

CASE STUDY:

Taklong Island National Marine Reserve (TINMAR), Guimaras

Background

The Taklong Island National Marine Reserve (TINMAR) is one of the 372 designated marine protected areas in the Philippines (Marine Conservation Institute, 2019). It was declared as a protected landscape and seascape in 1990 under Presidential proclamation No. 525 and was one of the core sites of the National Integrated Protected Areas System (NIPAS), also known as the Republic act 7586 of 1992. Under NIPAS, the essential ecological processes and life-support systems should be maintained and genetic diversity be preserved while ensuring sustainable use of resources.

TINMAR covers an area of 1,143.45 has making it the biggest among the 13 marine protected areas being managed by the Protected Area Management Board (PAMB) in Guimaras. It is composed of two major islands of Taklong and Tandog and small islets located within the two coastal barangays, namely Barangay Lapaz and San Roque in the municipality of Nueva Valencia, Province of Guimaras, Western Visayas, Philippines (Campos and Beldia, undated). It is within the geographical coordinates of 10.400000-10.433333°N (Latitude) and 122.48333-122.51917°E (Longitude) (Figure 1).

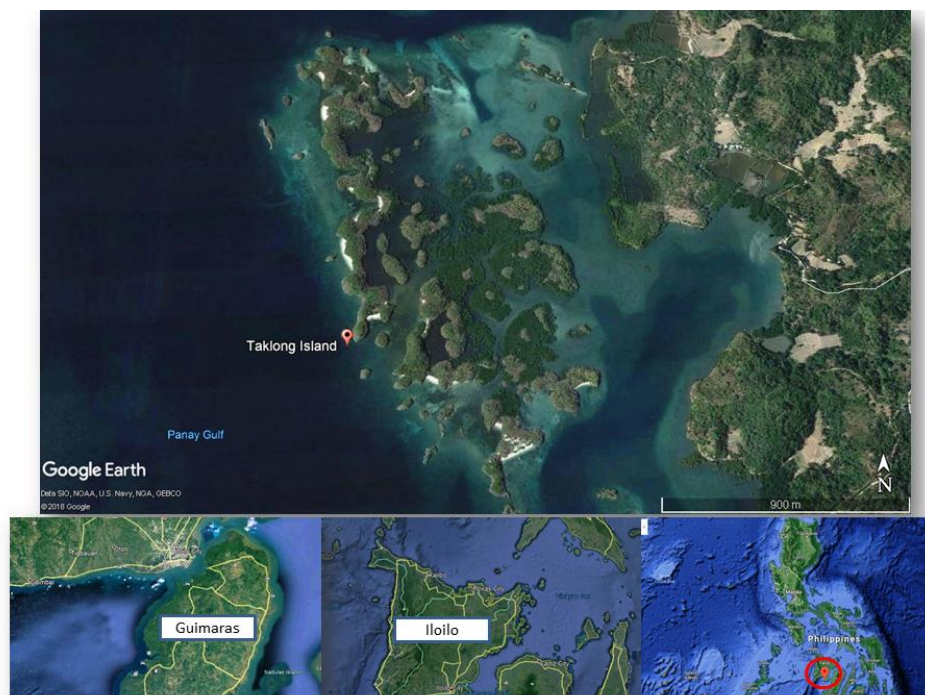


Figure 1. Taklong Island National Marine Reserve (TINMAR)

According to Alcalá et al. (2008), TINMAR is comprised of coral reef (fringing) mangroves, sea grass, algal bed and deep water habitats. However, it failed to meet the criteria of a “National Marine Reserve” due to illegal activities such as blast fishing, and construction of fish corral. The lack of permanent personnel to regularly monitor and conduct patrolling could be the primary cause why illegal activities

within this reserve occurred although violators were held accountable and constructed fish corrals were pulled out.

Likewise, Sadaba and Barnuevo (2010) and Baleña (2015) indicated that TINMAR was affected when the motor tanker Solar 1 sank on 11 August 2006. According to Paringit and Santillan (2009), the tanker carried more than two million liters of bunker fuel, of which an estimated 200,000 liters spilled in the southern coast of Guimaras. It affected the 50-km area of TINMAR that included the marine sanctuaries, mangrove reserves, coral reefs and sea grass beds, shellfishes and other marine life. The livelihoods of the local fisher folks and a total of 13,917 households were directly affected (Lizada, 2010). Some species of mangroves in the severely impacted areas exhibited significant reduction in leaf sizes (Barnuevo and Sadaba, 2014). Baleña (2015) reported that the Guimaras oil spill of 2006 was the worst environmental accident in the Philippines. The oil spill contaminated 239 km of coastline comprising 1.8 km² of terrestrial land, 9.6 km² of brackish/marine waters of TINMAR, 15.8 km² of coral reefs, 1.0 km² of mangroves, and 0.4 km² of seaweed farms. Thus, rapid habitat assessment and rehabilitation efforts were considered (UN-OCHA, 2006 as cited in Baleña, 2015).

The purpose of this case study is to assess the mangrove rehabilitation efforts being done by the Provincial Environment and Natural Resources Office (PENRO) in partnership with the local people's organization (PO) named San Roque Coastal Environment Program Association (SARCEPA), Inc. Before the oil spill, TINMAR had natural mangrove habitats with more than 26 mangrove species, including *Avicennia alba* (Bungalon), *Rhizophora apiculata* (Bakhaw/Bakawan lalaki), *Rhizophora mucronata* (Bakhaw/Bakawan babae) and *Sonneratia alba* (Pagatpat), *Aegiceras corniculatum* (Saging-saging, tinduk-tindukan), *Lumnitzera littorea* (Tabao, culasi), *Lumnitzera racemosa* (Tabao, culasi) among others.

The assessment of mangrove rehabilitation efforts was done through focus group discussions (FGDs). The FGD was conducted last September 10, 2018 at the Floating Cottage in TINMAR and attended by nine (9) members of the San Roque Coastal Environment Program Association, Inc. and one (1) field staff from PENRO (Figure 2). It was also complemented with key informant Interview (KII) and secondary data collection.



Figure 2. Focus group discussion among members of San Roque Coastal Environment Program Association, Inc. (SARCEPA) and Provincial Environment and Natural Resources Office (PENRO) field staff

This case study report was organized based on the mangrove rehabilitation framework used in this project, namely, local site coordination, comprehensive site assessment, participatory mangrove rehabilitation planning, participatory project implementation, and participatory monitoring and evaluation. There were two mangrove rehabilitation projects implemented in TINMAR. The first one was in response to the 2006 oil spill and the other through the National Greening Program. This case study focused on these two projects.

I. Local site coordination

In the 1990s as relayed by the FGD participants, there were still vast areas of big mangrove trees that protected the local communities from waves and storms preventing soil erosion. The mangrove trees served as the breeding grounds for fish, crabs, shrimp, and other shellfishes. This allowed the local people to enjoy the productive harvest. Also, the local people were attracted to the different species of birds which made the mangrove forests their habitat.

In the 2000s, there emerged socio-economic, institutional and environmental pressures that degraded the habitats in TINMAR. Based on the FGD, some mangrove trees were planted in the wrong site, e.g. sandy area, and some were converted to swimming areas. Poverty due to lack of livelihood opportunities or lack of income sources was cited as the main reason why local people engaged in illegal cutting for fuel wood and as material for Christmas tree making. Others engaged in illegal fishing to make a living. While the DENR previously prioritized the organization of the “forest police” to enforce the laws on mangrove protection, both the Local government units (LGU) and DENR overlooked the livelihood needs of the communities. Presented in Table 1 are some of the drivers related to socio-economic, environmental, and institutional factors that led to mangrove degradation in the area.

Table 1. Drivers of mangrove degradation in Taklong Island National Marine Reserve

Factors	Drivers of mangrove degradation	Actors	Rank
Socio-economic	Poverty due to lack of income sources /lack of livelihood opportunities (Income sources – farming and fishing)	Local residents within the community	1
	Lack of awareness on the importance of mangrove	Local residents , LGUs, DENR	2
	Illegal fishing	Local residents	3
Environmental factor	Natural or climate related calamities	Typhoon events	2
	Oil spill in August 2006	Petroleum corporation	2
Institutional	Imbalance in enforcement of the law	DENR, as forest police, focus on the protection neglected the community needs	3

In addition, natural or climate-related extreme events drove an environmental disaster that caused massive mangrove degradation. The strong winds, waves, and thunderstorms across Guimaras brought about by Habagat (southwest monsoon) and strengthened by Typhoon Saomai (local name Typhoon Juan) in August 2006 caused oil spill from the sinking of the motor tanker Solar 1. An estimated 200,000 liters of bunker fuel brought damage to the marine ecosystem and mangrove trees specifically during their vegetative stage where mangroves are highly vulnerable to oil toxicity (Paringit and Santillan, 2009). In August 14, 2006 the province of Guimaras, including the municipality of Nueva Valencia where the motor tanker sunk, were declared under the state of calamity through the Sangguniang Panlalawigan Resolution No. 107 Series Of 2006 and Sangguniang Bayan Resolution No. 064 Series of 2006, respectively.

There were two (2) mangrove rehabilitation efforts done in TINMAR. The first was done in 2009-2010 and the other which is still on-going since 2011 through National Greening Program (NGP). The first rehabilitation initiated was in response to the oil spill event in 2006. The budget for rehabilitation activities were derived from the government calamity fund.

The implementation of NGP from 2011-2016 through the issuance of Executive Order (EO) No. 26 under the administration of President Benigno Simeon C. Aquino addressed the increasing incidence of poverty in the country, deforestation and forest degradation as well as adaptation and mitigation strategies to climate change impacts. Section 2 of E.O 26, indicates that the NGP shall plant 1.5 billion trees to 1.5 million hectares for the period of six (6) years from 2011-2016 and from 2017-2022. TINMAR was also covered in the implementation of EO No. 193, series of 2015 known as "Expanding the Coverage of the National Greening Program". According to Sallave (2017), under the expanded National Greening Program (eNGP), DENR implemented the Bamboo Plantation Development Project (BPDP). The project aimed to increase the adaptive capacities of human communities and natural systems; sustainably manage natural resources; and improve environmental quality for healthier and cleaner environment. Of which, Guimaras was targeted to plant bamboos in around 500 has. This project also promoted the realization of the Mangrove and Beach Forest Development Project (MBFDP) as a component program under the National Greening Program (NGP).

Prior to implementing the projects within TINMAR, local site coordination was properly done. The stakeholders within the two barangays namely, Lapaz and San Roque covered within TINMAR were informed and they were coordinated and consulted properly especially the POs as collaborators in the implementation. Barangay resolutions were submitted to the Protected Area Management Board (PAMB) indicating the strong involvement of two barangays in rehabilitation activities. Rehabilitation projects were first presented to the PAMB where the barangay captains of respective barangays and PO leaders were members. A series of consultations and meetings with the POs were also conducted.

Partnerships with local people in the implementation of DENR-NGP were built as they are considered fundamental in the sustainability of the project. The NGP was well-explained to the stakeholders prior to project implementation. The peoples' organization namely, SARCEPA and Lapaz Fisherfolk Aquatic Resources Mangrove Management Association, Inc. (LAFARMA) were tapped as the direct collaborators of NGP.

In summary, there was a proper local site coordination and collaboration among the stakeholders (POs, LGUs, PAMB, DOT region, BFAR provincial level and Provincial Planning Development Council and Academe institution) regarding mangrove rehabilitation within Taklong Island National Marine Reserve.

II. Comprehensive Site Assessment

In the rehabilitation initiatives in 2009-2010 due to the oil spill, rapid assessment was only initiated by the technical staff of PENRO Guimaras, but hydrology patterns, slope and topography /factors existing in the area were not considered. On-the-spot planting was done utilizing *Rhizophora* and *Avicennia* as the frontline species in areas damaged directly by oil spill. The planting materials were sourced from outside of the reserve.

Under the 2011 NGP, prior to mangrove rehabilitation under the said program, site assessment, area survey and validation were done by the Ecosystems Research and Development Bureau (ERDB-DENR) regional office. The University of the Philippines Visayas was tapped to do the socioeconomic and demographic survey. Area survey was done by DENR following the distance of 1x1 meter spacing. The planting materials were grown within the site. On the average, the survival rate was only 30% using direct planting, which is less laborious. The members of SARCEPA and LAFARMA were directly involved in the NGP implementation from nursery management and planting as well as mangrove monitoring and evaluation of project but not in site assessment.

Sense of ownership is an essential factor for the success of NGP implementation. It brings many significant benefits for both the members of the community and for the project to attain excellence. During the FGD, the participants were asked to give their personal ratings in terms of sense of ownership about the project. All of the participants from SARCEPA gave a rating of 10, which meant that PO members (i.e. SARCEPA) have very high sense of ownership on the mangrove rehabilitation project and that they perform duties and responsibilities as part of their lifestyle. The sense of volunteerism efforts was also practiced among PO members during the project implementation especially in welcoming the visitors, hauling of seedlings to the site and even in monitoring since no budget was allocated.

III. Participatory Mangrove Rehabilitation Planning

The input of the local community stakeholders and residents in the planning process is vital in the success of the project. Involvement of local stakeholders in envisioning the desired future of the community will inspire them to work collectively towards attainment of the goals and objectives. In 2009, the goal was to rehabilitate the areas damaged by the MT Solar 1 oil spill event in 2006. The DENR led the mangrove rehabilitation in TINMAR in collaboration with other local stakeholders. Partnerships continued upon the implementation of the NGP that do not only aim to reforest but also envisioned the provision of livelihood opportunities to communities, including the establishment of an ecotourism site and the protection of nursery grounds of marine flora and fauna.

During the NGP, the DENR in partnership with line agencies initiated the mangrove rehabilitation planning since the area is a marine protected area. Land use survey, mapping and zoning were done by the National Mapping and Resource Information Authority (NAMRIA), the central mapping agency of the government. The plans for mangrove rehabilitation under NGP were presented to PAMB and table mapping was conducted as well as ground validation followed by the presentation of plans to the communities. The POs within TINMAR were not directly involved in the planning process but they were involved in the project implementation. During site selection and setting of targets, community members were informed and consulted through a series of FGDs and consultations.

The budget for mangrove rehabilitation implementation was also laid down directly to the POs. During the FGD, participants relayed that under NGP, the allocated budget was P7,500 per hectare where both POs (SARCEPA and LAFARMA) served as collaborators. Then, under the program “individual plus trees” (IPT) in 2016, an amount P50,000 was allocated for every PO per year. An enhanced NGP has been implemented since 2017 under the Sustainable Integrated Area Development (SIAD) Project, a DENR foreign-assisted/special project. Private corporations (Globe and Smart) also initiated rehabilitation efforts in the area.

IV. Participatory Project Implementation

During the implementation of mangrove rehabilitation in TINMAR under NGP, a memorandum of agreement (MOA) was made between DENR and the POs represented by the chair and the board (SARCEPA and LAFARMA). The agreement served as the legal document in describing the collaborator’s relationship and terms of reference. Deliverables between two parties were clearly indicated ensuring the commitment in the partnership towards sustainable rehabilitation. There was also a MOA made between the two (2) Barangay local government units (San Roque and Lapaz) for the calamity fund with the purpose of mangrove rehabilitation in 2009. Barangay resolutions were also submitted to PAMB for the implementation of mangrove rehabilitation.

Both SARCEPA and LAFARMA were reorganized as a People’s Organization in 2011 during the onset of NGP implementation through the Mangrove and Beach Forest Development Project (MBFDP) as a component program under the National Greening Program (NGP). The roles of POs in mangrove rehabilitation were seedling production and management of the nursery, planting, bagging of seedlings and maintenance and monitoring as well as welcoming visitors in the floating cottage. The DENR-PENRO of Guimaras functions to oversee the activities of the PO.

Aside from the POs, academic institutions including UP Visayas, and elementary and secondary schools within the Province were also tapped in the rehabilitation projects. Likewise, non-government organizations (NGOs), such as the GIZ, private sectors like Globe and Smart Telecom and the Philippine Insurance Cooperative as well as government-owned and controlled corporations served as partners in TINMAR mangrove rehabilitation. They were involved in planting, others were conducting research activities like UP Visayas, and few also provide funding in partnership to POs.

There were a total of 80.41 has planted by SARCEPA and LAFARMA within *TINMAR* from 2011-2017 (Table 2). There were 63.36 has of planted mangroves in Barangay San Roque, while 17.05 has were planted in Barangay Lapaz. Both Bakauan (*Rhizophora spp.*) and Bamboo were planted in TINMAR. Bamboo was utilized in the Mangrove and Beach Forest Development Project (MBFDP) as a component program under the National Greening Program (NGP). This was to strengthen the value and production of bamboo through its Bamboo Plantation Development Project (BPDP) since bamboo has unique commercial value, while contributing to climate change mitigation and adaptation (Sallave, 2017).

Table 2. NGP accomplishments by San Roque Coastal Environment Program Association, Inc. (SARCEPA) and Lapaz Fisherfolk Aquatic Resources Mangrove Management Association, Inc. (LAFARMA) in 2011-2017

Year	Barangay	Area (Has)	Species
2011	San Roque	10	Bakauan
2012	San Roque	10	Bakauan
2012	Lapaz	10	Bakauan
2013	San Roque	5	Bakauan Babae (indigenous spp.)
2013	Lapaz	5	Bakauan Babae (indigenous spp.)
2017	San Roque	38.36	Bamboo
2017	Lapaz	2.05	spp. Used not indicated
Total		80.41	

Source: DENR-NGP, 2018

<http://ngp.denr.gov.ph/index.php/11-hidden-articles/35-accomplishment-by-site>

During the implementation stage, the members of SARCEPA and LAFARMA were not only directly involved in the process but at the same time benefited from the rehabilitation projects. The rehabilitation projects gave the PO members an opportunity to conduct meetings for updating and regular sharing of information. Participants of the FGD also mentioned that their social capital and network increased as they build good rapport among members of the people organization and external organizations from both the government and civil society. They specially enjoyed the camaraderie within the association.

Members of PO enhance their skills in the attainment of goals and objectives of NGP. Several capacity development activities were provided and supported by DENR and LGUs to both POs. These capacity trainings increased their awareness on the importance of the mangrove ecosystem. As they relayed, "One leaf is equivalent to one fish." Technical trainings were also conducted such as hands-on training on GPS reading, tagging, bagging, planting, and identification of seeds as well nursery management, and mangrove pest diseases prevention and control. They learned that planting of mangroves should be done in areas where there is mud and not in those with sea grasses and sand. They were taught on what were the suitable species for a specific area and identification of species type. Moreover, DENR has a communication plan within TINMAR which aimed to raise awareness on the importance of the protected area (PEMSEA and Provincial Government of Guimaras, Philippines, 2018). According to the FGD, the NGP implementation increased the level of people's awareness in terms of the importance of mangroves in terms of its economic and ecological values. These activities helped develop their knowledge and skills.

Majority of the participants appreciated the importance of protecting their own environment. Social-organizational trainings included leadership trainings, organizational strengthening, personal development, bookkeeping and assessment of earnings. They were also provided with alternative livelihood opportunities including souvenir-making, seaweed farming, oyster culture, and sardines processing. The identified capacity building activities were ranked by the participants according to their level of contribution to the success of project implementation (Table 4).

Table 4. Capacity building activities and their perceived contribution to project implementation

Capacity building activity	Description	Frequency	Ranking*
PO formation	Both SARCEPA and LAFARMA were organized under NGP Opportunity for meeting and gathering	2	1
Leadership training	There 3 members trained on leadership	2	2
Livelihood training	Catering, souvenirs making, seaweeds/oyster making, hat and bags making, sardines processing through Gina Lopez and cucumber salad/jam processing	It depends on the needs	4
Team building	Team building was initiated by PO (food) with assistance from DENR	1	6
Study site visit	POs visited Aklan – Kalibo/Boracay for study visit attended by 8 members from SARCEPA and funding came from DENR	1	4
Hands-on training on mangrove ecology assessment	The POs learned to do GPS reading, tagging, bagging, site guide, planting, identification of seeds, mangrove pest control	5	4
Nursery management	Sticking, fencing, labeling, species identification and everyday planting	Everyday	5
Mangrove Assessment	POs can identify which trees/mother plant are healthy or can determined best mangrove source of seedlings	As needed	3
Site monitoring	When to plant, areas to be planted (muddy)	Once a week	3
Orient students	PO gave orientation to school		

* by level of contribution to project implementation

Aside from being capacitated, FGD participants also enumerated the direct benefits from the NGP project they gained as members of the PO. All of the participants in the FGD mentioned that they earned an income or received wages ranging from PhP 200-800 per day for being directly involved in cleaning, preparation, planting and monitoring, and even in welcoming visitors. As a result, they were able to send their children to school. Parents were also able to educate their children regarding environmental protection and its importance.

In 2015, the floating cottage was established, thus, PO members learned to welcome or entertain guests and tourists. Based on the report of PEMSEA and the Provincial Government of Guimaras, Philippines (2018), the floating cottage in Taklong Island is one of the biodiversity – friendly enterprises provided by DENR-PENRO in Nueva Valencia, Guimaras. One participant also mentioned that she gained additional income when visitors came in and requested her to do massage work. By being a member of a certain people’s organization (i.e. SARCEPA), each member was tasked to do duty work in the floating cottage at least once a week in order to welcome guests and visitors.

Participatory mangrove rehabilitation was indeed beneficial not only to the ecosystem but also to local residents in the area providing livelihood opportunities. When the members of SARCEPA were asked to identify and rank the stakeholders in terms of importance and influence in the success of mangrove rehabilitation, among the identified stakeholders with high influence and high importance were DENR-PENRO, PAMB, MLGU/BLGU, PO - SARCEPA, PO-LAFARMA, UPV, GIZ and a Japanese NGO. The Bureau

of Fisheries and Aquatic Resources (BFAR) was also placed under high importance but of less influence since the area is under the jurisdiction of DENR (Figure 5).

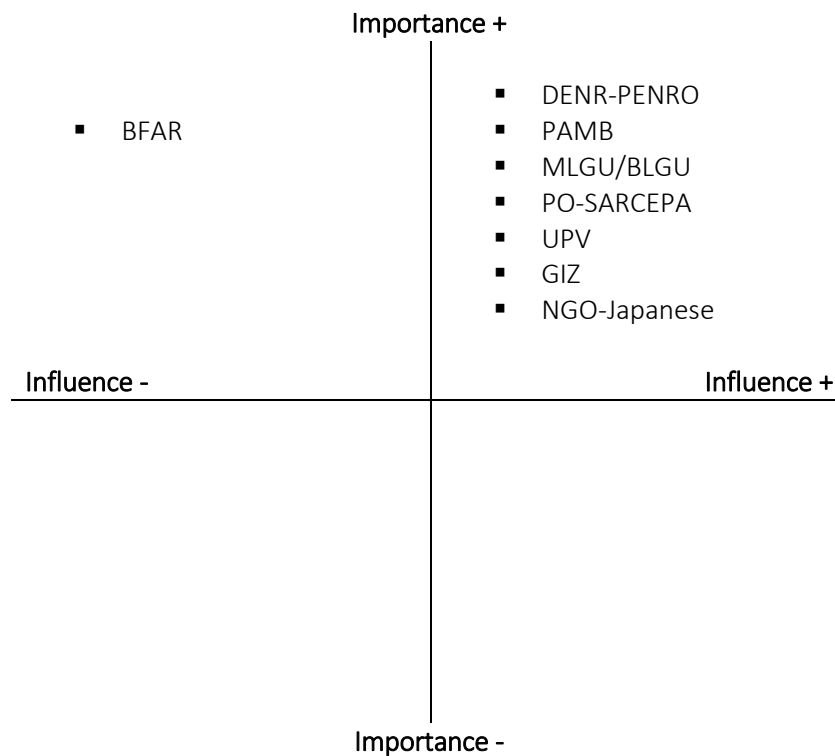


Figure 5. Importance-influence matrix in the implementation of the mangrove rehabilitation project in TINMAR.

V. Participatory Monitoring and Evaluation

Both POs in TINMAR were trained on how to assess the health of mangroves planted under the NGP project, thus, they also participated in monitoring. They replaced dead seedlings since payments were done based on the seedling survival in the area. There was a quarterly monitoring of mangroves planted done by parties including PAMB, DENR-PENRO and POs. The monitoring plan served as a basis in evaluating if the target and activities were achieved.

The six-year NGP implementation in TINMAR was considered successful as perceived by members of SARCEPA. Strong collaboration among stakeholders was one of the essential factors in the success of the project. In addition, the information and education campaign (IEC) on the importance of mangrove ecosystems complemented the capacity trainings that the community received. Moreover, constant meetings between the DENR personnel and POs also served as an opportunity of replanting. Accordingly, the NGP rehabilitation efforts within TINMAR, not only increased the vegetation cover but also addressed the needs of local communities. The communities were given utmost importance by being involved and increasing their livelihood opportunities. In 2017, the communities were able to meet their targets of rehabilitating around 38 has of the area of TINMAR.

Lessons and Challenges

In 2017, TINMAR won the Para El Mar's most outstanding National Integrated Protected Area System (NIPAS) Marine Protected Area (MPA) Award for having the best practices in MPA management in the Philippines. The award also recognized the outstanding local efforts in conserving and sustainably managing the country's coastal and marine resources. However, there are still a number of issues and challenges that TINMAR experienced. The following are the issues and challenges encountered during the implementation of mangrove rehabilitation TINMAR as relayed through FGD and KII:

- Funding and incentives were critical in the implementation of rehabilitation efforts. There were cases that some members of POs backed out due to delays in the processing of funds and payments.
- Timing of planting was being affected by trade winds from Amihan (northeast monsoon) and intense rainfall from Habagat (southwest monsoon). There were events when planting and other activities for mangrove rehabilitation were halted.
- There are private resorts near TINMAR. Lack of a marine reserve buffer allowed people to stay overnight in shores within the buffer of the protected area. This issue had been addressed by sending letters directly to the private resort owners.
- Solid waste was also another concern within the protected areas. Some visitors left their wastes at sites they visited inside the marine reserve.
- There were conflicts between the community members and the *bantay dagat* (sea guards). Many community members were angry with the bantay dagat due to the implementation of non-inclusive policies for the strict protection of TINMAR.

From the point of view of POs, strong commitment, cooperation among members and good leadership of officers are the key factors to the success of the rehabilitation efforts. The practice of *bayanihan* or volunteerism is also an ingredient for meaningful mangrove rehabilitation. Having a system of regular monitoring and meetings is the best way of updating and evaluating whether the targets and goals are achieved. Moreover, strong support from the local government units and government personnel, such as the DENR field staff, sustain collective efforts. Lastly, addressing the local needs through livelihood support and awareness raising builds a sense of ownership, which motivate stakeholders to work towards sustainable mangrove rehabilitation.

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