switchasia
Funded by the European Union
asean CSR Network

CIRCULAR ECONOMY BUSINESS CASE STUDIES IN SOUTHEAST ASIA

Axel Integrated Farm

Samar, Philippines
Agrifood, coconut farming
www.facebook.com/farmniaxel
Analysis period: 2021-2023

Organic Coconut Farming with Commercialization of Co-products

Business Spotlight

The Axel Integrated Farm's case study illustrates the transformative power of leadership, innovation and application of appropriate technology for circular economy (CE) in agriculture. Jayson Pascual started Axel Integrated Farm in 2021 as the fulfillment of a boyhood dream to apply his acquired knowledge in advanced farming techniques in his birth province and thereby improve the lives of local farmers. His hometown of Talalora is a geographically disadvantaged area in the province of Samar. He set out to demonstrate that a circularity mindset in coconut and vegetable production can unlock the full potential of crops with the use of state-of-the-art sustainability practices and techniques in planting and propagation to minimise waste and maximise resource efficiency. Through product diversification, he maximised the value of coconut fruit by processing coconut water into coconut juice (buko) and coconut sap into seven variants of coconut vinegar, coco treats and coco syrup.

The innovations increased revenues five-fold in 2023, with new products contributing 90%. Moreover, these products increased the net profit margin by 25% and reduced fertiliser costs by 80% and water use by 15%, while improving soil quality. New farm products were made possible by intercropping with banana, taro and sweet potato.

The wages of 20 coconut and vegetable farmers increased by 76% compared to the local farmer average. But their total earnings grew tenfold by means of sharing profits 50-50 from sales of the new value-added coproducts processed from coconut water and coconut.

Armed with his 'proof of concept', Jayson convinced the majority of farmers in his hometown to organise into the Talalora Farmers Agriculture Cooperative (TALFAC) in August 2022, and also to adopt the circularity inspired farm model. Farmer members were able to similarly increase their average annual income and are now part of a supportive network for knowledge sharing. In 2023, TALFAC received a grant as one of the Top 10 Most Outstanding Awardees by the Bank of the Philippine Islands (BPI) Foundation SINAG award winner for social entrepreneurs with sustainable business models that build resilience by addressing social and environmental challenges.

Keywords

Coconut production, Coconut co-products, Eco-farming

Innovation

Product, Production, Resource efficiency, Resource circularity, Resource substitution

Analysis of Axel Integrated Farm

Context and baseline

Jayson Pascual decided In November 2021, to move back to his mother's hometown of Talalora. Located in southern Samar province, Talalora is among the Geographically Isolated and Disadvantaged Areas (GIDA) in the Philippines, i.e. a remote area with limited development opportunities and a marginalised population with limited access to social services. It had a fledgling coconut industry, with smallholder farmers struggling with limited product volume, inconsistent quality, limited market access, no access to financing and limited government support.

In 2021, prices for the main copra product (the dried white flesh which is used for oil extraction) were so low and the retail price of coconut oil could not compete with the lower priced palm oil from the international market. Driven by a profound sense of mission and equipped with years of work experience in the agricultural sector, and a wealth of acquired knowledge in advanced farming techniques, Jayson quickly recognised an untapped opportunity for rebuilding the local industry and the farmers' livelihoods, and unlocking the coconut's full potential through circularity concepts in planting and propagation, processing and product innovation.

Innovation

The innovation efforts at Axel Integrated Farm focused on improving coconut cultivation and creating new marketable products to grow while also diversifying farmers' income.

Optimisation of coconut production

Fresh coconut meat is typically enjoyed raw, grated, or pressed into milk. The hard shell is widely used for bowls, charcoal, and furniture. The dried coconut kernel, known as copra, is the primary source of coconut oil. One kilo of copra yields around 600–640 g of oil, which can be used for cooking, cosmetics, and in principle as input for the production of biofuels.

Jayson established Axel Integrated Farm as a commercial-scale demonstration eco-farm on the family's four-hectare land. The Farm showcases responsible and efficient agriculture through innovations in coconut planting and propagation, minimising waste and maximising value. It also introduced intercropping of banana trees and vegetables alongside the coconut trees to capitalise on their mutual benefits such as improved soil fertility and biodiversity. Jayson thereby demonstrated the best available farming practices and their benefits, in terms of reduced negative impact on soil, water and air, increased farm productivity and improved farmer income.

Jayson also introduced practical low-cost innovations, particularly:

- **Portable soil and water analysis:** Axel Integrated Farm utilises the affordable, portable Nutrient Analysis Meter (around PHP 1500, approximately EUR 25), which instantly measures nitrogen, phosphorus, and potassium (NPK) levels to tailor fertiliser use to soil quality and crop needs, thereby reducing fertiliser use and costs by up to 80%.
- **Using plastic film as a substitute for mulching:** Costing around PHP 1400 (approximately EUR 23) per 300 m^2, lasting 8 months to act as an artificial substitute for mulch layers, to control weeds and insects while increasing soil and air temperatures, thus reducing weeding labour costs by 90%. The film also conserves water by retaining soil moisture, minimising irrigation needs and preventing damage from heavy rain on emerging crops.

Circular Innovation through product diversification using discards from coconut production

To reduce the traditional dependency on copra for farmer income, Jayson diversified into food processing to produce coconut water, locally known as 'Buko' Juice, and root crop chips. He also ventured into new products, specifically:

- **Coconut sap wine:** wine is produced through controlled fermentation at the farmers' homes for 3–6 months, then aged and bottled in a small processing centre.
- **Coconut nectar syrup:** a natural sweetener that replaces refined sugar, offering a guilt-free alternative with a unique flavour profile.
- **Coconut nectar aminos:** a versatile condiment with a delicious umami boost, replacing soy sauce with a touch of coconut sweetness.
- **Coconut nectar instant drink:** a convenient, nourishing and healthy beverage packed with coconut's natural goodness.
- **Coconut sap vinegar:** a sustainable and flavourful alternative to sugar cane vinegar.

Circular Economy impact

The Axel Integrated Farm demonstrated the feasibility and farmers' benefits of improved and commercial coconut cultivation, utilising the full crop potential. Circular practices yielded positive benefits towards the key circular economy strategies, particularly:

- **Resource Efficiency** – by means of reduced use of fertiliser as a result of nutrient analysis; minimised need for irrigation water as a result of using plastic film; and elimination of the need for oil absorbent paper in the waste stream through the use of de-oiling machines (for banana and root crop chip production) to replace manual frying. These practices contributed to an 80% reduction in fertiliser costs with the switch from chemical fertilisers to organic alternatives that also improved soil quality; and a 15% decrease in water consumption due to efficient irrigation practices and rainwater harvesting.
- **Resource Circularity** – coconut husks (a waste byproduct of copra production) are turned into an organic seedling medium, reducing costs and promoting sustainable waste management. Coconut husks are also processed into coir dust or coco peat, a valuable soil amendment that improves drainage and aeration for healthier plants. Banana and root crop peels are composted. Harvested rainwater is used for washing produce (approximately 96 L of water per 10 kg of produce), rather than letting rain water run off unutilized from the Farm.
- **Resource substitution** – substitution of chemical fertilisers by organic farming favouring natural alternatives such as bat manure (available in the area) to improve soil health and lead to healthier crops; partial substitution of 30–40% of fossil fuel by use of coconut husks as bio fuels.

Business and market impact

CE innovations generated financial benefits for the Farm in terms of a more than 400% increase in 2023 revenue compared with the previous year, showcasing the success of this circularity-inspired farm model. This increased the net profit margin in 2023 by 25%.

Intercropping led to greater resilience to market fluctuations in the demand for and price of coconuts. Bananas and vegetables thus provided not only ecological benefits to soil and crop quality, but also reduced dependence and consumption of off-farm inputs, resulting in additional savings and revenues.

New processed products are a significant source of income for the Farm, and were a significant driver of sales when prices of copra (the original core product) fluctuated, accounting for 90% of total sales in 2023.

The Farm employs 15 coconut farmer labourers and 5 vegetable farmer labourers, whose income has now increased to a level 76% higher than the average annual farmer income (to PHP 44,000 (approximately EUR 728) per year, compared to the local average of PHP 25,000 (approximately EUR 428). Their total earnings though grew tenfold by means of sharing profits 50-50 from sales of value-added products processed from coconut water and coconut - up to PHP 220,000 (approximately EUR 3673) to PHP 270,000 (EUR 4462), including the lean seasons.

There are also future plans to scale up Integrated Coconut Sap Production with the construction of a 600 m^2 facility for large-scale production of coco vinegar and syrup for which a 30 million-peso grant (~ EUR 496,000) was secured from the CocoLevy Fund in September 2023. This will allow TALFAC to:

- Increase processing capacity and production volume to meet growing demand for their products.
- Incorporate more farmers and enable them to supply the required raw materials and benefit from the expanded market reach. This will directly involve at least 60 farmers and significantly lessen dependence on copra production and sales.
- Save at least 80% on energy costs since it will simplify the process compared to copra production and other products.
- Leverage funding for raw materials, packaging, and inventory management, which are essential for sustainable growth.

Stakeholders

Using the encouraging results at the Axel Integrated Farm to make local farmers more receptive to the circularity model, Jayson initiated the formation of the Talalora Farmers Agriculture Cooperative (TALFAC) in August 2022, and became its founding Chairman. It was officially registered with the Cooperative Development Authority (CDA) and TALFAC members thereafter received training in Business Management for Cooperatives conducted by the Department of Trade and Industry Philippines (DTI). The cooperative was subsequently invited to participate in the DTI Christmas Trade Fair at the largest mall in Tacloban City, Leyte, In December 2022, just 75 kilometers from Talalora, where it sold 400 bottles of Buko Juice – an outstanding achievement for the cooperative.

Knowledge, tools, and confidence to adopt sustainable practices empowered the farmers of Talalora. The Cooperative has become a kernel for job creation, creating 50 new jobs, both directly and indirectly. From logistics and processing to farm work, these opportunities breathe life into the community, injecting much-needed income and purpose. The Cooperative's success has opened doors for local businesses, with increased demand for its products, and in turn creating new market opportunities. This ripple-on effect fosters economic growth and empowers the entire community.

Recent further innovations include:

- **Smart data management:** the Cooperative created a Google cloud for cooperative efficiency, for secure storage of crucial information like profiles, accounting documents, sales, customer details, and more, enabling efficient record-keeping and collaboration. As the Cooperative expands, further automation of business processes is taking place.
- **Scaling Up with Oracle NetSuite:** a grant from Oracle Corporation has provided the Cooperative access to its NetSuite system, a state-of-the-art accounting and financial management software to further optimise the farming cooperative's operations, giving them a significant edge in managing finances and growth.

Implementation

Upon reaching 'proof of concept', Axel Integrated Farm actively shared its knowledge and expertise through:

- **Training workshops:** equipping farmers with skills and techniques for implementation of sustainable practices in their own farms.
- **Demonstration plots:** showcasing the practical application of eco-farming methods and their benefits firsthand.
- **Peer-to-peer learning:** fostering a supportive network for farmers to share experiences and encourage one another.

In parallel, TALFAC extended support to other cooperatives through seminars and trainings, such as the Value Chain and Skills Training for Coconut Cooperatives organised by the Cooperative Development Authority Region 8 and the Inphase EcoFarm Training organised by the Agricultural Training Institute.

TALFAC gained recognition in 2023 through receipt of one of the Top 10 Most Outstanding awardees for social entrepreneurs with sustainable business models that build resiliency from the Bank of the Philippine Islands (BPI) Foundation SINAG.

The Cooperative is also developing new services and exploring additional ways to support its members, including:

- Savings and credit programs: providing access to financial services for investment and growth
- Marketing and distribution assistance: connecting farmers with wider markets and ensuring fair prices for their products

Takeaways

- **Sustainability pays off:** The Farm's success demonstrates that environmental responsibility and economic prosperity can go hand in hand even for farming communities in marginal areas.
- **Innovation is key:** Embracing new techniques and the best agronomic and circularity practices were crucial for adapting to changing market demands and maximising efficiency.
- **Community matters:** Providing proof-of-concept is an effective approach for promoting circularity. Empowering farmers through knowledge sharing, support networks, and access to resources is essential for sustainable growth.

Acknowledgements

This business case study was prepared within the framework of the Technical Advisory project: Mobilising Business Action for Circular Economy in the ASEAN countries under the EU SWITCH-Asia Policy Support Component for the sole purpose of documenting and analysing business experiences with the circular economy. The case study was produced by Lisa Inez Antonio (national expert, Philippines) and reviewed by Rene Van Berkel and Thomas Thomas (regional experts) on the basis of information provided and validated by Axel Integrated Farm, Philippines.

www.switch-asia.eu

EU SWITCH-Asia Programme
@EUSWITCHAsia

SWITCH-Asia
@SWITCHAsia

SWITCH-Asia Official
@switch-asia-official