

Agriculture 4.0 in ASEAN

Concept Note

Background and Objectives

The use of AI and digital technologies to improve farming methods is sometimes referred to as Agriculture 4.0. From plant-monitoring drones to smart irrigation systems, many innovative SMEs are popping up in this space and addressing local issues.

Inspired by agricultural companies using AI and frontier technologies taking part in the WIPO Conversation, this project aims to connect to Agriculture 4.0 companies to help them understand IP and use it as a strategic business tool for growth.

Project Overview

The project will comprise four phases:

1. An initial **brainstorming session** to identify key topics of interest to Member States in relation to AI and IP and to identify innovators and SMEs that would benefit from IP coaching. This initial meeting will guide the direction of the following events.
2. A **regional capacity building event** with policymakers from the region to reflect on policy issues related to frontier technologies and IP, AI tools for IP Offices, and to connect with regional enterprises and innovators on the ground.
3. **IP Management Clinics** for innovators in Agriculture 4.0 to help them enhance their IP skills to support their growth and development. This phase will include a training program and one-on-one mentoring sessions.
4. An **In-person Event** to highlight the impact of the project and showcase the results of the IP Management Clinics.

Timeframe

Phase	Format	Duration	Schedule	Audience
1. Brainstorming Session	Virtual	1.5 hours	Q3 2024	IPOs and relevant Ministries
2. Regional capacity building event	Virtual	3 half-days	Q3-Q4 2024	IPOs, relevant Ministries, project participants
3. IP Management Clinics	Hybrid	4 months	Q1-Q2 2025	8-12 selected companies
4. In-person event	In-person	1 day	Q2 2025	IPOs, relevant Ministries, project participants

Selection of Project Participants

At the initial brainstorming session, we will work with the local stakeholders to identify innovators in the agriculture 4.0 space who will take part in phases 2-4.

PROJECT DOCUMENT

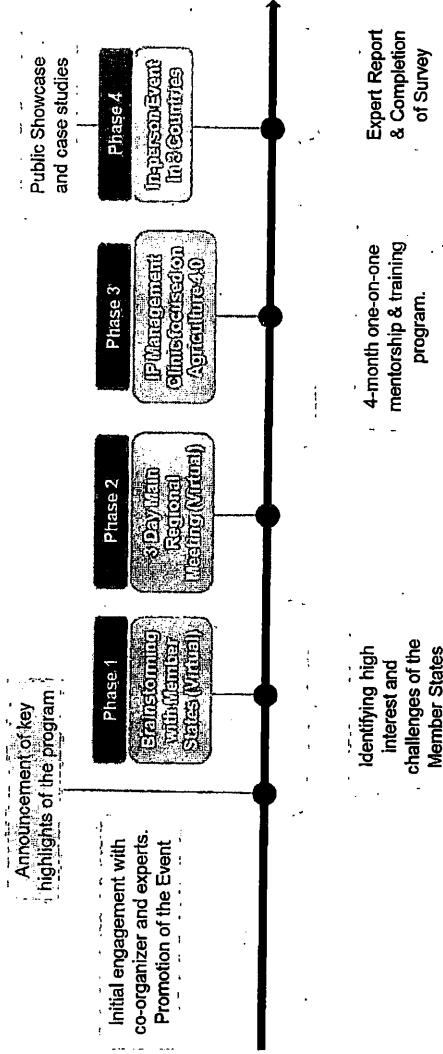
<p>1. SUMMARY</p>	
<p><u>Title</u></p>	<p>Agriculture 4.0 in ASEAN</p>
<p><u>Background</u></p>	<p>The use of AI and digital technologies to improve farming methods is sometimes also referred to as Agriculture 4.0. From drone for plant monitoring, AI to predict farmers' needs for equipment and approval for micro loans, smart irrigation systems and more. Many SMEs are springing up around the world in innovating in this space and addressing local issues.</p> <p>Inspired by the interaction with companies in agricultural based economies using AI and frontier tech in the agricultural industry as part of the preparation for the WIPO Conversations in 2021-2022, the project is intended to connect to them to help them understand IP and use it as a business tool for growth.</p>
<p><u>Description of Project</u></p>	<p>It is proposed to launch the project in 4 phases: Brainstorming with Member States, Main Regional Information Sharing Meeting, IP Management Clinics for Enterprises in the Digital Economy: Agriculture 4.0 and an in-person Event.</p> <p>The Clinics will include IP counselling and guide notes for the selected 8-12 companies in AI and frontier tech in the agricultural industry from diverse geographies to leverage their IP to grow their business and develop a competitive strategy.</p> <p>n. b. This project also will also feed into short form summary patent landscape of AI and Agriculture 4.0 to be published in 2024 which seeks to build on the WTT 2019 report and World IP Report 2022 to give policymakers and overview of the patent trends in this space.</p>
<p><u>Implementing Area</u></p>	<p>IP and Frontier Technologies Division (IPFT) Division for Asia and the Pacific (DAP) IP for Business Division (IPBD)</p>

<u>Person(s) responsible</u>	Ms. Ulrike Till Mr. Andrew Ong Mr. Guy Pessach
<u>Links to other related Area(s)/Project(s)</u>	This is a pilot project in the area of Agriculture 4.0. A similarly structured project consisting of 4 phases but targeted to the LAC region and SMEs operating in the AI area is planned for 2024/2025.
<u>Key national stakeholders</u>	<ul style="list-style-type: none"> - Local SMEs/startups operating in the frontier technologies field - National IP Offices - Policymakers - National research and innovation institutions - National governmental institutions in agriculture and technologies - Business associations - AI innovation hubs
<u>WIPO's contribution</u>	<ol style="list-style-type: none"> 1. Organization and cost coverage of the below activities: <ul style="list-style-type: none"> - Brainstorming with Member States to identify their high interest and challenges (online) - Main Regional Meeting, a 3-day meeting with policymakers from the region to reflect on selected policy issues on frontier technologies and IP and meet regional enterprises (online) - IP Management Clinics for Enterprises in the Digital Economy: Agriculture 4.0 with the selected enterprises (online) - Event to showcase the success stories covered in the IP Management Clinics (in-person)
<u>Links to Expected Result/ Performance Indicators in the Program and Budget 22/23</u>	Expected Results 2.2 of Program and Budget 2024-2025

Project Duration

18 months in total and it is expected to be completed by Q4 of 2025

Timeline (AI and IP in ASEAN)



Project Budget

TBD – To be proposed and approved through internal memo with cost estimate, contributions from the collaborating Sectors/Divisions

2. DETAILED PROJECT DESCRIPTION

2.1. Project Objectives

- Enhanced knowledge, skills and use of AI in making agriculture smarter and more sustainable supporting the SGDs, and raising awareness amongst selected stakeholders and beneficiaries how to use IP as a business tool in this area resulting in market expansion and increased economic activity;
- Strengthened local and regional expertise in IP and frontier technologies including AI for Agriculture 4.0 ;
- If successful promote Agriculture 4.0 project replication and scaling up;
- Build capacity for the effective use of IP to create value in field of frontier technologies including AI for Agriculture 4.0 ;
- Mentor a selected group of Agriculture 4.0 enterprises and develop them tailored IP management strategies;
- Create alliances and networks for exchange of knowledge among Agriculture 4.0 enterprises in the region.

The project has a special focus on impacting the SDGs, improving the IP capacities and skills of young people and women, as well as highlighting national success stories and the exchange of good practices with other countries in the region.

2.2. Delivery Strategy

The delivery strategy for the Project will include the following:

1. **BRAINSTORMING PHASE to tailor the project to the participating countries**
2. **MAIN REGIONAL INFORMATION SHARING MEETING**
3. **MENTORING PHASE FOR SELECTED ENTERPRISES**
4. **CLOSING PHASE**

The project implementation will envisage of the following Milestones:

- Milestone No.1: Organization of the Brainstorming session with Member States to identify their high interest and challenges (online)
- Milestone No. 2: Main Regional Meeting, a 3-day meeting with policymakers from the region to reflect on selected policy issues on frontier technologies and IP and meet regional enterprises (online)
- Milestone No. 3: Completion of the Mentorship Program through IP Management Clinics for Enterprises in the Digital Economy: Agriculture 4.0 with the selected enterprises (online)
- Milestone No. 4: Realization of in-person Promotional Event to showcase the success stories covered in the IP Management Clinics
- Milestone No. 5: Submission and Approval of Final Report

2.3. Potential risks and mitigating measures

Risk 1: Difficulty in identifying the project beneficiaries

Mitigation: Close cooperation with DAP, local IP Offices, governmental authorities in frontier technologies and research institutions and innovation hubs

Risk 2: Difficulty in finding suitable national experts for the Clinics

Mitigation: Harnessing the use of speakers and moderators of past WIPO Conversations, local alumni from WIPO programs and other WIPO networks

Risk 3: Technical problems when connecting for the on-line sessions.

Mitigation: One or two rehearsals will be made prior to the first delivery of the online session.

Risk 4: The participants do not engage or attend the on-line sessions.

Mitigation: Actively reaching out to participants and briefing them before sessions. After the course, a certificate of attendance will be issued, provided that participants attend at least 90% of sessions.

Risk 5: Lack of engagement from mentees to the mentorships

Mitigation: Actively reaching out to participants and briefing them before sessions Certificate of attendance to be issued for compulsory meetings with mentors

<p>Risk 6: External risks (political, economic, natural)</p> <p>Mitigation: Close follow up with national project team and continuous communication between project actors (inclusion of all key stakeholders in project)</p>	
<p>3. REVIEW AND EVALUATION</p> <p>3.1. <u>Project Objective(s)</u></p> <ul style="list-style-type: none"> - Enhanced knowledge, skills and use of AI in making agriculture smarter and more sustainable supporting the SGDs, and raising awareness amongst selected stakeholders and beneficiaries how to use IP as a business tool in this area resulting in market expansion and increased economic activity; - Strengthened local and regional expertise in IP and frontier technologies including AI for Agriculture 4.0 ; - If successful promote Agriculture 4.0 project replication and scaling up; - Build capacity for the effective use of IP to create value in field of frontier technologies including AI for Agriculture 4.0 ; - Mentor a selected group of Agriculture 4.0 enterprises and develop them tailored IP management strategies; - Create alliances and networks for exchange of knowledge among Agriculture 4.0 enterprises in the region. <p>3.2. <u>Project Deliverables</u></p>	<p>Indicators of Success in Achieving the Project Objective(s) (Outcome Indicators)</p> <ul style="list-style-type: none"> - Number of public policies/ actions implemented by the region for supporting the sector. - Number of success stories of beneficiaries implementing IP management strategies in their business plans, with IP filings completed/ in process and/or cases of commercialization, licensing, branding (i.e.). - Number of participants completing the Clinics

- Deliverable No. 1 - Assessment and gap analysis exercise
- Deliverable No. 3 - Training for relevant stakeholders
- Deliverable No. 4 - Capacity building in the region
- Deliverable No. 5 - Public outreach and awareness in the AI and IP field

[END]

Indonesia	<p>Food security is an important goal for Indonesia, and since the introduction of the Food Law of 2012, the country has made good progress in staple food production. However, a World Bank report pointed out that overall food security performance—i.e., the availability, affordability, and (nutritional) quality of food—is mixed. To date, food security policies have aimed at improving availability; going forward, the policy focus should shift to enhancing affordability and nutritional quality. The COVID-19 crisis has highlighted weaknesses of the agri-food system in the country, but it also brings an unprecedented opportunity to transform the system. Emerging markets such as Indonesia are developing a dynamic and vibrant AgriTech ecosystem in five key business models—farmers advisory, peer-to-peer lending, traceability, digital marketplaces, and mechanization. Increased investment in agriculture to modernize food systems and make them more efficient is key to improving the country's food production. This will also enable smallholder farmers to improve productivity and earn more income.</p>	<p>https://www.brookings.edu/blog/future-development/2022/01/21/the-digital-transformation-of-agriculture-in-indonesia/</p>	<p>National Movement of 1000 Digital Startups; Making Indonesia 4.0 (Toward 2030); e-Agriculture National Strategy</p>	<p>National Research and Innovation Agency (BRIN); Industrial Engineering and Management Competency Training Institute; Center of Agricultural Data and System Information (CADIS)</p>
Thailand	<p>Farmers operating in Thailand's agriculture sector experience several constraints that make it difficult to thrive and build resilience. These challenges include small farm size and lack of land ownership, limited networks and access to information to guide efficient farm management operations, an ageing workforce, rising production costs, lack of access to water/irrigation resources, increased frequency of extreme weather events and rising debt profiles, among others. Mobile and frontier technologies can help to address these pain points. Thailand AI in Agriculture Market is projected to grow at a robust CAGR during 2022-2027. The major factors contributing in the growth of the market includes the growing demand for agricultural production owing to the rising adoption of information management systems, technological advancements for increasing crop productivity and growing demand for agricultural production. Based on offering, market has been classified into hardware, software and AI-as-a-Service. In 2021, the software segment dominated the AI in Agriculture Market due to increasing demand for real-time data management systems and rising use of artificial intelligence software to improve farm productivity and the segment is anticipated to maintain its dominance during the forecast period as well.</p>	<p>https://www.techscresearch.com/report/thailand-ai-in-agriculture-market/1902.html; https://www.gsma.com/mobilefordevelopment/wp-content/uploads/2022/06/GSMA_CIU_Thailand-MSME-Digitalisation_Jun2022.pdf; https://www.adb.org/sites/default/files/publication/817496/thailand-ecosystem-support-technology-startups.pdf</p>	<p>DEPA Digital Infrastructure Fund for Private Investment; Thailand 4.0</p>	<p>Digital Economy Promotion Agency (DEPA); Thai IoT Association; Office of Agricultural Economy; Agro Business Creative Center (ABC); National Innovation Agency</p>
Philippines	<p>Agriculture is one of the leading industries in the Philippines. Filipino researchers and agriculturists continue to develop and implement management strategies that can further improve the quality of agriculture in the country. Filipino farmers and agricultural product manufacturers have started taking advantage of R&D to generate bountiful yields, with improve quality and lesser losses.</p>	<p>https://astl.dost.gov.ph/communications/ansurian/2019/project-gul-ai-promoting-ai-technology-in-agriculture/</p>	<p>Gul.AI Project</p>	<p>DOST-Advanced Science and Technology Institute (DOST-ASTI); the University of Rizal System (URS); Department of Science and Technology – Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (DOST-PCAARRD); UPSCALE Innovation hub; Philippine Council for Industry, Energy and Emerolna Technology Research Malaysian Research Accelerator for Technology and Innovation's (MDECI); Malaysia Digital Economy Corporation (MDEC) - Ministry of Communications and Digital; Malaysian Palm Oil Board's (MPOB) Biology and Sustainability Research Division; ERI Malaysia, nation's foremost authority on Geographic Information System (GIS) technology; Malaysian Global Innovation & Creativity Centre (MaGIC); Ministry of Science, Technology and Innovation (MOSTI); Malaysian Agricultural Research and Development Institute</p>
Malaysia	<p>The agriculture industry is vital to Malaysia's economy, contributing 7.10% (RM101.5 billion) to the Gross Domestic Product (GDP) in 2019. In line with the global megatrend, Malaysia's agriculture industry is gradually moving away from traditional farming. Start-ups and corporations are venturing into innovative solutions through smart farming and advanced technology such as AI, Big Data analytics, drones and robotics. Despite that, there are still obstacles impeding the development in Malaysia's agriculture sector. The top challenges include food security issues and research and development (R&D), which are crucial for sustained productivity growth. Innovation and technology adoption are essential for a sustainable ecosystem that will improve crop yield and decrease cost. Another aspect is the shortage of capital investment in Malaysia's agriculture sector. This means that smallholder farmers who do not have adequate funding, will not be able to purchase automated hardware such as robotic harvester which could help them combat the labour shortage</p>	<p>https://www2.deloitte.com/my/en/pages/ris/articles/emerging-tech-innovation-in-malaysia-agriculture.html</p>	<p>Malaysia Artificial Intelligence (AI) Roadmap; eLadang Digital AgTech, a pilot initiative driven by MDEC, MALAYSIA DIGITAL; MaGIC Agritech Bootcamp program; MOSTI National Technology and Innovation Sandbox (NTIS); Malaysian Digital Economy Corporation (MDEC) pilot project to spur the yield and quality of crops utilizing the latest technologies, via a public-private partnership with the Pertubuhan Peladang Kawasan Kuala Langat (PPKKL)</p>	<p>DOST-Advanced Science and Technology Institute (DOST-ASTI); the University of Rizal System (URS); Department of Science and Technology – Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (DOST-PCAARRD); UPSCALE Innovation hub; Philippine Council for Industry, Energy and Emerolna Technology Research Malaysian Research Accelerator for Technology and Innovation's (MDECI); Malaysia Digital Economy Corporation (MDEC) - Ministry of Communications and Digital; Malaysian Palm Oil Board's (MPOB) Biology and Sustainability Research Division; ERI Malaysia, nation's foremost authority on Geographic Information System (GIS) technology; Malaysian Global Innovation & Creativity Centre (MaGIC); Ministry of Science, Technology and Innovation (MOSTI); Malaysian Agricultural Research and Development Institute</p>

Name of the company	Country	Webpage	Description	Contact information	Status	Technology	Other information
CHKCHIC	Thailand	https://chikchicinfo.wixsite.com/english	CHKCHIC has developed technology to help farmers monitor and maintain their chicken houses by using malfunction alerts and controls that allow them to manage the temperature and other conditions. Another aspect of the company's service is financial management. With software supporting productivity tracking and cost controls, chicken farmers have access to all the tools to run their business more efficiently at the touch of their finger. The startup in Thailand employs cutting-edge technology to improve rice quality inspection, rice cultivar, purity inspection, and the data management system. They are a group of researchers and developers who brought artificial intelligence (AI) applications to the table to integrate technology and agriculture.	https://www.facebook.com/Chikchic.farm/	Yes	IoT	Received support from the Digital Economy Promotion Agency (DEPA)
Easyrice	Thailand	https://easyrice.ai/		sales@easyrice.ai	Yes	AI	Supported by AWS and Nvidia
Ricuit Co	Thailand	https://www.web.ricuit.com/	Ricuit aspires to create a world where smallholder farmers no longer have to worry about their finances by "democratizing lending" for them. They developed an app for farmers that can monitor the weather (daily, weekly, and monthly), provide satellite imagery of the farm, and give expert advice to increase their productivity and profit.	contact@ricuit.com	Yes	AI	Related to Thai Wah. Received support from the Digital Economy Promotion Agency (DEPA)
Evergrow	Thailand	https://www.evergrow.me/	Evergrow is a developer of smart modular system for indoor hydroponic cultivation of vegetables and herbs inside a 40*8*9.5' shipping container. The system has attached sensors for tracking the environment and growth of the plants. The sensors stream data to the cloud based platform which pushes notifications to the mobile based app of the user for an actionable. The user can remote control the system and its environment.	business@evergrow.me	Yes	IoT	
Algaebea	Thailand	https://www.algaebea.com/any/	Founded in 2016, Algaebea aims to provide sustainable seafood through its AI aquaculture technology. Their microalgae production and hatchery technology means they can precisely monitor and control every step of larval growth, enhancing survival rates by 40%, enabling clients to achieve higher productivity.	info@algaebea.com	Yes	AI	
KoMoMi	Thailand	https://komomi.net/	Using IoT technology, this startup helps farmers manage their irrigation systems digitally, dividing land by soil and crop type for pinpoint irrigation control.		Yes	IoT	Received support from the Digital Economy Promotion Agency (DEPA)

Indonesia

Food security is an important goal for Indonesia, and since the introduction of the Food Law of 2012, the country has made good progress in staple food production. However, a World Bank report pointed out that overall food security performance—i.e., the availability, affordability, and (nutritional) quality of food—is mixed. To date, food security policies have aimed at improving availability; going forward, the policy focus should shift to enhancing affordability and nutritional quality. The COVID-19 crisis has highlighted weaknesses of the agri-food system in the country, but it also brings an unprecedented opportunity to transform the system. Emerging markets such as Indonesia are developing a dynamic and vibrant AgriTech ecosystem in five key business models—farmers advisory, peer-to-peer lending, traceability, digital marketplaces, and mechanization. Increased investment in agriculture to modernize food systems and make them more efficient is key to improving the country's food production. This will also enable smallholder farmers to improve productivity and earn more income.

<https://www.brookings.edu/blog/digital-development/2022/01/24/the-digital-transformation-of-agriculture-in-indonesia/>
National Movement of 1000 Digital Startups; Making Indonesia 4.0 (Toward 2030); e-Agriculture National Strategy

National Research and Innovation Agency (BRIN); Industrial Engineering and Management Competency Training Institute, Center of Agricultural Data and System Information (CADSI)

Thailand

Farmers operating in Thailand's agriculture sector experience several constraints that make it difficult to thrive and build resilience. These challenges include small farm size and lack of land ownership, limited networks and access to information to guide efficient farm management operations, an ageing workforce, rising production costs, lack of access to water/irrigation resources, increased frequency of extreme weather events and rising debt profiles, among others. Mobile and frontier technologies can help to address these pain points. Thailand AI in Agriculture Market is projected to grow at a robust CAGR during 2022-2027. The major factors contributing in the growth of the market includes the growing demand for agricultural production owing to the rising adoption of information management systems, technological advancements for increasing crop productivity and growing demand for agricultural production. Based on offering, market has been classified into hardware, software and AI-as-a-Service. In 2021, the software segment dominated the AI in Agriculture Market due to increasing demand for real-time data management systems and rising use of artificial intelligence software to improve farm productivity and the segmented is anticipated to maintain its dominance during the forecast period as well.

<https://www.techinsights.com/research/ai-and-robotics-in-agriculture-market/1922.html>
DEPA Digital Infrastructure Fund for Private Investment; Thailand 4.0

Digital Economy Promotion Agency (DEPA); Thai IoT Association; Office of Agricultural Economy; Agro Business Creative Center (ABC); National Innovation Agency

Philippines

Agriculture is one of the leading industries in the Philippines. Filipino researchers and agriculturists continue to develop and implement management strategies that can further improve the quality of agriculture in the country. Filipino farmers and agricultural product manufacturers have started taking advantage of R&D to generate bountiful yields, with improve quality and lesser losses.

<https://asi.dost.gov.ph/communications/gu-ai-project-guarian/2019/project-gu-ai-promoting-ai-technology-in-agriculture/>

DOST-Advanced Science and Technology Institute (DOST-ASTI); the University of Rizal System (URS); Department of Science and Technology - Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (DOST-PCARRD); UPSCALE innovation hub; Philippine Council for Industry, Energy and Emerging Technology Research and Development (PCIEERD) Malaysian Research Accelerator for Technology and Innovation's (MRANTI); Malaysia Digital Economy Corporation (MDEC) - Ministry of Communications and Digital; Malaysian Palm Oil Board's (MPOB) Biology and Sustainability Research Division; Esri Malaysia, nation's foremost authority on Geographic Information System (GIS) technology; Malaysian Global Innovation & Creativity Centre (MaGIC); Ministry of Science, Technology and Innovation (MOSTI); Malaysian Agricultural Research and Development Institute

Malaysia

The agriculture industry is vital to Malaysia's economy, contributing 7.1% (RM101.5 billion) to the Gross Domestic Product (GDP) in 2019, in line with the global megatrend. Malaysia's agriculture industry is gradually moving away from traditional farming. Start-ups and corporations are venturing into innovative solutions through smart farming and advanced technology such as AI, Big Data analytics, drones and robotics. Despite that, there are still obstacles impeding the development in Malaysia's agriculture sector. The top challenges include food security issues and research and development (R&D), which are crucial for sustained productivity growth. Innovation and technology adoption are essential for a sustainable ecosystem that will improve crop yield and decrease cost. Another aspect is the shortage of capital investment in Malaysia's agriculture sector. This means that smallholder farmers who do not have adequate funding, will not be able to purchase automated hardware such as robotic harvester, which could help them combat the labour shortage.

<https://www2.deloitte.com/my/en/pages/its/articles/serategic-tech-innovation-in-malaysia-agriculture.html>
Malaysia Artificial Intelligence (AI) Roadmap; e-Learning/Digital Ag Tech, a pilot initiative driven by MDEC, MALAYSIA DIGITAL, MaGIC AgriTech Bootcamp program; MOSTI National Technology and Innovation Sandbox (NTIS); Malaysian Digital Economy Corporation (MDEC) pilot project to spur the yield and quality of crops utilizing the latest technologies, via a public-private partnership with the Pertubuhan Peladang Kawasan Kuala Langat (PPKK)

DOST-Advanced Science and Technology Institute (DOST-ASTI); the University of Rizal System (URS); Department of Science and Technology - Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (DOST-PCARRD); UPSCALE innovation hub; Philippine Council for Industry, Energy and Emerging Technology Research and Development (PCIEERD) Malaysian Research Accelerator for Technology and Innovation's (MRANTI); Malaysia Digital Economy Corporation (MDEC) - Ministry of Communications and Digital; Malaysian Palm Oil Board's (MPOB) Biology and Sustainability Research Division; Esri Malaysia, nation's foremost authority on Geographic Information System (GIS) technology; Malaysian Global Innovation & Creativity Centre (MaGIC); Ministry of Science, Technology and Innovation (MOSTI); Malaysian Agricultural Research and Development Institute