Interview result for Indonesia | Research Organization

National Research and Innovation Agency

Organization information

- The Food and Agriculture research division of National Research and Innovation Agency is the sole-government agency that involves in end-to-end agricultural research.
- The food and agricultural research division encompasses several research centers such as Appropriate technology, Livestocks, AgroIndustry, Food Crops and Processed foods.

1. Background of Sustainable Agriculture Region in Indonesia

Social issues related to realization of Agriculture in the region.

- The major social issues associated with Sustainable Agriculture are the large number of smallholder farmers that are in rural and remote areas. These farmers have traditional farming method due to lack of access to modern method and the skill (*generational farmers).* Other than that, there is also an issue of continuation due to young farmers have low interest in working on the agriculture field.

Social issues of particular importance

- In terms of importance, the agency believes that upskilling the farmers capability with modern farming method and technology will serve as the best way to address the yield gap in the short term.

1. Background of Sustainable Agriculture Region in Indonesia (Cont'd)

Social issues of particular importance (cont'd)

- The agency realizes that agricultural technology is not fully disseminated to farmers and lack of operational capabilities. Furthermore, the price of agricultural technology is often very expensive to small scale farmers.

Overall Agriculture-related issues

- The government plans to narrow the yield gap across regions. As of now, Java still leads rice production which cause a large gap between Java and other regions.
- So, the main agricultural issues are difficulties in procuring agricultural inputs like fertilizer, chemical nutrients as well high-quality certified seeds. The agency observes that less than 50% of farmers use high-quality certified seeds.

Specific to Sustainable Agriculture

- As of now, the agency analyses that food losses in production and distribution is still the main issue. The Agro-Industry (Post-harvest) division estimated that the loss throughout that process is around 35-40%.
- In order to combat this, the agency is developing coating technology to improve the maturity of the foods, mostly fruits and vegetables. In addition, the key aspect is to develop high-quality seeds that has high resistance towards climate change impact.
- In terms of carbon emission, the agency is currently developing a low-emission crop variety, specifically in plantation sectors like palm oil or sugar cane. The agency plans to leverage this with the recently launched carbon credit or trading mechanism.

National Research and Innovation Agency

2. Demand for sustainable agriculture

Current market situation and market growth outlook

- The agency thinks that sustainable agriculture-related solution has a massive potential. This is mostly because sustainable agriculture addresses the major agricultural issues in Indonesia, which are land extensification (decreasing farming land) and farming intensification (poor farming management method).
- As of now, the sustainable agriculture-related solution has significant presence in post-harvest section. For pre-harvest, mechanization and distribution of agricultural inputs still have big presence.

Potential targets for related solutions/technologies

- The main target is towards smallholder farmers as they occupy the most of agricultural farms in Indonesia.

Potential solutions and technology needs related to sustainable agriculture

- Water-saving technology for interconnected irrigation.
- Less-pollutant pesticides because the agency observed that farmers often use fertilizer excessively. The presence of precision farming towards the use of drone fertilizer is still low. High-pollutant pesticides heavily impact the soil nutrients

Current/prospective price acceptance for related technologies /solutions

- In terms of pricing, price range is not the core focus of disseminating technology and solutions. The focus should be in composing a favorable financing scheme or payment method to farmers.
- For instance, many smart farming startups or company provide post-harvest payment to farmers. This allows farmers to protect their cashflows.

2. Demand for sustainable agriculture (cont'd)

Current leading distribution channel for sales(e.g. Agricultural cooperatives, farmer's community, etc.)

- The major distribution channel is mostly through farmer's community or *Gabungan Kelompok Tani (*Gapoktan). To increase effectiveness in explaining their technology, many smart farming companies collaborate with *Gapoktan* and local-municipal government. This helps companies to identify or determine key leaders that can influence the overall farmers.

Preferred method of promotion to local customers

- The main target is towards smallholder farmers as they occupy the most of agricultural farms in Indonesia.

Potential solutions and technology needs related to sustainable agriculture

- Plot demonstration is the most preferred method by farmers in terms of promoting agricultural technology. Through this demonstration, farmers can see firsthand the impact of the technology towards production yield or improving the nutrients.
- Plot demonstration is basically a small area of farming land that are leased for specified period for the companies to showcase its technology

Interview result for Indonesia | Research Organization

National Research and Innovation Agency

3. Companies in sustainable agriculture

Current strong player in this market：Domestic or Foreign / Pure technology provider or Other service provider/ ….

- Domestic startups are mostly the leader in smart farming or precision farming landscape. They are mostly technology provider like smart weathering system, IoT, smart irrigation system and drone-fertilizer technology.
- For mechanization landscape like tractors, harvesters, thresher, foreign companies are still the major players.

Presence of Japanese Companies

- Japanese companies are mostly known for its mechanization technology and diesel generators. Japanese companies have very strong presence in this landscape.
- *The agency cannot share the company name or brand because it may be perceived as endorsement.*

4. Future prospect for Japanese cooperation

Expectations for Japanese technology/solution (applicability and social acceptance of Japanese technology)

- The three main fields for collaboration are in high-quality seed development, cultivation technology and market leadership. Market leadership is defined as commercialization of food crops to international market. Cultivation technology that can be combined with automation and IoT technology.
- The agency has collaborated with Japanese company, Sakata Seed. Together, they developed a seed variety of decorative plants for dry lands.

Potential positioning hypothesis of Japanese technology

- In terms of positioning, The agency realizes that the main collaboration should be within the food crops like Rice, fruits and vegetables. Those are the strategic food commodities which government puts high attention and focus.

5. Specific Measures to Expand Collaboration

Possible issues for expansion of cooperation and business

- One of the major issue is technology calibration. Based on the agency experience with Komatsu, their agricultural technology cannot be implemented directly to Indonesian farm. This is because land structure is different. Indonesia has deeper land than Japan.

5. Specific Measures to Expand Collaboration (cont'd)

Support available for expansion of collaboration

- In terms of support, knowledge transfer to researchers and educational support to farmers are certainly needed, specifically on the advanced technologies.
- The agency along with Indonesian and Japanese companies can develop an agricultural technology prototype together.

インタビュー結果　サマリー

Thailand | Agricultural Engineering Research Institute (AERI)

組織の概要

- 現在はMOACの管轄
- 教育機関を除き、タイ最大の農業機関。農業部門で唯一のエンジニアリング部門を持つ
- 農業機械、作物生産工学、ポストハーベスト工学の研究と知識の共有に注力

持続可能な農業に関する対象組織の取り組み

- 現在は第3世代のプロジェクトとして、灌漑設備等のハードウェア開発に重点を置いている
- 今後第4世代のプロジェクトとして、GNSS肥料、ドローン、ブームスプレーヤー、スマート灌漑システム、色彩選別機、シーダーマシーン、スマート温室、ロボット雑草制御等に注力する方針
  - 特に、自動化と精密農業（ドローン）、ロボットとAI、電動トラクター、植物工場
- 若い世代を農業に引き込むための中規模農家をターゲットとして研究開発を促進
  - 中規模農家：1農家あたり30Rai程度
- また、政府の政策の一環として、新技術を通じて農業の魅力を高めることを目指している

持続可能な農業に関する課題

- **農業生産性の向上**
  - 農作物の生産コストが高い
  - 農家の平均年齢が59歳と高く、労働力不足も深刻化
- **小・中規模農家への技術普及拡大**
  - 特に小規模農家はコストの問題があり、収入の限界もあるので技術が活用されていない現状
  - 対策としてはクレジットを与えること。クボタもやっているがローンを与える等できれば小規模農家でも使ってもらえる可能性
- **AERIの見解による解決策案**
  - 精密農業機械の導入（ドローン等による生育状況の把握）
  - ロボット農家とAI（生育状況の把握）
  - 電動農用トラクター（既にクボタが取り組むものの、普及には至らず）

日本企業参入に対する示唆

- **日本への期待**
  - 米以外のサトウキビやキャッサバ、果物等への技術導入
  - 自動化とAI等のソフトウェアとロボットの実証
- **日本企業の参入方法**
  - 各政府機関が管理する農業協同組合のようなコミュニティを通じたアプローチが現実的
  - 具体的には、AERIを通じた「トレーナー研修」等のそのネットワークを通じて知識を広めることは可能

Thailand | Agricultural Engineering Research Institute (AERI)

Organization information

- The only engineering department within the agricultural sector as largest agricultural agency in Thailand apart from educational institute.
- Initially under the Rice Department since 1955, currently under the Department of Agriculture (DOA).
- Focusing on researching and sharing knowledge on agricultural machinery, crop production engineering and post-harvest engineering.
- Branches located in Chiang Mai, Khon Kaen, Chantaburi, and Surat Thani.
- Projects include
  - Generation 2.0-3.0: Pump pipes, Steel Buffalo, Combine harvester, Coffee roaster, Residual chopper.
  - Generation 4.0: GNSS fertilizer, drones, Boom sprayer, Smart irrigation system, Color sorting machine, Seeder machine, Smart greenhouse, Smart evaporative systems, and robotic weed control

1. Current Needs and Development

- Current situation in Thailand
  - High crop production costs.
  - Aging farming population (average age 59 years).
- Pain Points:
  - High crop production and labor costs.
  - Labor shortages.
- Requiring Solutions (according to AERI's opinion)
  - Precision agriculture.
  - Robotic farmers and AI.
  - Electric farm tractors (notably, Kubota is facing commercialization challenges).
- Target Group of AERI is Medium-sized farmers and young, smart farmers to attract the younger generation into agriculture. They aim to make agriculture appealing through new technologies as part of government policy.
- Challenges for Local Farmers (Small-Sized) are High costs and difficulty in owning equipment. Medium-sized farmers typically rent equipment for farming. Kubota seems to provide equipment leasing services.
- Definition of Medium-Sized Farmer is Ownership of 30 rai (approximately 12 acres) per farmer. Information sourced from the Office of Agricultural Economics (OAE).

Thailand | Agricultural Engineering Research Institute (AERI)

2. Community-Level Support

- There is Large-scale farming groups and agricultural promotion groups, run by Agricultural Productivity Improvement Learning Centers
- Thai Government often lends machinery. In Japan, machinery loans are often subsidized by half, which differs from Thailand's approach.
- For Additional Potential Collaborations, Department of Cooperative Promotion has strong communities among many Cooperatives in rural area due to sustainable revenue-sharing system, such as the soybean cooperative.
- Example schemes include startups company providing technology for free in exchange for data sales. The startups have collaborations with National Innovation Agency (NIA).

3. Organization activities

- AERI focuses on 2 topics as smart agriculture and agricultural processing. They emphasis on intelligent agriculture in research.
- They mentioned not focusing Organic agriculture and it is under different department at regional agricultural research and development offices within the Department of Agriculture or National Bureau of Agricultural Commodity and Food Standards.
- They currently emphasis on hardware development (Generation 3.0).
- In the future, they would like to increasing focus on automation and precision agriculture (drones), robotic farmers and AI, electric farm tractors, and plant factories.

4. Future prospect for Japanese cooperation

- Autopilot and AI as demonstrations of technology from Japan would be beneficial.
- Plant Factories as staffs of AERI wish to visit plant factories in Japan.
- Drones as considering Chinese alternatives (DJI) due to lower costs.
- Focus Crops as preferring sugarcane, corn, cassava, and fruits over rice.
- Knowledge to improve Quality Control as inspection technology to maintain quality before export (e.g., disease checks)
- Software for Automation and AI as they are lacking knowledge in AI, computer vision for tasks like spraying crops
- Developing an application for robotic weed control and seeking support from Japan.
- Need for application developers to connect Photography drones with spraying drones for precise fertilizer applications.
- Desire to send personnel for training in Japan.

インタビュー結果　サマリー

Philippines | Department of Agriculture

組織の概要

- 持続可能な農業システム、持続可能性、生物多様性など、さまざまな側面から取り組む

持続可能な農業に関する対象組織の取り組み

- FAOの持続可能な農業システムやADBとのプロジェクトも実施
- 特に土壌の健康と気候変動に関する4つのプログラム（気候変動やスマート農業、特許農業等）を提案
    - 例えば、土壌の健全性では、土壌研究所の強化に関連するプロジェクトを支援する予定
    - 農業システム分野では、農業政策、農業経営、農業モニタリングなど、特定の持続可能な慣行の適用に関するプロジェクトや技術移転を支援

日本企業参入に対する示唆

- **日本への期待**
    - 新技術のデモンストレーション設備の導入
    - 技術としては、MRVやAWD、バイオチャー等
- **日本企業の参入方法**
    - 農業に参入するコングロマリット企業
    - 政府を介した小規模農家へのアプローチ（ファームクラスタリングプログラム）

持続可能な農業に関する課題

- **生産性の向上**
    - フィリピン政府は生産性向上に重点を置いており、気候変動や持続可能な農業への対応はまだ優先事項ではなく、ASEAN他国と比較して未熟な段階
    - 特に水、肥料の効率的な利用と物流コストの削減が必要
- **生産者意識の改革**
    - 農家が儲からなければ食料安全保障に取り組むことは非常に困難
    - 技術導入の際の追加コストやトレーニング等が必要となる中、収益性が上がらないと農家は導入には否定的
- **小規模農家への技術普及拡大**
    - 1農家あたり1ha以下の小規模農家が大多数であり、10%以下がMNCによる大規模農家
    - 特に果実農家はMNCが多いが、その他は小規模農家が主流
    - 他国と相対的に見て、政府による民間への介入は難しい環境
- **特に重視されているテーマ**
    - 有機肥料
    - 水や肥料などの資源効率化
    - 廃棄物削減・活用
        - 農産物のうち、約60％は収穫後のロスがある

Philippines | Department of Agriculture

Organization information

- Our proposed programs in relation to sustainable agriculture stem from a series of workshops attended by our directors and officials. We have identified four specific programs focusing on soil health, climate change, smart agriculture, and patent agriculture.

- Soil Health Program
  - Enhancement of Soil Laboratories, Soil Assessment and Farming Systems
- Climate Change Program
- Smart Agriculture Program
- Patent Agriculture Program
- Upland Agriculture Support
  - Application of specific sustainable practices in upland agriculture. Support for agricultural policy management and monitoring.

1. Current Needs and Development

- Integration of Climate-Smart Practices
  - The Philippines is still in the early stages of integrating climate-smart agricultural practices. There is a need to improve the integration of smart technologies with business models that bring financial rewards to farmers.

- Utilization of Agricultural Waste
  - There is potential in utilizing agricultural waste for energy production, but challenges remain in finding partners for implementation.

- Cooperative Governance
  - While cooperatives can be a good channel for marketing and distribution, there are both successes and failures. The governance of cooperatives is currently being rationalized to improve their effectiveness.

Philippines | Department of Agriculture

2. Current State of Filipino Farmers

- Small-scale Farming
  - Most Filipino farmers are engaged in small-scale farming, which makes it difficult to achieve economies of scale and integrate advanced technologies.
- Government Support
  - Government programs such as farm clustering and mechanization are in place to support farmers. These programs aim to consolidate production, improve mechanization, and enhance post-harvest facilities.
- Private Sector Involvement
  - Large business conglomerates are increasingly investing in agriculture, providing new channels for technology integration and market access

3. Future prospect for Japanese cooperation

- Technology Integration
  - There is a high demand for technologies that can support sustainable agriculture, such as the Alternate Wetting and Drying (AWD) technology for rice production and biochar technology.
- Carbon Credits
  - Opportunities exist in projects related to carbon credits and bamboo production. Bamboo can be utilized for carbon sequestration, alternative fuel, and sustainable landscape development.
- Private Sector Collaboration
  - Japanese companies can collaborate with both the government and private sector entities to introduce and scale up sustainable technologies. This includes participating in government-supported programs and leveraging the growing interest of large conglomerates in agribusiness.

Philippines | IRRI(International Rice Research Institute)

Organization information
- 世界中のコメに関する研究開発を推進。
- 今回インタビューに出席いただいた方の担当領域は下記。
    - 経済学・政策面からのコメによるGHG削減メカニズムの探索：カーボンクレジットの活用
    - 持続可能な土壌利用
    - 稲の育種イノベーション

1. Current Needs and Development
- 気候変動への適応
    - 気候変動状況に適応するための保険商品のようなものが求められている
    - フィリピンでは、台風、洪水などのリスクが深刻化しており、デジタルソリューション等で解決しようとしているものの、解決しきれないものがある
    - 保険スキームにより、農家への適応対策の推進が必要。
    - 技術的な側面が重要視されていることは理解しているものの、本来的には社会的側面や、経済的側面も重視したパッケージを検討する必要がある。
- カーボンクレジット(特にAWDの活用)
    - ASEANと日本の間でのJCMは、GHGの排出量削減を経済的な面からも実現する期待領域である。
    - 他方で、農家への導入という社会的な側面への着目が非常に重要。
    - 以前、ウェビナーで農家の代表が、これらの技術は素晴らしいものの、AWD等の技術などを採用することによって、どのように利益を上げることができるのかを明確化する必要があると話していた。
- 高品質種子
    - 稲作の大部分が借地で実施されていること、また灌漑設備が未整備である地域が依然残ることを踏まえると、水管理の技術以上に、そのような条件下でも生産性維持が可能な、高品質な種子の導入が求められている。
    - 他方で、そのような種子の存在を知らない農家も多く、導入に向けては農家への支援が必要。