

Evaluation of Livelihood Assets in Community-Based On-Farm Demonstration of IMTA in Milkfish Mariculture in Guimaras, Philippines

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Introduction

The aquaculture of milkfish, *Chanos chanos* Forsskal, continues to contribute towards sustaining the fish food needs of the country in the midst of emerging food security issues, increasing food prices and environmental problems in the Philippines. Hence, one of the key targets of the country's Comprehensive National Fishery Industry Development Plan (CNFIDP) is to increase the annual production of milkfish by 4 % per year and to improve its processing and value-adding options (BFAR-NMC, 2019). Milkfish, being a euryhaline species, has been successfully cultured throughout the country in brackishwater, freshwater and marine water environment using a variety of culture systems or enclosures such as ponds, pens, cages, tanks and raceways. However, farming of milkfish in these environment types is often confronted by economic and environmental challenges. The adoption of IMTA by many small-holder mariculture operators is envisioned to help mitigate pollution of coastal areas while providing livelihoods that make milkfish available to consumers, and address the “price squeeze” confronting milkfish farmers (due to increasing feed cost vs. stagnant market prices) by deriving additional income from co-culture of high-value non-fed species.

However, prior to adoption of a selection of livelihood strategies, people, either as individuals or grouped as a household or working as a community, contend that they had to be equipped with an array of assets categorically distinguished as natural or environmental, human, physical, financial and social assets (IFAD, undated). In the dynamic utilization and transformation of these assets into goods and services, the sustainable livelihoods approach (SLA) places people at the center of a web of these inter-related influences that affect how they create or adopt a livelihood for themselves and their households. The SLA is applied as a tool for determining the main factors that influence the adoption of new development activities, such as the introduction of IMTA. The SLA enables the integration of concepts in the discussions about poverty, food and livelihood security, and enhancing sustainable culture practices that comprise the complex concerns of traditional producers (Lewins, 2004; Garrido and Moreira, 2017).

Methods

SEAFDEC/AQD, in collaboration with JIRCAS, initiated an on-farm demonstration of IMTA in milkfish mariculture in pen in July 2015 by signing an agreement with aquaculture stakeholders in Barangay Pandaraonan in the municipality of Nueva Valencia, Guimaras province, Philippines. Stakeholders in this small-holder aquaculture livelihood demonstration comprise of the local government units (LGU) at the municipal and barangay (village) levels, and the Pandaraonan Unified Association (PUA). Thus, a tri-party collaboration model is applied to implement the community-based on-farm demonstration of IMTA. Selected fisherfolk-members of PUA perform the day-to-day operation in the IMTA setup in the nearshore waters in the village. The LGU, having the governance jurisdiction over its constituents and the project location, guarantee and oversees the participation of PUA. SEAFDEC/AQD and JIRCAS provide the technical direction, and financial and structural requirements of the on-farm IMTA demonstration while addressing the IMTA research questions. Six (6) culture runs were implemented from July 2015 up to December 2018. In all of these runs, 4–6 male fisherfolks were engaged and trained in day-to-day activities in milkfish mariculture starting from site assessment; pen construction; stocking of milkfish and co-culture species such as seaweeds and sandfish that absorb excess nutrients in IMTA system; feeding the milkfish with commercial diet at recommended rates; monthly sampling to evaluate growth and changes in environmental parameters; harvesting; and selling to provide fisherfolks with entrepreneurial experience. Women were trained on value-adding of milkfish harvest, such as deboning, marinating, cooking in oil, and sun-drying (locally called *lamayo*). Stakeholder meetings were held as needed, including a workshop in aquaculture project planning and financial management.

The Sustainable Livelihoods Approach (SLA) was applied as an impact assessment framework in promoting and evaluating the adoption potentials of IMTA in milkfish mariculture. Using a structured questionnaire, 52 stakeholder-respondents rated the changes in livelihood assets in the community-based IMTA project.

Results and Discussions

The SLA as applied in the evaluation of the IMTA project in Guimaras showed that there were some increments, but variable, in the acquisition and development of five livelihood assets during the three evaluation periods considered in this study (**Figure 1**). Human, financial, environmental and social livelihood assets were perceived to have improved significantly in some stages, but physical assets did not (**Table 1**). Results of SLA as an impact assessment framework in promoting and evaluating the adoption potentials of IMTA in milkfish mariculture showed an array of long-standing concerns, especially on the limited physical and financial assistance. Research, industry, governance and policy recommendations all require collective public attention and action to secure benefits from IMTA in milkfish mariculture.

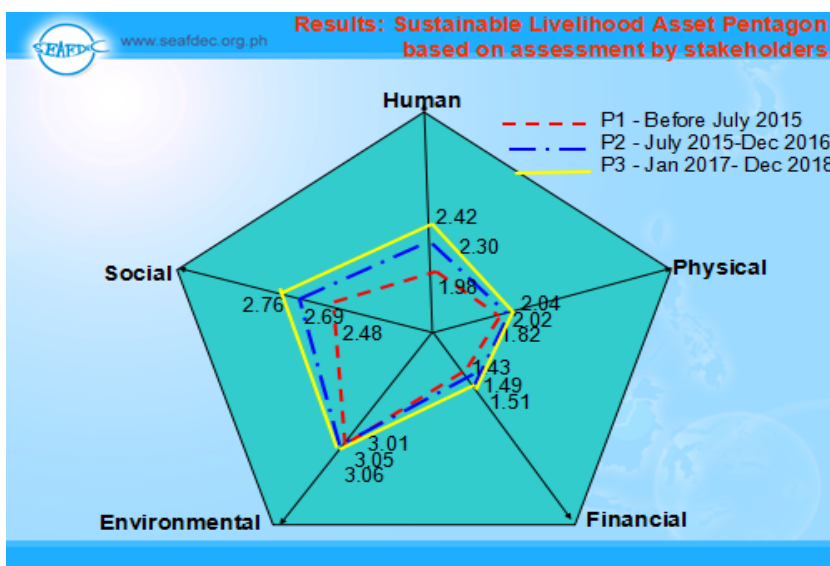


Figure 1. The sustainable livelihood asset pentagon before, during and at the end of the on-farm demonstration of IMTA in milkfish pen culture in Barangay Pandaraonan, Nueva Valencia, Guimaras, Philippines, 52 stakeholder-respondents, February 2019.

Table 1. Changes in sustainable livelihood assets in the on-farm demonstration of IMTA in milkfish pen culture, Brgy Pandaraonan, Nueva Valencia, Guimaras, Philippines, 52 stakeholder-respondents, February 2019.

Perceived change in livelihood asset level	F-value			
	P1 to P2	P2 to P3	P1 to P3	
Human	0.562	0.981 **	0.546	
Environmental	0.906 ***	0.884	0.978 **	
Physical	0.789	0.898	0.889	
Financial	0.972 **	0.957 **	0.975 **	
Social	0.850	0.957 **	0.808	

*Significant at 1 %, ** Significant at 5 %, ***Significant at 10 %

Conclusion and Recommendation

This study showed the need to develop the livelihood assets of rural communities to enable them to engage in aquaculture-based income generating activities. The SLA evaluation showed that the benefits in terms of its contribution to livelihood asset build-up is generally positive. While human, social and environmental capacities were improved, the financial and physical assets were dissipated and insufficient for many stakeholders with keen interest to participate in the communal project. Therefore, the recommendation is to organize more and bigger collaborative projects, such as this IMTA of milkfish, with emphasis on sustainable livelihood asset development to create significant economic impact to target beneficiaries.

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