



Las Kuatras Marias - Integrated Diversified Organic Farming System

Introduction

Las Kuatras Marias farm is located in San Narcisso village, near Victoria City in Oriental Mindoro, Philippines, where rice monoculture is the main source of income for family farmers in the area. The household is composed of the family members, three living on the farm (a couple and one child) and three children studying different aspects of agriculture. The family is supported by a young graduate farm technician, including on the monitoring of the farm.

Applying an extensive knowledge of indigenous and organic practices, the farm is strategically structured in distinct components that are designed to maximize one another. A nutrient recycling system generates a virtuous closed loop process on the farm (Figure 1), and biodiversity is intensified to multiply key ecological functions and processes within and among the components (e.g. natural pest management and optimal use of sunlight, rainfall and soil fertility). With an increased occurrence of typhoons, floods and drought in the region, the family has learned, analysed and scaled up the most resilient plants and practices to reduce their vulnerability.

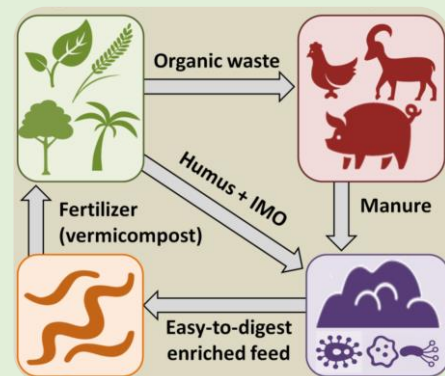


Figure 1. Integrated Nutrient Cycle System

As a result, the family farmers produce quality organic products, including their own seeds and fertilizers, reducing their dependency on external input providers. Despite the farm only being 0.5 hectares, the food and nutrition needs of the family are amply fulfilled with a production including rice (black, red), pigs, poultry, goats, fish, roots, fruits, vegetables, culinary herbs and feed for livestock. Overall, forty indigenous medicine plant varieties are also grown, documented and used. An agro-forestry component provides wood for cooking and material to build or fix the other components, acting as a climate regulator and enhancing favourable habitat for local wildlife.

The human living area itself is a component of the farm with a learning centre and a farm-tourism facility. Local knowledge is valued and shared, and the provision of goods and services to visitors generates additional income for the family and the community, thus fostering the local economy.

Description of the Agroecology system

Integrated Nutrient Cycle System: The cornerstone of the organic farming system is a vermicompost component that enables autonomous recycling of organic and inorganic matter on the farm, maintaining soil quality without chemical inputs. Crop waste on the farm contributes to feed the livestock (pigs, chickens, goats) whose manure is mixed with small debris and humus that is rich in Indigenous Micro-Organisms (IMO), contributing to biodegradation and nitrogen fixation. Once dried (taking at least two weeks), the aggregate that is obtained feeds the vermiculture, where the worms process it into a nutrient-rich organic fertilizer known as vermicompost. Easier to



Figure 2. Integrated farming



absorb by the plants and holding moisture better than plain soil, this fertilizer also makes the plants more resistant to pests and diseases because of the presence of the IMO. Worms can also be released on the farm to support its overall soil health.

Integrated Rice-Fish Vine: A canal is dug around and connected to a high water rice crop. Local freshwater fishes (about ten species) and ducks evolve in both the rice crops and the canal and enrich it with their manure while regulating insect populations. Other canals dug around the farm are streamed toward this component, recycling nutrients from the entire farm and enriching the water, which can be used to complement the nutrient sources used for other crops. Above the canal, vertical bamboo trellises support various vine crops including nitrogen-fixing crops like beans. This system provides further shade on the canal and thus regulates the component's microclimate, stabilizing water temperature, providing shade to the fishes and producing an additional source of food. Separated nursery ponds are also developed to secure the population of the fish ponds. Importantly, the bottom of the canal is heterogeneously designed and eatable comestible indigenous plants are grown around and on the water (e.g. azola) in order to imitate a natural ecosystem. This provides shade to the fishes and an additional nutrient source for both the family and the livestock. Enabling conditions for natural regulators, such as spiders and frogs that are observed in good quantity on the farm, contribute to the health of the component.



Figure 4. Integrated Rice-Fish Vine

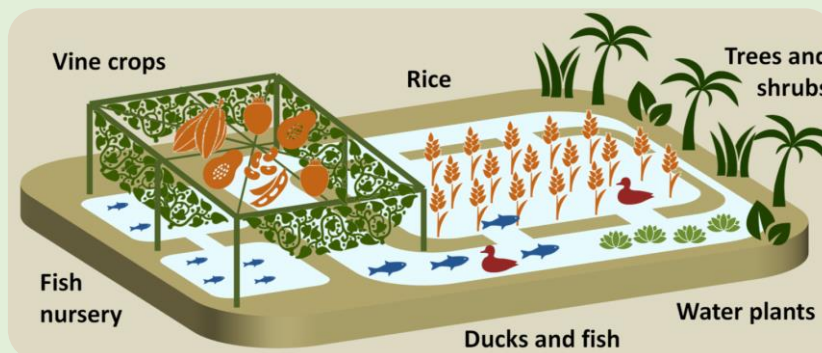


Figure 3. Overview of the integrated Rice-Fish-Vine component

Agro-forestry: Trees are grown together in abundance, replicating a local forest ecosystem, in order to maintain and improve soil fertility (nitrogen fixation), while providing windbreaks for the farm. Humus and debris rich in IMO are collected for the vermicomposting system too. Endogenous trees, observed to be much more resistant to natural disasters, are actively planted on the farm. Fruit trees, another good nutrient source on the farm, are planted too. Medicinal values and traditional uses of the trees grown on the farm are known and documented. The trees also provide habitat for local wildlife, including bird species who also contribute to a healthy ecosystem on the farm. Moreover, after some years, some of the trees can be used as material to build or to fix components of the farm.

Mixed crop-tree component: Different varieties of crops and trees with different patterns (nutrient needs, duration, physical use of space, sunlight needs) are planted in the same area, including vine crops above low-growing crops. This diversity increases the opportunity for beneficial interactions



between species, enhancing the presence of natural regulators for pest insects. This diversity of production leads to a richer diet for the family and reduces dependency on one or two crops that may not do well for some reason. Because the area is regularly exposed to natural disasters such as typhoons and floods, resilient and adapted crops are planted, such as root crops that are more resilient to typhoons and taro in the lower part that can resist floods.



Figure 5. Flowering around the farm

Flowering / Beautification: Flowers are actively planted in all areas of the farm, along the walks and the components, attracting pollinators such as butterflies and bees. These pollinators contribute to the reproduction of crops and plants, and to a well-balanced ecosystem both on the farm and in surrounding areas. The family also highly values the beautification of the farm - they recognize that the flowers contribute to their happiness and well-being.

Learning centre for sustainable communities (SILANGAN) and farm-tourism: The learning centre was developed when the farm was at a mature stage. It is a facility to host trainings and visitors, and is built in the human living area using locally produced materials where they are available. The farm is thus a learning site that provides a space to share and to teach local best practices for sustainable agriculture. The site also hosts farm-tourism visitors, who can participate in the farm's duties. The visitors present many economic opportunities for the family and the isolated rural community, for the provision of goods and services.

System of Rice Intensification (SRI): SRI is a well-documented low-water, labour-intensive, organic method in which seedlings are separately grown in nursery beds, before being transplanted manually and singly at a wide spacing. While the wide-spacing allows the plants to get more light and more nutrients from the soil, the low water level pushes the rice roots to grow deeper, obtaining more nutrients and becoming stronger to face pests and diseases. With increased sunlight on the field, the wide spacing reduces the presence of insects and rats, while permitting the use of weeders (during the first month) to reduce weeds and aerate the soil. The SRI allows excellent yields while considerably reducing the seeds used.

Farm support

Producer organizations at local and national level, respectively the Mindoro Ecological and Sustainable Agricultural Federation (MESAFED) and the National Confederation of Farmers and Fisher Organizations (PAKISAMA), provide timely support to the family through trainings and tools. The overall approach has been consolidated by PAKISAMA as the "Integrated, Diversified and Organic Farming System" (IDOFs), targeting first and foremost the food and nutrition security of the family through the development of sustainable and self-reliant small-scale farming. It has been scaled up following natural disasters and as part of a transition away from vulnerable monoculture production systems. The family farmers also hosted international farmer exchanges with farmers from Bangladesh. The exchanges were facilitated by the Asian Farmers Association for Sustainable Rural Development (AFA), Agriterra and FAO, to share experiences working with the IDOFs and the farm strategic design.

Through these organizations and the active engagement of the family farmers, regular contact took place with the Local Government Unit (LGU) and the provincial Agricultural Training Institute (ATI) of the Department of Agriculture (DA), leading to the official recognition of the farm as a Learning Site (LS) to provide on-the-field trainings. This recognition also facilitated the mobilization of public institutions and partners in favour of the community following natural disasters.



As part of the farm strategy, a young graduate farm technician has recently been hired to support the functioning and monitoring of the farm, and to assist in facilitating on-farm trainings. Social media is also extensively used by the family members, to bond with and to mobilize the global community. After typhoon Nona in December 2015, funds and tools (chainsaws) were collected through social media to help clean up the farm.

Outcomes of the practices

Even after natural disasters, food and nutrition security at the family level is achieved to the extent that a social enterprise to export high value organic rice to Manila was created and registered, contributing to national growth. The success of this economic dimension is largely based on the strategic planning of the farm to ensure its feasibility and its viability, while reducing dependency and vulnerability.

While farming is still seen by many as a second-class job, the beautification strategy and the Learning Centre/farm-tourism facility values the farm within the community, and fosters the preservation of indigenous biodiversity, while increasing currency circulation in the remote area.



Figure 6. Agroforestry system

Witnessing the benefits, other family farmers in the area adopted similar strategies, achieving food and nutrition security and building resilience. Moreover, solidarity within the community was developed through enhanced sharing of seeds, tools and knowledge.

Challenges and success factors

A key challenge of such a multi-faceted system is the diversity of the skills required, particularly following natural disasters, where different things need to be fixed. On the other hand, by diversifying their skills, the farmers empowered themselves and improved their self-confidence. Meanwhile, it is important to recognize that the stable access to natural resources, land and water on the farm facilitates its success. A fool proof winning attitude from the family farmers definitely appears to be another critical factor for success.

Political space

Although a national law on organic agriculture exists and despite an increasing recognition of its relevance in the context of climate change and food security, the institutional environment to support family farmers' Agroecology systems in the Philippines is still weak. Because the existing third party certification system is not affordable for most of the family farmers, organizations like PAKISAMA actively advocate for IDOFS to be included in curricula at the national level and to allow family farmers already practising organic agriculture to certify and to sell their products through participatory guarantee systems.

Message from farmer to farmers

"Climate change is a sign of our time that we must read. In this context, our farm is our strength, not a burden, to secure our food and livelihood."