



# State of the Mangroves in BANI, PANGASINAN



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## I. INTRODUCTION

Bani is a second class municipality found in the westernmost part of Pangasinan province. It has two bodies of municipal waters: Tambac Bay with 8.56 km shoreline, which is part of Lingayen Gulf in the east, and Olanen Bay with 4.87 km coastline, which faces the West Philippine Sea. Two barangays (namely Aporao and San Miguel) face Tambac Bay while four barangays (namely Colayo, Centro Toma, Dacap Sur and San Simon) face the West Philippine Sea. The six coastal barangays have a total area of 6,294 ha with a population of 10,868 or 23% of Bani's total population of 46,225.

The primary sources of income at the Tambac Bay side are aquaculture, salt making, farming and fishing. Fishing, charcoal making and farming are the primary sources of income in Olanen Bay. Some of the social problems experienced by the coastal communities are the limited fishing area due to municipal boundary disputes; lax implementation of fishery, coastal and forestry laws and ordinances, cutting of trees for charcoal making, and construction of illegal structure along rivers and shorelines; erosion, siltation and sedimentation combined with water pollution causing shallowing and eutrophication of rivers; and natural hazards such as flooding of riverine barangays (Tambac Bay side) and tsunami-prone areas at Olanen Bay.

### *Importance of Mangroves*

The mangrove ecosystem in Bani has a prominent role in litter and detritus production, which provides a food source to a variety of juveniles of fishes, prawns, crabs and shellfish as well as serve as the nursery and habitat of 123 bird species. Mangrove roots shelter fishes, prawns, crabs and shellfish, which all serve as human food sources of protein and calcium. Mangroves play a very important

role in protecting the coastal shorelines predominantly composed of fishponds (Tambac Bay side) and forests (Olanen Bay side).

Plenty of mangroves died when the MPA was hit by Typhoon Emong in 2009. As silviculture practice and with the LGU's permission, dead mangroves were cut and made into charcoal, serving as an additional source of income of Bangrin Federation members. Riverside residents trim mangroves during riverine cleanup to use them for fuel.

## II. STATUS OF MANGROVES

Based on the data from the Provincial Government of Pangasinan, Bani currently has 66.91 ha of mangroves with 22.03 ha of potential planting area. The breakdown for old stands, secondary growth and new plantations was not provided (**Table 15**).

### *Degradation of the Mangrove Forests*

Originally, more or less 2,000 ha of old stands and natural growing mangroves were abundant in the alienable and disposable as well as private lands located in barangays San Miguel, Aporao, Luac, Garrita, Banog Norte, Ambabaay, Poblacion, Masidem and Tugui Grande. Degradation took place when all mangrove forest areas were converted into

**Table 15:** State of mangroves in Bani, Pangasinan (in hectares)

Old Stand	Secondary Growth	Plantation
no data	66.91	no data





fishponds and salt farms without leaving the 20-m salvage zone as buffer, as provided in the terms and conditions of the Fishpond Lease Agreement (FLA).

In the 1970s to 1990s, more than 374 ha were applied for by rich Bulakeños and Nueva Ecijanans and were awarded wide areas for fishpond development under a 25-year FLA tenurial instrument renewable for another 25 years to the Department of Environment and Natural Resources (DENR) and the Department of Agriculture-Bureau of Fisheries and Aquatic Resources (DA-BFAR). Sixty-two leaseholders, few of them Bani residents, operate aquaculture ponds predominantly containing bangus. Salt intrusion affected rice lands found nearby and were also converted into fishponds. Prawns, sea basses, siganids and crabs are minor aquaculture commodities. Some aquaculturists who were affected by typhoons, flash floods and fish kills converted their fishponds into salt farms because of the lower cost of capital. Degradation of mangroves in the municipality resulted in the decline of fish catch due to limited fish nursery areas; polluted river water due to wastes, toilets and piggeries coming from an increasing riverside population; erosion due to few vegetation that helps prevent siltation; and weakened coastal/riverine protection from storm surge.

#### *Threats to Mangrove Forests*

Like other mangroves in other parts of the Philippines, Bani coasts face threats such as high salinity. Being a brackish water dweller, mangroves incur mortality during the dry season. Irrigation dams and small water impounding projects reduce the amount of freshwater flowing to the river systems, thus salinity reaches as high as 50 ppt.

Erosion from upland areas due to deforestation pushes down sediments, leading to the shallowing of rivers and overcoming the filtration ability of mangroves resulting to their drying out and suffocation.

Overfishing affects the ecological balance of food chains in the river and estuary. Herbivorous fish populations cannot consume all the algae scattered all over the shoreline. *Lumut* topples the newly planted mangroves and shells cling to their stems, killing the plants.

Strong water movements and waves, typhoons, and floods are also threats to the new plantation. Moreover, sea level rise brought about by climate change can kill mangroves, especially newly planted *Avicennia* and *Rhizophora* species. These species die during the month of July to August when water fluctuation and ebb tide are high, thereby drowning the plantation.

### III. MANGROVE PROTECTION AND MANAGEMENT

The local people of Bani, aware of the consequences of the massive destruction of their coastal and riverine ecosystem, decided to save and rehabilitate the remaining mangroves. In 1990, the DENR Integrated Mangrove Rehabilitation Project was started through a 3-year community and family contract between the Bani LGU and DENR. DENR allocated PHP 522,000 in funds and LGU-Bani, represented by the late Mayor Marcelo C. Navarro, Sr., and Punong Barangay Pedro Camba, along with the community pioneered the mangrove reforestation project by planting 100,000 propagules.

The idea of establishing a Marine Protected Area started with consultation with the fisherfolk of Brgy. San Miguel by BFAR and LGU-Bani (20 October 2000), in line with the celebration of Fish Conservation Week. A petition was made and signed by the fisherfolks with the assistance of the Barangay FARMC, proposing for the MPA establishment. It was then supported by a resolution passed by the San Miguel Barangay Council on the same day. The occasion also paved the way for hearing the community's voice on suggested management strategies, allowable activities at the sanctuary and fishery reserve, violations and penalties. The resolution and petition were forwarded to the Sangguniang Bayan for legislation.

Mayor Gabriel E. Navarro issued Executive Order 05 Series 2000 that created the Multi-sectoral Technical Working Group on Marine Protected Area I Management Planning. The MPA I Management Plan was passed to the Sangguniang Bayan by the Technical Working Group to support the resolution and petition. The Sangguniang Bayan enacted Ordinance No. 01 declaring Bangrin Mangrove Marine Protected Area on 8 October 2001. It has a total area of 42 ha and is co-managed by Bangrin Federation (Aporao Fisherfolks Association Inc. and Nagkakaisang San Miguel Association Inc.) and the Local Government of Bani.

Since its establishment, the NGAs, NGOs and foreign funding institutions have been partners in coastal and riverine reforestation with LGU-Bani: BFAR-Fishery Resources Management Program (2000–2005), DENR-RO I, UP-MERF Sagip Lingayen Gulf Project (2003–2007) and NEDA-KR2 Project (2008-2010), Provincial Government of Pangasinan, PMA Class '72, Hundred Islands Rotary Club, US Peace Corps-Volunteer's Environmental Grant, and the DENR-BFAR's Tanim Kalikasan National Greening Program.

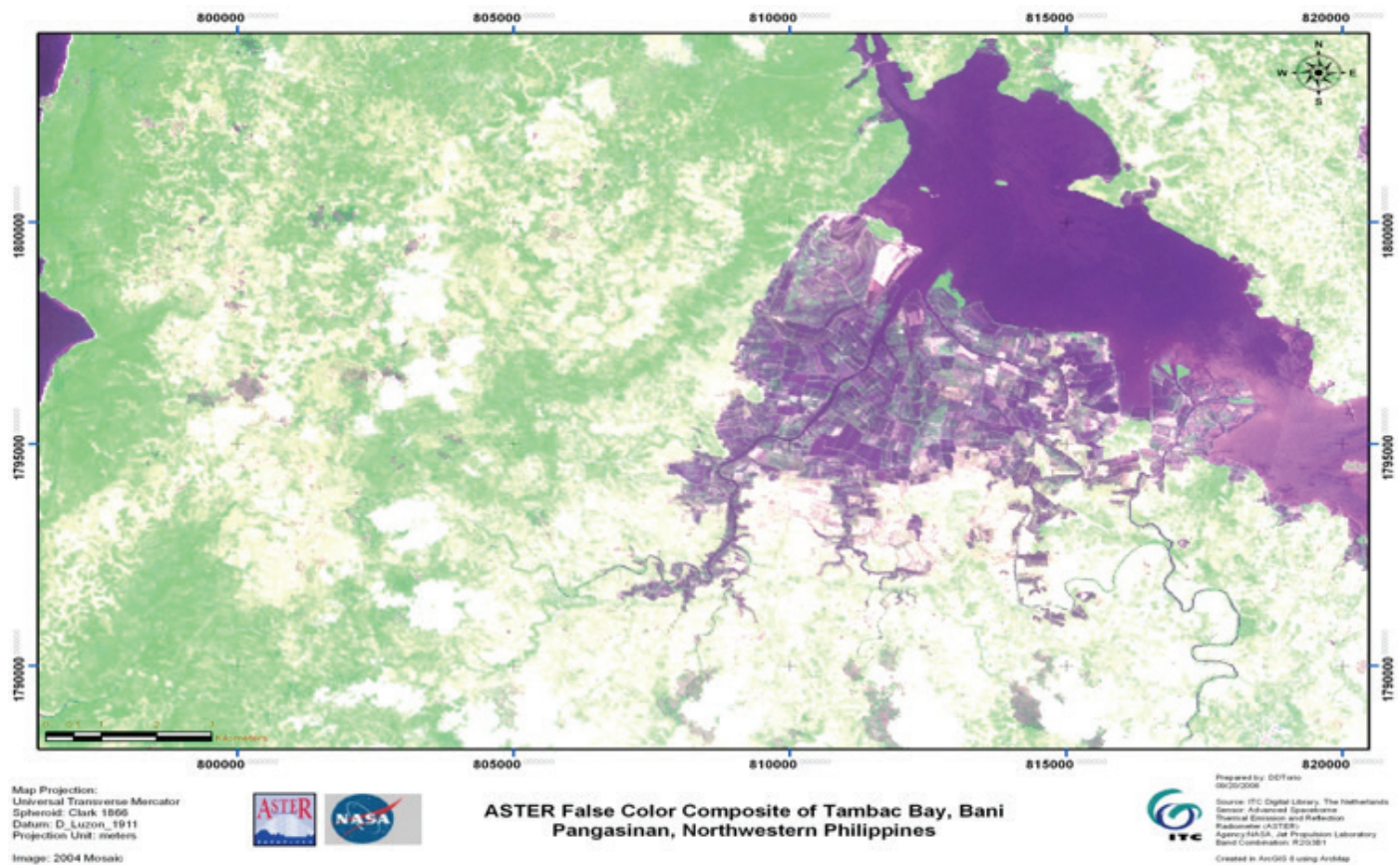


Figure 8: Map of rehabilitated mangrove areas in Bani, Pangasinan.

From this period up to the present, Bangrin Federation and fisherfolk organizations joined hands with the local government unit for sustainable management. Municipal Fishery Ordinance No. 02 was enacted by the *Sangguniang Bayan* on 25 October 2004 and embodied in this ordinance in Section 41 (management of mangrove along riverbanks), Section 42 (management of mangroves), and Section 43 (immediate restoration of mangroves). At present, the planted mangrove species are composed mainly of *Rhizophora mucronata* and a few *Rhizophora apiculata*, *Avicennia marina* and *Sonneratia alba*. Figure 8 shows the map of rehabilitated areas.

#### Mangrove Rehabilitation

With the inspiring award won by Bani in 1995 for its mangrove reforestation efforts and as the country's Best Community-Based Coastal Development Project, the succeeding mayors, Ireneo Orlino, Gabriel Navarro, Marcelo Navarro, Jr., and Gwen Palafox-Yamamoto, and the Banians continued to support coastal and riverine mangrove reforestation, as embodied in the different Coastal Resource Management Plans from years 2000–2002, 2003–2005, 2005–2009, 2010–2012, and in the

Integrated Management Plan for 2013–2017. For them, reforestation is one of the best ways to reduce vulnerability and risk brought about by climate change. *Rhizophora mucronata* is the dominant species planted. *Avicennia marina* and *Sonneratia alba* were rarely planted due to its high mortality from nursery to outplanting. A total of 37.05 ha in coastal and 32.41 ha in riverine areas had been reforested, maintained and protected in the last ten years. Appendix F provides a summary of the mangrove reforestation activities in the municipality.

#### Monitoring and Evaluation

Monitoring of new plantations includes survival and growth rates. Since the first to the last mangrove monitoring, survival ranged from 34% to 64%. High mortality is attributed to the toppling of the plantation by *lumut* and heavy infestation of barnacles at the stems. The assessment of mangrove forests is done once a year. The average tree density is 1,400 per ha. Typhoon Emong, in 7 May 2009, caused the dilapidation and eventual death of many mangrove trees. It was also during monitoring that damage/defoliation of leaves by insects were observed.





### Impacts of Mangrove Rehabilitation

After 14 years of mangrove reforestation, increase of daily fish catch was noticed from 2.0 kg in 1995, to 3.25 kg in 2000, to 6.68 kg in 2007. The 23.05 ha mangrove plantation at Bangrin MPA served as nursery ground for fishes, crustaceans and shellfish feeding on its thick litters and detritus. It serves as sanctuary and breeding ground of shore birds during the cold months, from December to February. The man-made mangrove forest was declared as the 13<sup>th</sup> Bird Watching Site of the Philippines in 2008 by Recreation Outdoor Exchange and Wild Bird Club of the Philippines and was also a DENR-accredited tourism facility in 2009. In 3 March 2014, it was strongly endorsed by the Sangguniang Bayan of Bani as an important flyway network site of migratory birds for the Philippines, which is identified as among the countries located along the migration route of the East Asian-Australasian Flyway—hence, a partner country to the international partnership on the conservation and protection of migratory birds.

The thick forest serves as buffer, weakening gusty winds and water surge in times of typhoons. It protects coral reefs by absorbing sediments from erosion and organic nutrients from solid wastes flowing down from the river system. Mangrove seedling production and reforestation served as livelihood for Bani fisherfolks.

### IV. SUMMARY AND RECOMMENDATIONS

All these mangrove rehabilitation, management and protection efforts in the Bangrin Marine Protected area garnered the following awards: Tambuyog Award was won by Bangrin Federation as *Model Barangay Fisherfolk Organization for MPA Management* in 2009 by the Pangasinan Provincial Government Unit; *Accredited Ecotour Facility* in 2009 by the Department of Tourism (DOT); *2009 Philippine Wetlands Conservations Award Special Citation* by the Protected Areas and Wildlife Bureau DENR-Quezon City; and *2nd Place for the Most Outstanding MPA Award in Para El MAR* 2011.

LGU-Bani, Municipal FARMC, Bangrin Federation and the POs envisioned that Bangrin Marine Protected Area would become a well-maintained ecotourism area in the country,

attracting visitors and offering quality facilities and services. A concrete road going to Pataga Fish Port in barangay Aporao (a jump-off point to the MPA) was built in 2013. To mark its boundary and to prevent poaching, a concrete boardwalk will be constructed from funds to be provided by DENR-Sustainable Coral Reef Ecosystem Management Project and DOT; a view deck and the rehabilitation of guard house to be funded by DOT; skills training for appreciation, utilization and marketing. DENR-Regional Office I is now extending technical assistance to the LGU in updating and formulating a Wetland Management Plan for Bangrin. The FARMC IEC Committee plans to conduct periodic IEC/advocacy campaigns on coastal habitat protection and resource management to maintain its sanctuary and fishery reserve. Livelihood projects for Bangrin Federation such as the bottling of fish and deboning of bangus, are being processed for funding by DENR-SCREMP. A proposed amendment of Municipal Fishery Ordinance and strict enforcement of national and local laws is lobbying for its reactivation. The municipality needs to adopt and implement the best practices in coastal management for mangroves.

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