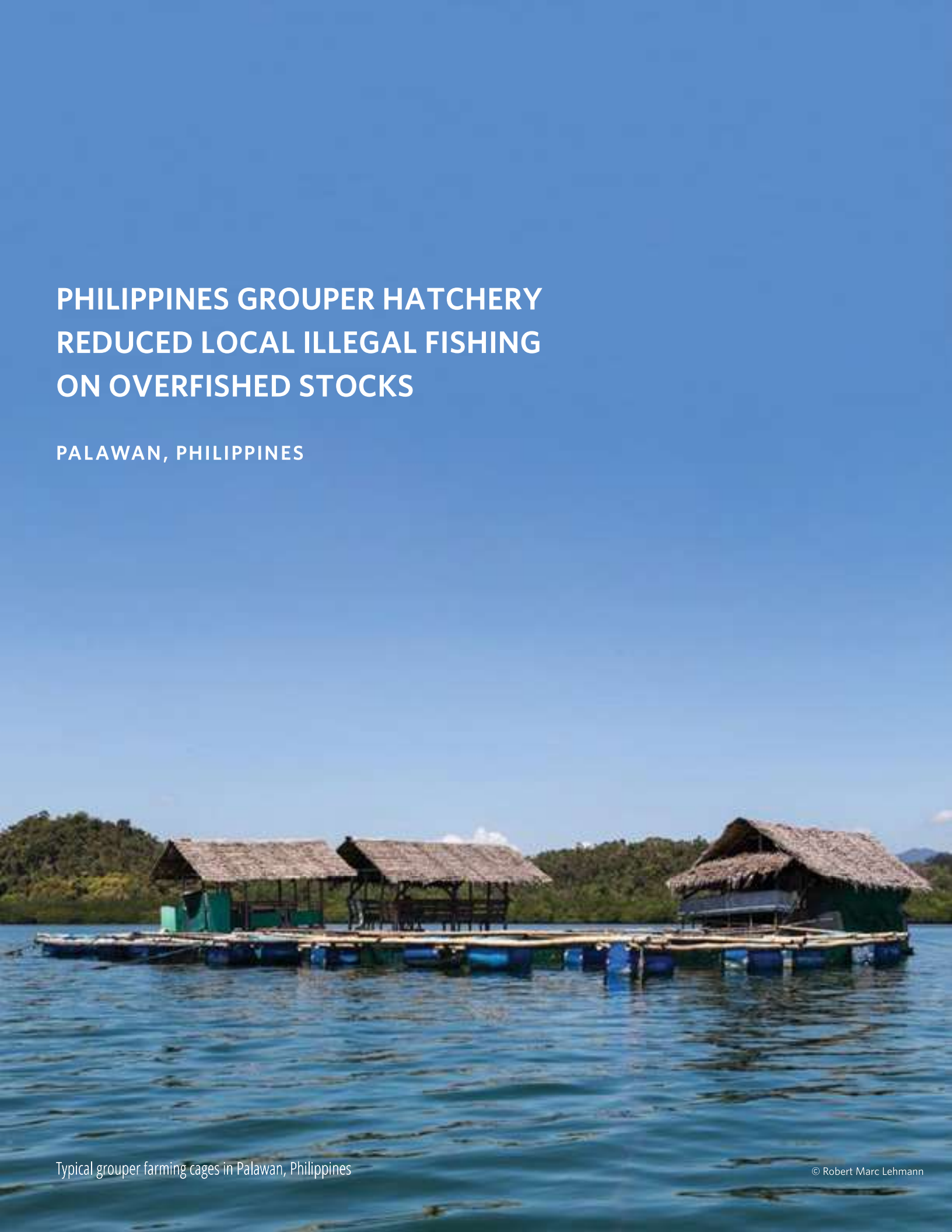
PHILIPPINES GROUPER HATCHERY REDUCED LOCAL ILLEGAL FISHING ON OVERFISHED STOCKS

PALAWAN, PHILIPPINES



Typical grouper farming cages in Palawan, Philippines

PROJECT SUMMARY

PROJECT LEAD:

Centre for Sustainability (formerly Fins and Leaves) (Dutch NGO)

PROJECT NAME:

Grouper Livelihood Program

PROJECT DATES OF OPERATION:

2006-2016

PROJECT OBJECTIVE:

Reduce the use of wild grouper fingerlings; Capacity building for sustainable mariculture; Increase livelihoods of small-scale growers; Ensure food security of the local community.

Grouper are a highly valuable species in the Coral Triangle region, fetching high prices, especially when sold live. Cyanide has been used to catch grouper to sell these large fish to restaurants often in China and Hong Kong, where live fish are stocked in restaurant fish tanks.

The impacts of cyanide on coral reefs and the marine life that relies upon them are well-documented. In addition to these impacts, coastal communities began capturing live, juvenile grouper, which were kept in captivity and grown to a size where they could be sold. The practice of removing juvenile fish from reef ecosystems before reaching breeding size exacerbated the decline of wild fish populations. In the Philippines, the Bureau of Fisheries and Aquatic Resources (BFAR) recognizes 6 native species of grouper as Vulnerable or Nearly Threatened based on information from FishBase.org and an identification guide for live fish in Hong Kong's wet markets (BFAR, 2019). Both of these sources reference the IUCN Red List of Threatened Species (FishBase.org, 2019; Hau, Ho, and Shea, 2019).

To decrease the ecological impact to reef ecosystems from cyanide fishing, and provide local communities with a more consistent supply of economically valuable fish, the organization Fins & Leaves (formerly the Centre for Sustainability) began its Grouper Livelihood Program (GLP) in Palawan, Philippines with the stated objective to "Provide a sustainable alternative for wild grouper fisheries by promoting grow out of hatchery bred grouper fingerlings" (van Beijnen, 2015). This project aimed to reduce the use of wild grouper fingerlings, build capacity for sustainable aquaculture in Palawan, increase the livelihoods of small-scale aquaculturists, and increase food security (ibid.).

Species of grouper raised by the GLP included; orange-spotted grouper (*Epinephelus coioides*), tiger (Brown-marbled) grouper (*E. fuscoguttatus*), Malabar grouper (*E. malabaricus*), giant grouper (*E. lanceolatus*), and the humpback grouper (*Cromileptes altivelis*). The program operated between 2006-2016, providing hatchery-reared grouper fingerlings to local community members who would grow them to market size for live sale to other Asian countries.

At the time of this project, full-cycle grouper aquaculture was already practiced in Indonesia and Taiwan, but was not yet successful in the Philippines, despite multiple attempts, and infusions of money by large, global organizations.

FACTORS INFLUENCING THE PROJECT

LEADERSHIP

The GLP benefitted from a small, clearly structured leadership team that included the lead organization Fins & Leaves (then called the Centre for Sustainability), investment organizations (for the first two years of operation before the project becoming financially sustainable), and an operations manager. The GLP was run by Dutch project leaders and was supported by the Vice President of Fins & Leaves, Jonah van Beijnen, who brought technical knowledge of aquaculture operations to the project and was supported by an administrative manager who managed the necessary permits, tracking of finances, and administrative duties.

Operations at the facility were managed by a Filipino Hatchery Manager who had attended university internationally and worked in aquaculture across Southeast Asia and the Middle East. This individual returned to the Philippines to continue his career with the GLP.

Project leaders were initially of Dutch descent. The leadership provided a workplace environment that encouraged staff to stay, with many remaining on for the duration of the project. Many staff were local Filipinos who had been formerly incarcerated and had been experiencing homelessness until they were able to secure jobs at the facility. In general, as stated by van Beijnen, there is a sense of willingness and passion from local communities to improve their living situation and be able to more consistently provide for their families. After 6 years of implementation, the project was entirely run by local staff, which led to a high level of trust between staff and leadership of the program.

STAKEHOLDER ENGAGEMENT

During the planning and operation stages of the GLP, communication between project leadership, local affected communities, and supply chain members was consistent. GLP leadership maintained ongoing dialogue and opportunities for feedback and engagement with local community members through the sale of juvenile grouper, training workshops, and provision of technical guidance documents.

Additionally, GLP leadership maintained a relationship with the local government to ensure its continued approval, and financial support. The direct relationship of GLP leadership with local community members and maintained relationship with local government officials fostered a sense of trust in the work of the GLP. However, a change in local government administration in 2014 resulted in less engagement and support, which led to the eventual closure of the project. This is further discussed in the Policy and Regulation section below.

FINANCIAL SUPPORT

Initial development of the project, construction of the hatchery and growout facility, and purchasing of equipment were funded by investors, local and foreign donors, as well as personal funds from the project leaders. The largest amount of funding was donated by the City Government of Puerto Princesa. Throughout the operation of the GLP, additional large donors included the Interchurch Organisation for Development Cooperation (ICCO), USAID, and Transpetrol. The project was eventually able to produce approximately 100,000 fingerlings (3 inches) annually, and by 2012 operation of the project became largely financially self-sustaining. Demand for fingerlings was high, and before the change in administration, the GLP had plans to expand up to 10 times its initial size, however, these plans were not able to be brought to fruition.

COMMUNITY CONTEXT

As noted earlier, many people in the community look for ways to improve their livelihoods. In 2009, approximately 24% of families in Palawan were living beneath the poverty threshold (NEDA, 2013). University programs in the Philippines produce a high number of fishery and aquaculture graduates, however, with very few jobs available, the majority leave the county in search of work. For entry-level positions, the GLP hired local staff who were largely uneducated and had fewer options for careers. At its peak, direct employment by the GLP provided 25 local community members with jobs and a steady income.

Community members who purchased the juvenile grouper to grow out had improved income due to a more consistent supply of high-quality grouper to raise and sell.

Beyond the direct employment of the GLP, community members who purchased the juvenile grouper to grow out had improved income due to a more consistent supply of high-quality grouper to raise and sell. Farmers were able to sell lower-priced grouper species for approximately 500 PHP/kg (approximately $10/kg), while others fetched higher prices. This level of income, in some cases, enabled families to send their children to university.

In addition, the GLP informally trained farmers in the community to improve farming practices. It provided a 50-page manual describing best practice techniques, small brochures containing streamlined and more accessible information, and training sessions. In addition, the GLP assisted local farmers with finding buyers for their products. Occasionally, the GLP also released juvenile grouper into the wild to restock wild populations. These actions forged a strong relationship with fishermen and the broader community.

LOGISTICS AND INFRASTRUCTURE

The initial development of the GLP facilities experienced some unanticipated challenges. Much of the necessary equipment for developing the hatchery facilities was not manufactured in the Philippines and therefore needed to be

imported. Project leaders traveled to Malaysia to purchase equipment and bring it back in person so it could be tracked. This added additional costs to the development of the facilities.

In addition, the electrical power grid in the region is weak and prone to outages. Generators were frequently required, especially at night, which resulted in the project leader spending many nights at the facility to ensure the welfare of the juvenile grouper. Air blowers that must run constantly also required a high level of maintenance and frequent replacement due to the poor electrical supply, when under normal circumstances they would rarely need to be replaced.

POLICY AND REGULATION

To build and operate an aquaculture facility in the Philippines, there are various permits, licenses, and leasing arrangements that must be obtained. In the Philippines, BFAR, housed within the Department of Agriculture regulates the country's aquaculture industry. Within municipal waters, Fisheries and Aquatic Resources Management Councils (FARMC) are tasked with the preparation and implementation of municipal and integrated (multiple municipalities in a water body) fishery development plans, as well as their enforcement.

In general, the GLP project leaders found that the process for getting a visa as a foreign investor was relatively simple, as the Philippines is very supportive of foreign investment opportunities. Tax discounts and exemptions for non-profit organizations were offered, and at the national level, the process of becoming licensed to start a business was not as expensive, complex, or time-consuming as it can be in many other areas of the world. While the visa process proved to be conducive to foreign investment, navigation of import regulations and policies proved to be challenging.

For the first 8 years of the GLP operation, the local government was highly supportive of conservation initiatives and was enthusiastic about the project's mission to decrease the prevalence of cyanide fishing for grouper. It facilitated siting, as well as the necessary permitting, licensing, and leasing, and became the largest donor throughout the project.

However, a change in local administration in 2013 resulted in a shift in the dynamic between the GLP's mission and the policies of the new local political leader. The new administration made changes to many of the policies and programs of the former administration, many of which had supported the GLP. The project leadership team found it increasingly difficult to maintain the project's permits and licenses under the new administration, and eventually forfeited the facility in 2016, at which point it ceased operations.

MARKET CONDITIONS

Many local aquaculturists had previously relied on cyanide fishing, or other destructive fishing methods to collect small grouper to raise to market size, and switched to raising hatchery-reared fish. There was high demand for grouper from other Asian countries, therefore demand for hatchery-raised juveniles was high as well. The GLP was able to sell juvenile grouper for approximately $1.00 per 8 cm fish, which allowed the project to break even on costs.

ENVIRONMENTAL CONDITIONS

Palawan remains largely undeveloped, with many natural ecosystems still intact. It includes sandy beaches, a mountain range extending the length of the island, and plains areas that are mainly used for rice production (Province of Palawan, no date). While many of the Philippine islands are regularly subjected to destructive typhoons, Palawan is rarely impacted by them (ibid.).

The main economic activities on the island include agribusiness and manufacturing (mining, mineral processing, pharmaceuticals, shipbuilding, electronics, and semiconductors) (Bajpai, 2020). Tourism, forest product gathering, and pearl farming are other important industries on the island (UNESCO, 2013).

The Philippines is generally well suited for grouper aquaculture. All of the species grown by the GLP are native to the area, which is a broad indication that they can be cultivated in the area. The area in which the hatchery and growout sites were located was selected for its good water quality, exchange rates, and depth. These factors, along with protection from strong weather patterns, accessibility, and distance from critical habitats influenced the location of the hatchery and growout sites.

OUTCOMES

Throughout the operation of the project, it was proved that a grouper hatchery could operate and provide a consistent source of juvenile grouper to local farmers, thereby successfully reducing local demand for wild juveniles sourced through cyanide fishing.

SOCIO-ECONOMIC

Many community members who had relied on wild-caught juvenile grouper for their growout stock switched to hatchery-bred juveniles. This was an attractive shift, as hatchery-bred groupers could be fed dry feed pellets, whereas wild-caught juveniles would only eat fresh fish which was inconsistent in price, quality, and availability. Additionally, hatchery-raised groupers are subject to biosecurity protocols, resulting in a lower risk of disease in farmed stocks. Making the switch to hatchery-raised groupers allowed a consistent, year-round supply of juvenile grouper, with uniform growth rates. Grouper are

cannibalistic, and many grouper growers stocking wild fish experienced losses of their stock when they kept fish of different sizes together. The provision of hatchery-raised grouper that were all of the same approximate sizes, with the same growth rate mitigated the risk of cannibalization.

ENVIRONMENTAL

The GLP itself did not include monitoring of the reef ecosystem, however, anecdotal evidence from local community members indicates that species of grouper that had become very rare in Honda Bay (specifically *C. altivelis*) rebounded during the timeframe the hatchery was operating. It is unclear, however, what role the hatchery played in this increase.

While data from the Filipino Bureau of Agricultural Statistics show a rough correlation between the volume of grouper produced in aquaculture facilities and the volume captured in the wild during the years that the GLP was operational (2006-2016), given the significantly lower volume of aquaculture production, it is difficult to draw any conclusions about any possible direct influence on stock replenishment due to the release of eggs and juveniles from the GLP.

GROUPER PRODUCTION 1997-2018 (MT)

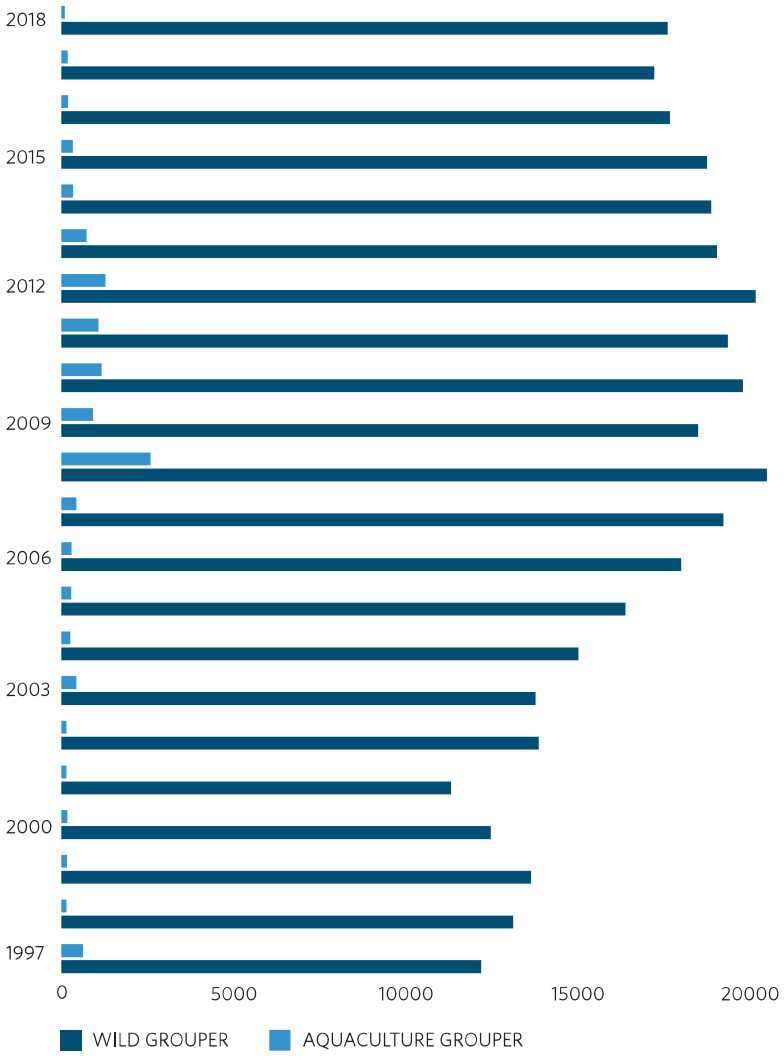


Figure 1: Historical wild and aquaculture grouper production in the Philippines.

LESSONS LEARNED

Although they experienced challenges, the GLP was a successful venture for 10 years from 2006 – 2016. The project team successfully navigated the technical aspects of grouper aquaculture while also engaging and supporting the local community in positive and constructive ways.

The initiative yielded some valuable information for future ventures considering the operation of a marine fish-culture project within an existing fishing community.

Project leaders must take the time to understand and respect local cultures, and their social and cultural norms.

- The GLP was run by Dutch project leaders and was supported by Dutch funders and a Dutch university. Social norms can be very different between the Dutch and Filipinos (e.g. expectations around time management). The project leaders of the GLP ensured that their communications, time management, and expectations of the local staff were aligned with local norms.
- Allow space for reflexivity in the approaches to planning and implementation to better respond to social and cultural norms.

The local political structure and local politics can significantly impact an initiative's success or failure.

- Understanding the political structures and climate at the time of project implementation is critical, as is understanding how dynamics in the community tend to shift as administrations change. The GLP leadership team found it increasingly difficult to maintain the project's permits and licenses under the new administration, and eventually forfeited the facility in 2016, at which point it ceased operations.

Table 1. Influential factors in the Palawan Grouper Livelihood Program

CATEGORY	STRENGTHS	CHALLENGES
LEADERSHIP	• Clear project need project goals • Leadership included a technical expert in aquaculture, local hatchery manager, administrative support, and financial backing • Dedicated leadership team	• Labor, resource, and time-intensive for the leadership team in the early stages of the project

STAKEHOLDER ENGAGEMENT	• Local community was engaged via:
	  ▪ Employment of locals
	  ▪ Sale of juvenile fish to locals for growout operations
	  ▪ Training of local community members on aquaculture techniques
	  ▪ Assistance with finding buyers for grown grouper
	• Local government was engaged and supportive of the GLP, as it was consistent with government policies
	• Local government facilitated lease, licensing, permits, and ongoing legality
		• Change in local government administration resulted in changed political priorities and conflicting interests
		• Relationships strained leading to difficulty maintaining necessary legal requirements for operation

FINANCIAL SUPPORT	• Financial support from external funders covered costs in the early years of operation and infrastructure investment. • After 6 years the GLP was financially self-sustaining	
COMMUNITY CONTEXT	• Local community were open to new methods of ensuring livelihoods • Aquaculture was accepted by the public	
LOGISTICS AND INFRASTRUCTURE		• Limited access to necessary aquaculture equipment, had to travel to obtain it • Inconsistent electricity resulted in common reliance on a generator and increased need for equipment maintenance

CATEGORY	STRENGTHS	CHALLENGES
POLICY AND REGULATION	• Relatively easy process for foreign investors to obtain visas • Tax discounts and exemptions for non-profit organizations • Licensing process for business operation is relatively cheap and streamlined	• Inconsistent regulatory priorities • Local agency leader's conflict of interest influenced permitting processes
MARKET CONDITIONS	• Only successful grouper facility in the Philippines resulted in a market advantage • Local grouper aquaculturists purchased juveniles to grow out (consistent demand)	
ENVIRONMENTAL CONDITIONS	• All species grown were native, and well suited to the environmental conditions • Siting of hatchery, nursery, and growing facilities based on environmental conditions • Island not subject to the strong weather patterns that affect much of the surrounding area	

PROJECT	PROJECT GOAL	GOAL REACHED?
SOCIO-ECONOMIC	• Increase livelihoods of small-scale growers • Ensure food security.	• Yes, during the time the GLP was operating. Did not continue after GLP closure. • Increased access to resources for growers during GLP operation.
ENVIRONMENTAL	• Reduce the use of wild grouper fingerlings • Capacity building for sustainable mariculture.	• Yes, at a small scale during GLP operation. Did not continue after GLP closure. • Did not continue after GLP closure.