sustainability. Connectivity, understood in its broadest sense, involves not only the improvement of transport and technology networks, but also the strengthening of institutional relations and mutual understanding among member economies, which facilitates greater cooperation and joint development. Within this framework, the various strategic initiatives have had a considerable impact, achieving significant progress in reducing trade barriers, improving key infrastructure and fostering digital and economic cooperation.
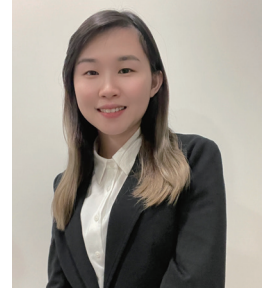
Looking ahead to Korea's chairmanship in 2025, it is crucial that these efforts are maintained and expanded to ensure that the region continues to lead the global economy in a responsible and sustainable manner. APEC 2025's theme, "Building a Sustainable Tomorrow", reflects a commitment to not only strengthen economic connectivity, but also to ensure that it is inclusive and environmentally responsible. This implies that connectivity policies should continue to promote equitable access to digital and physical infrastructure, fostering collaboration between governments, businesses and civil society to address common challenges, such as climate change, resilience to global emergencies and building a stronger regional cooperation environment.

Integrating AI-Powered Smart and Sustainable Agriculture for Food Security in the APEC Region

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Introduction

The global challenge of food insecurity remains a critical issue, driven by factors such as climate change, population growth, resource competition, and the vulnerability of global supply chains. The uneven distribution of technological advancements in agriculture further exacerbates disparities in productivity and innovation[1]. In this context, the agricultural sector in Taiwan faces its own challenges, including limited arable land, an aging workforce, and climate change impacts[2]. Despite these obstacles, there are opportunities to leverage technological advancements to enhance agricultural productivity and sustainability.

APEC has long prioritized food security, with frameworks like "Food Security Roadmap Towards 2030"[3] guiding member economies in addressing

related challenges. This paper introduces "AIMIA Prophet," a smart agriculture platform developed in Taiwan that uses AI technologies to provide innovative solutions for enhancing agricultural productivity and sustainability. By offering real-time insights into crop growth and water needs, AIMIA Prophet helps optimize resource use, reduce environmental impact, and stabilize crop yields. The platform aligns with APEC's goals of promoting digitalization, innovation, and sustainability, contributing to food security and resilience in the APEC region by expanding these innovations to other crops, supply chains, and regions.

Food Security in APEC

Since the first APEC Ministerial Meeting on Food

1. FAO, IFAD, UNICEF, WFP, and WHO. (2024). The State of Food Security and Nutrition in the World 2024. https://openknowledge.fao.org/handle/20.500.14283/cd1254en.
2. Ministry of Agriculture. (2024, September 27). Current Status of Agricultural Operations. https://www.ey.gov.tw/state/CD050F4E4007084B/0ededcaf-8d80-428e-96b7-7c24feb4ea0d.
3. APEC. (2021). The Food Security Roadmap Towards 2030. https://www.apec.org/meeting-papers/sectoral-ministerial-meetings/food-security/2021_food_security/annex.

Security in 2010, significant achievements include the establishment of the APEC Policy Partnership on Food Security (PPFS) forum in 2012, the publication of the "APEC Food Security Road Map Towards 2020" in 2014, the update of the "Food Security Road Map Towards 2030" in 2021, the formulation of its implementation plan in 2022, and the adoption of the "Principles for Achieving Food Security Through Sustainable Agrifood Systems in the APEC Region" in 2023.

Although these road maps, implementation plans, and principles are voluntary and non-binding commitments for APEC member economies, discussions in APEC forums, along with policy sharing and technical cooperation among member economies, have continuously contributed to maintaining food security in the Asia-Pacific region. APEC is also dedicated to realizing the "APEC Putrajaya Vision 2040" in terms of food security. This includes implementing the "Aotearoa Plan of Action", "The Food Security Road Map Towards 2030", and its implementation plan by promoting agriculture and food trade, sustainability, and innovation among APEC members. It also advocates for resilient and low-carbon agricultural practices to ensure sustainable food security, food safety, and improved nutrition for all people in the region while reducing food loss and waste.

The Implementation Plan of the Food Security Roadmap Towards 2030 focuses on the following objectives:

1. Digitalization and Innovation
2. Productivity
3. Inclusivity
4. Sustainability
5. Public-Private Partnerships

Current Implementation of APEC Initiatives and Principles

Peru recently led the proposal of the "Trujillo Principles for Preventing and Reducing Food Loss and Waste in the Asia-Pacific Region[4]" in 2024. The document articulated APEC's shared perspectives, serving as a foundation for preventing and reducing food loss and waste and strengthening food system approaches. It proposed seven principles:

· Principle 1: Strengthen institutional frameworks
· Principle 2: Promote public-private partnerships and coordination with other relevant stakeholders
· Principle 3: Foster research, innovation, technology, and digitalization
· Principle 4: Promote capacity building, awareness, and education
· Principle 5: Improve data collection and knowledge management
· Principle 6: Create an enabling environment to promote investment in physical infrastructure
· Principle 7: Promote food rescue and donation

In Taiwan, the implementation plans are primarily reflected in the areas of "Digitalization and Innovation" and "Sustainability" in APEC. Our government serves as the lead economy for action 17(e) of the "Implementation Plan of the Food Security Roadmap" concerning the reduction of food loss and waste (FLW). We are committed to providing capacity-building and best practice-sharing workshops to support SDG 12.3. Our previous projects align with multiple FLW principles, including promoting innovation and digitalization, enhancing capacity building, and raising awareness, as well as proposing

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4. APEC. (2024, August 18). Trujillo Principles for Preventing and Reducing Food Loss and Waste in the Asia-Pacific Region. https://www.apec.org/meeting-papers/sectoral-ministerial-meetings/food-security/9th-apec-food-security-ministerial-meeting/trujillo-principles-for-preventing-and-reducing-food-loss-and-waste-in-the-asia-pacific-region.

FLW quantitative assessment guidelines, and establishing the APEC-FLOWS website database.

The AIMIA Prophet Platform

Supported by the National Science and Technology Council Germination Program, a team in Taiwan developed the AIMIA Prophet—a smart agriculture forewarning platform that leverages artificial intelligence to identify crop physiological characteristics[5]. The platform provides real-time reflections of crop growth status and predicts crop needs, offering agricultural practitioners water demand warnings and cultivation recommendations through a user-friendly mobile application. By utilizing image spectral conversion algorithms, the system lowers the threshold for adopting smart agriculture technologies, helping to stabilize crop quality and yield while maximizing the use of water and land resources.

The development of AIMIA Prophet aligns with APEC's priorities as outlined in "Food Security Roadmap Towards 2030", and addresses the following key objectives:

1. Digitalization and Innovation: The platform uses AI algorithms to convert RGB images into multispectral images, reflecting crop physiological indicators for quick monitoring. This allows for accurate predictions of crop water demand and phenotypic variations throughout the growth cycle.

2. Productivity: By providing precise water demand warnings and irrigation recommendations, the platform helps optimize resource use, reduce environmental impact, and stabilize crop yields. This is particularly significant given that agricultural water uses accounts for over 70% of total water consumption in Taiwan, with irrigation being the largest component[6].

3. Inclusivity: The platform addresses the aging agricultural workforce by offering an easy-to-operate system that converts farmers' operational experience into system parameters. The use of smartphones aligns with the high mobile internet usage in the region, where 97.1% of internet users access the internet via mobile phones[7], making it accessible across different age groups.

4. Sustainability: AIMIA Prophet contributes to the net-zero transition strategy[8]. The water-saving cultivation methods facilitated by the platform can reduce methane emissions from paddy fields by 30-70%, potentially reducing emissions by 180,000 to 420,000 tons of CO_2 equivalent.

5. Public-Private Partnerships: Collaboration between academia, government, and private enterprises has been pivotal. Successful partnerships have led to the creation of commercial rice cultivation demonstration areas, achieving a 92% accuracy rate in crop identification and a 20% reduction in irrigation water usage without compromising yield or quality.

Moreover, AIMIA Prophet supports the proposed "Trujillo Principles for Preventing and Reducing Food Loss and Waste in the Asia-Pacific Region," specifically: Principles 2, 3,5, and 6.

Conclusion

Addressing the challenges of food security in the APEC region requires a multifaceted approach that leverages technological innovations and public-

5. Chu, Yen-Wei. (2024). Smart Agriculture Proactive Alert Platform. National Science and Technology Council Germination Program. https://wsts.nstc.gov.tw/STSWeb/main/Main.aspx.

6. Water Resources Agency, Ministry of Economic Affairs. (2022). Consuming Water Statistics Database. https://wuss.wra.gov.tw/annuals.aspx.

7. Ministry of Digital Affairs. (2024). National Digital Development Research Report. https://moda.gov.tw/digital-affairs/digital-service/dv-survey/8557.

8. National Development Council. (2022). Phased Goals and Actions Toward Net-Zero Transition. https://www.ndc.gov.tw/Content_List.aspx?n=733396F648BE2845.

private partnerships. AIMIA Prophet exemplifies how artificial intelligence and digital technologies can transform traditional agricultural practices, making them more efficient, sustainable, and resilient. By providing real-time insights and predictive analytics, this platform not only helps stabilize crop yields and quality, but also promotes the sustainable use of resources and reduces environmental impact.

As we move forward, it is crucial to expand the application of such technologies to other crops and regions, ensuring that the benefits of smart agriculture are widely accessible. By doing so, we can enhance the resilience of the food systems in the APEC region, ultimately contributing to a healthier and more sustainable future.

References

1. APEC. (2021). The Food Security Roadmap Towards 2030. https://www.apec.org/meeting-papers/sectoral-ministerial-meetings/food-security/2021_food_security/annex.

2. APEC. (2024, August 18). Trujillo Principles for Preventing and Reducing Food Loss and Waste in the Asia-Pacific Region. https://www.apec.org/meeting-papers/sectoral-ministerial-meetings/food-security/9th-apec-food-security-ministerial-meeting/trujillo-principles-for-preventing-and-reducing-food-loss-and-waste-in-the-asia-pacific-region.

3. Chu, Yen-Wei. (2024). Smart Agriculture Proactive Alert Platform. National Science and Technology Council Germination Program. https://wsts.nstc.gov.tw/STSWeb/main/Main.aspx.

4. FAO, IFAD, UNICEF, WFP, and WHO. (2024). The State of Food Security and Nutrition in the World 2024. https://openknowledge.fao.org/handle/20.500.14283/cd1254en.

5. Ministry of Agriculture. (2024, September 27). Current Status of Agricultural Operations. https://www.ey.gov.tw/state/CD050F4E4007084B/0ededcaf-8d80-428e-96b7-7c24feb4ea0d.

6. Ministry of Digital Affairs. (2024). National Digital Development Research Report. https://moda.gov.tw/digital-affairs/digital-service/dv-survey/8557.

7. National Development Council. (2022). Phased Goals and Actions Toward Net-Zero Transition. https://www.ndc.gov.tw/Content_List.aspx?n=733396F648BE2845.

8. Water Resources Agency, Ministry of Economic Affairs. (2022). Consuming Water Statistics Database. https://wuss.wra.gov.tw/annuals.aspx.