

## CIRCULAR ECONOMY BUSINESS CASE STUDIES IN SOUTHEAST ASIA



## Diaspora Farm Resort

 Pampanga City, Philippines

 Agri-tourism

 [www.facebook.com/diasporafarmresortph](https://www.facebook.com/diasporafarmresortph)

 Analysis period: 2018-2023

## Circularity in Fruit and Vegetable Farming

### Business Spotlight

According to Diaspora Farms co-founder, Annette Patdu, what started as a conventional mango farm in 2015 transformed to a productive and integrated fruit and vegetable farm employing organic farming practices that improved their produce and the environment. Circular farming is illustrated by resource efficiency, integrated and diversified farming, minimising the use of external inputs, using solar powered irrigation in place of fuel, recycling agricultural by-products, reducing wastes, and value-added product development.

Farming practices in mango and dragon fruit production include soil reconditioning through the mixing of soil with organic fertilisers (vermicast, vermicompost, processed animal manure and/or carbonised rice hull) and drenching it with indigenous micro-organisms (IMO). Pests and weeds are controlled using herbal organic insecticides produced at the farm and applied through foliar spraying. The dragon-fruit production area is equipped with a solar-powered drip irrigation system for efficient irrigation. Raised bed technology is used in the vegetable production area to contain the nutrients of the soil, prevent erosion as the volcanic lahar soil has low water holding capacity, and minimise labour requirements for soil and land preparation. Crop

rotation is practiced for soil fertility management and pest control. All biodegradable farm wastes are composted on the farm and used as soil conditioners and/or converted to a substrate for plant food.

Benefits of all of the above include cost-savings in fertilisers and pesticides, and an estimated increase in production yield of 15–20%, every year since 2018. Other benefits from the use of solar-powered water pumps for irrigation system are annual electricity savings of Php 84,000 (EUR 1350) with corresponding savings on water use of 4170 m<sup>3</sup> of water per year and annual fuel savings of 24,000 liters.

Diaspora is now an organic farm certified by the Organic Certification Programme of the Philippines, and it serves as a research, demonstration and training centre under various government programmes to share best practices and experiences. The owners have also added a resort section to the farm. Meanwhile the owners continue to prioritise sustainable farming approaches over bulk production to ensure that their land, their farm, and the quality of their products are healthy, safe and nature-blessed.

## Keywords

Organic farming, Circularity, Mango production, Vegetable farming

## Innovation

Production, Resource efficiency, Resource substitution, Resource circularity

## Analysis of Diaspora Farm Resort

### Context and baseline

Diaspora Farms was established by Agie and Annette Patdu in 2003 in an area that had been inundated with volcanic lahar from the catastrophic Mt Pinatubo eruption of 1991, which forced many residents to relocate elsewhere. The couple took a leap of faith and returned 12 years later to redevelop their land in Bacolor, Pampanga, determined to continue the farming legacy of Annette's parents.

Inspired by the success of mango farms in neighboring Zambales province, which had also been hard hit by lahar, the couple established a mango farm and expanded their property to 3.5 ha. Ms Annette left her full-time city job to concentrate on farming. She attended training and seminars, where she learned about the effects of agriculture on the environment and health, and about more natural farming methods, including vermiculture to increase plant and soil fertility, and about intercropping methods. These inspired her to take the first steps to switch from conventional to organic farming after 2013.

### Innovation

Diaspora Farms has developed and implemented innovations in the management and operation of their orchards and in the management of the by-products.

Innovations in orchard management and operation include:

- Soil reconditioning by mixing soil with organic fertilisers: vermicast, vermicompost, processed animal manure and/or carbonised rice hull, drenching the soil with indigenous micro-organisms (IMO), and switching from synthetic to organic fertilisers derived from animal manure and the vermiculture of organic waste.
- Pests and weeds are controlled using herbal organic insecticides produced at the farm and applied through foliar spraying.
- Erosion-preventive measures like planting of buffer plants such as bamboo and eucalyptus in the farm perimeters; they also serve as windbreakers and help to minimise synthetic pesticide and fertiliser contamination by wind drift from outside.

- Integrated and diversified farming by planting mulberry trees, dragon fruit, guyabano (soursop), papaya and Java plum (locally known as duhat), Aside from the mangoes which tend to bear fruit only every other year if allowed to fructify naturally, there is a fruit harvest every year. Moreover, livestock has been integrated with the crops.
- Use of a drip-irrigation system and raised-bed technology to improve water efficiency in vegetable production. Raised-bed technology is also used to contain the nutrients of the soil and prevent erosion, because lahar soil has low water-holding capacity and raising the beds minimises labour requirements for soil and land preparation.
- Substituting fuel-powered with solar powered irrigation pump systems.

Also addressed were new product innovations such as organic produce concoctions and extracts, and using previously discarded peels from mango and other fruit to produce pectin as a jam-thickening agent.

Continuing assistance from the Department of Science and Technology (DOST) through the Small Enterprise Technology Upgrading Programme (SETUP) also enabled the farm to acquire grid-connected solar power for the farm's irrigation system in 2017 to provide a stable source of water for the fruit and vegetable farm, especially in the off-season, thus overcoming the rain-dependency of traditional farming. This was augmented with off-grid solar-powered irrigation equipment sourced from the Department of Agriculture (DA) Bureau of Soils and Water Management (BSWM).



## Circular Economy impact

The circular farming solutions of Diaspora Farms contribute to resource efficiency (through integrated and diversified farming and minimising the use of external inputs), resource substitution (using solar powered irrigation in place of fuel and organic instead of synthetic fertilisers and insecticides) and resource circularity (by recycling agricultural by-products, reducing wastes, and adding value with new product developments).

**Resource efficiency:** To augment the efficiency of land use, Diaspora Farms diversified. As the farm's mango trees bear fruits every other year, other trees have been planted on the farm such as mulberries, guyabano, papaya and Java plum (locally known as duhat). Slowly, Diaspora Farms also integrated different farm animals like carabaos, cattle, goats, sheep, chicken, geese, turkey, and native pigs. These created an additional revenue stream for the farm, and helped to restore biodiversity by increasing soil fertility with the accumulation of organic matter from decaying trees and leaves, and animal manure, as well as more available biomass to meet livestock needs.

Agricultural productivity was enhanced through the adoption of raised-bed technology and in 2015 by adding a drip irrigation system under the Consultancy on Agricultural Productivity Enhancement (CAPE) program of the Department of Science and Technology (DOST). The farm has a small impounding area from which water is sourced to irrigate fruits and vegetables, but as yet has no return-flow system where drainage and surplus irrigation could be channeled back into the irrigation network.

**Waste management and resource circularity:** Tree branches and twigs are dried and processed into wood chips using a chipping machine. Wood chips are then used as substrate for vermicomposting and as mulch for the crops. Green and dried leaves from trees and plants are collected and added to animal manure and decomposed to form a substrate for plant food. All biodegradable farm wastes are composted in the farm and used as soil conditioners.

**Resource substitution:** The farm has restored soil fertility to lahar-contaminated land by adding chicken manure, rice hulls and other waste materials to encourage the proliferation of beneficial micro-organisms. The farm shifted to organic farming by using vermiculture to convert organic waste, such as carbonised rice hulls, fruit and vegetable peelings, to nutrient-rich compost.

Installation of a solar-powered irrigation system for its vegetable production has also allowed the farm to shift to renewable energy source.

## Business and market impact

The benefits of natural farming are demonstrated by the 15–20% increases in production yields in 2022 and 2023, even while the farm was recovering from the pandemic-induced economic slump.

Specifically, the solar powered irrigation pumps achieved electricity savings of PhP 84,000 (EUR 1350) annually with corresponding savings on water use of 4170m<sup>3</sup>. In addition, operational savings in labor costs of PhP 12,600 were achieved (approx. EUR 200) per year, with fuel savings of about 24,000 l per year.

Circular farming practices have also created additional revenue streams:

- Access to new markets resulting from certification from the Organic Certification Program of the Philippines (OCCP).
- Seminars and services conducted after having been certified as a training and assessment center for Organic Agriculture Practice by the Technical Education and Skills Development Authority (TESDA).
- Addition of resort facilities as a non-agricultural diversification to supplement the income of the farm and provide amenities for trainings, seminars and other group activities and to accommodate overnight staying guests.
- Farm tours and guest services as the first recognised agri-tourism farm site in Pampanga by the Department of Tourism.

The owners are developing a similar farm in Bataan province to expand production, as well as apply the knowledge and skills they have acquired at their Pampanga Farm.



## Stakeholders

Together with like-minded farmer neighbors who have adopted the Diaspora farming model and circular farming practices, the owners have formed the Bacolor Farm Tours Organisation to expose more visitors to their region and to the benefits of natural farming.

Diaspora has been accredited by the DA-Agricultural Training Institute (ATI) in Region III as a learning site, allowing Ms. Annette Patdu to share her knowledge and hands-on experience with best practices in operating an organic farm. Trainees include farm owners, agriculturists, hobbyists and returning Overseas Filipino Workers (OFWs) under the Reintegration Programme (of the Department of Labour and Employment).

Through its training activities, Diaspora Farm will continue to create awareness about the ill-effects of synthetic chemical inputs in food production as well as the importance of organic farming. It is hoped that small farmers will be inspired to become better agripreneurs and that students will be encouraged to connect with organic agriculture and promoting organic produce for a healthy lifestyle.

## Implementation

Although having little formal training in farming, acquiring needed skills resources and technology was possible through partnerships with government, universities, like-minded farmers and an openness to the possibilities of natural farming, despite the apparent prospects of higher potential returns from conventional farming. Instead of being a barrier, there was instead an opportunity to learn and grow.

There is a need however, for continuing technological assistance and capacity building to avoid situations where the farm is unable to address and repair equipment breakdowns on its own and must rely on external servicing and/or government assistance, which is not always timely or available.

## Takeaways

Health and food safety should not be compromised by unsafe and unsustainable farming practices. Thus, there is a need to look beyond profit and find ways to combine health and food safety with responsible farming. Inspiring other farmers and agripreneurs to adopt the farming and business models of Diaspora Farm can result in much bigger and wider impact, and thus serves as the owners' legacy.



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