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CIRCULAR ECONOMY BUSINESS CASE STUDIES IN SOUTHEAST ASIA

Gading Mas Indonesia Teguh (GMIT)

Jember, East Java, Indonesia

Agrifood

www.anj-group.com/id/kacang-edamame

Analysis period: 2021-2023

Value Chain Innovation in Domestic Edamame Production

Business Spotlight

PT Gading Mas Indonesia Teguh (GMIT) is part of PT Austindo Nusantara Jaya Tbk. (ANJ), an agribusiness and food company focusing on edamame and recently okra processing. GMIT seeks to reduce its burden on the environment through value-chain innovation for water-use efficiency and waste minimisation, reduction of greenhouse gas (GHG) emissions, and improved traceability.

For edamame and okra growers, drought may mean the total failure of one entire harvesting season in the affected area. Therefore, GMIT recognises that water scarcity is a significant risk with respect to the productivity and sustainable success of the company, along with the community of growers operating in the surrounding area. GMIT has installed solar panels that reduce greenhouse gas (GHG) emissions by 19%. For improved traceability, GMIT has developed a Trace Back System (TBS codes) supported by an information system for agriculture and manufacturing known as SIGAP.

Keywords

Agribusiness, Water efficiency, Energy management, Water access

Innovation

Manufacturing, Resource circularity, Resource efficiency, Resource substitution

Analysis of PT Gading Mas Indonesia Teguh (GMIT)

Context and baseline

PT Gading Mas Indonesia Teguh (GMIT) is part of PT Austindo Nusantara Jaya Tbk. (ANJ), an agribusiness and food company, operating as a joint venture with AJI HK Limited, to grow, process and export high-value frozen vegetables from its facility in Jember in East Java Province

In 2015, GMIT began cultivating and processing edamame, a type of bean high in protein and antioxidants, belonging to the soybean family. GMIT uses a collaborative model with its farmers, providing them agronomic inputs, training and on-the-ground support to maintain and increase yield and quality. In 2020 GMIT started growing okra, another high-quality vegetable. The company is committed to implementing best agronomic practices, innovation and efficiency in growing and processing sustainable high-value vegetables, particularly edamame and okra. In 2017, ANJ entered into a joint venture with AJI HK Limited to facilitate GMIT's market expansion into Asia Pacific. In March 2021, GMIT started commercial operations of its frozen products and started exporting frozen edamame to Japan. Various innovations have also been adopted to enhance sustainability efforts such as water management, installation of rooftop solar panels, and an information system for agriculture and manufacturing.

One of the main circular economy issues at GMIT are energy and water management. As an agribusiness, GMIT must manage water responsibly because it is a limited, shared, and essential resource. The people in the vicinity of the company operations need water to irrigate their crops as well as meet their daily sanitation and drinking requirements. Hence GMIT must guarantee that the water withdrawn for its commercial activities does not restrict the local communities' and stakeholders' access to potable and irrigation water.

Innovation

Located on 1.7 Ha of land, GMIT operates a state-of-the-art factory which has a production capacity of 8,000 tonnes per year and three tonnes per hour of frozen vegetable products (based on individual quick freezing, IQF). The products meet the strict quality control criteria of international and Indonesian food safety agencies, including British Retail Consortium Standard (BRC), ISO 22000, Kosher, Food and Drug Administration (FDA), National Agency of Drug and Food Control – BPOM, and the Indonesian Ulema Council (Majelis Ulama Indonesia – MUI) Halal certifications. To be able to supply a high-quality and responsible product, GMIT needs to adhere to a good agronomic and processing practices, including in water management and for energy efficiency.

GMIT strives to limit water withdrawal and preserve water quantity by conserving water with, for example, reservoirs and rainwater harvesting, reusing water in the production process, protecting and maintaining water sources, and creating infiltration wells to recharge groundwater storage levels. The used wash water from edamame is passed through reverse osmosis and, depending on process requirements, is either reused or discharged to surface water.

Water usage is monitored and managed in relation to production achieved and water saving targets. GMIT employs an external auditor for water management, to monitor water intensity and trends, and to provide recommendations for continuous improvement. These water conservation measures have resulted in a 20% decrease in water use intensity across operations from 2018 to 2023.

In 2023, GMIT also completed the installation of rooftop solar panels, which is a pioneering move within the ANJ Group. The solar panels produced a 19% reduction in GHG emissions from the factory in the first year. The rooftop solar panels have an annual capacity of 356,948 kWh which is expected to supply 15% of the factory's operational electricity needs. The government in Jember has acknowledge GMIT as a pioneer in adopting clean-energy solutions and changing mindsets in Jember and the surrounding industrial areas in East Java Province.

Another GMIT milestone is in digital transformation using SIGAP[1], an information system for agriculture and manufacturing specifically designed to support agricultural operations, in particular the freeze-processing of edamame and okra, that includes the entire process starting in the fields including land and farmer selection, land preparation, planting, plant maintenance, harvesting, and supplying produce to the factory. In 2024, SIGAP was expanded to include factory processes, from receiving harvests, sorting and blanching, to IQF (individual quick freezing) processes as well as sanitation (in locker areas). The use of this technology enables the GMIT team to easily establish partnerships with farmers, and ensures a strong traceability system to monitor the quality and safety of the products. The next step will be to develop SIGAP to cover the packaging and delivery of the final products.

1 Sistem Informasi GMIT untuk Agrikultura dan Pabrik

Circular Economy impact

The innovations developed and implemented by GMIT contribute to the circular economy transition through the complementary strategies of resource efficiency (efficient use of water, fertilisers and energy), resource substitution (a partial shift to using renewable energy) and resource circularity (reuse of water, including from rainwater harvesting).

Water is of key importance to the company's operations and the crop success for the farmers. The ratio of total water withdrawals to renewable water supplies at GMIT is between 20%–40%, posing a medium risk of water stress, according to the classification in the Risk Atlas of the World Resource Institute. GMIT must thus limit water withdrawal and preserve water quantity by means of water recovery and reuse, with reservoirs for rainfall collection and reuse of treated water in its production process, and creating infiltration wells to maintain groundwater storage. Moreover, the company works to protect and maintain the existing natural water sources.

In addition, to mitigate the risk of water pollution, GMIT treats wastewater discharged by their treatment plants to meet regulatory quality standards. Moreover, GMIT constructed controlled landfills, ending open waste dumping and located far away from water sources to further reduce the potential for contamination. It also enforced the sensible application of fertilisers to avoid runoff, and avoid planting in river buffer zones.

GMIT suppliers are smallholder farmers who do not operate any processing operations that consume water; they do, however, consume irrigation water for plant cultivation that is closely monitored and measured. Company oversight consists of promoting sound agricultural practices and sustainable principles among the independent smallholder farmers, including good water management, and avoiding steep slopes or flood-prone areas for planting and installation of solar powered pump in the area with limited surface irrigation source. Local communities participate in maintaining water quality by preventing the pollution of waterbodies with domestic waste. Water discharged from the manufacturing site is routinely measured, and found to adhere to regulations established by regulatory agencies. GMIT adheres to the standards established by the Ministry of Environment and Forestry and the Ministry of Health, taking the baseline from the Environmental and Social Impact Assessment (AMDAL) document for the specific area into account. Likewise, reclaimed water must adhere to strict regulatory norms and standards. Comparing water samples collected every 3 to 6 months to the baseline established in the AMDAL enables the company to assure compliance with regulatory criteria and specifications.

To support zero-waste and organic fertilizers, GMIT is collaborating with local cattle farmers to use stems and leaves of edamame as cattle feed and take their manure as organic fertilizer. Under the Kampung Edamame initiative the community is assisted in processing off-specification edamame into valuable products for the local market, thereby preventing these being disposed as waste. GMIT has also implemented reusing plastic waste from edamame seed processing.

Business and market impact

GMIT has been able to obtain a score of 'B' for water management under the CDP system for disclosure of climate risks. Furthermore, in 2022 ANJ – the holding company for GMIT – signed up for SBTi (Science Based Targets initiative), thus committing publicly to align its GHG mitigation targets with the 1.5°C climate change ambition established in the Paris Climate Agreement.

Implementation of water-management initiatives has started to demonstrate positive results in mitigating extreme drought and flooding in the farmers' land and surrounding areas.

Stakeholders

GMIT has collaborated with 38 smallholder farmers who use 165 ha of their land in Jember and surrounding areas to grow edamame and supply edamame to GMIT. Within this operational cooperation partnership, farmers are given access to information and guidance by field assistants. This smallholders' land contributes to the plantation area, which in 2023 totalled 531 ha compared to 429 ha in 2022 and enabled an increase in production to 2,860 metric tonnes in 2023, an increase of 12.9% compared to 2,533 metric tonnes in 2022. GMIT has also developed a strategic partnership with the Taiwan-based company Asia Food Group to export frozen edamame to Japan. In parallel the Edashi brand is marketed independently in domestic market and to India. As the majority of the production is exported, GMIT generates foreign-exchange to the country and in support of the economy in Jember Regency.

In addition, during the COVID pandemic GMIT established Kampung Edamame (Edamame Village), a community-based programme to empower the people living around the GMIT area to process edamame into innovative, value-added products. The programme takes edamame unsuitable for processing for export markets for processing by local women who currently number about 15, a trifold increase since the start of the initiative.

In 2023 Kampung Edamame's sales have increased 2.6 tonnes from 1.2 tonnes in 2022 with 72% of increase of sales value to IDR 249 million (approximately EUR 14,900), through investment in new machines supporting larger production capacity. There has also been an expansion into other products with the launch of crispy okra. In addition, Kampung Edamame products have obtained licensing and halal certification from MUI.

Implementation

The GMIT edamame venture has made efforts in a number of key areas, including:

- Expanding the planted area by establishing broader collaborations through joint operation mechanism with smallholder farmers in and around Jember
- Increasing yields by implementing the best agronomic practices, investing in seed-quality programmes, and strengthening integrated pest management strategies
- Making consistent effort in water management possesses to reduce water-use intensity and bring the ratio of total water withdrawals relative to the available renewable water supply below 30%
- Developing professional and skilled field assistants through the Field Assistant Development Programme to guide farmers towards better yields
- Optimizing factory capacity by processing other raw vegetables during low edamame production periods
- Expanding export markets to countries beyond the Asia Foods channels, and to grow the domestic market with Edashi-branded frozen edamame packs.

Takeaways

GMIT has not only taught farmers how to cultivate edamame, it has also developed essential transferable skills for maintaining sustainable agriculture along with providing education on how to lead more environmentally friendly lives through a water-management programme. With their complete programme, GMIT may be able to achieve a lower risk of water stress as outlined by the World Resource Institute's Water Risk Atlas criteria.

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