

State of the Mangroves in **BATANGAS**

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I. INTRODUCTION

The province of Batangas is located along the southwestern edge of Luzon. It is part of the Southern Tagalog Region (Region 4A) and is bordered by the provinces of Cavite in the north, and Laguna and Quezon in the east. The province has a land area of approximately 316,581 ha and consists of 31 municipalities and three cities. There are three major bays in the province, namely Batangas Bay, Balayan and adjacent bays, and Tayabas and adjacent bays.

Batangas Bay forms a semi-enclosed body of water, with an average depth of about 60 meters and a total area of about 220 ha. The Batangas Bay Region (BBR), has a total land area of 146,100 ha and a coastline of 92 km. Within this region lies 14 coastal and inland cities and municipalities. The BBR is bordered by the coasts of Batangas City, San Pascual, and parts of Lobo, Tingloy, Mabini, and Bauan. The inland towns include Lipa City, San Jose, Ibaan, Cuenca, Alitagtag, Padre Garcia, Rosario, and Taysan.

Balayan Bay is comprised of 12 municipalities with a total land area of 108,900 ha, and a coastline of around 300 km. It is bordered by the coasts of Nasugbu, Lian, Calatagan, Calaca, Balayan, Lemery, Taal, and San Luis, and parts of Tingloy, Bauan, Mabini and Tuy. Taal Lake is the major freshwater body in the province, which flows out into the Balayan Bay via Pansipit River.

Tayabas and Adjacent Bays (TAB) are shared by the provinces of Batangas and Quezon. Sigayan Bay and Coloconto Bay are minor enclaves within Tayabas Bay. The Tayabas and Adjacent Bays Region (TABR), comprises the coastal municipalities of San Juan and parts of Lobo and

the inland municipalities of Rosario and Padre Garcia and the City of Lipa. The total land area of TABR is 95,865 ha, while its coastline is around 100 km (SEMP, 2005–2020).

Batangas Province has 152 coastal barangays with a total shoreline length of 492 km and a coastal area of 350,891 ha. As of 2015, there are 2,540,618 people living in Batangas. Of which, 366,850 are living in the coastal areas. The province has a population growth rate of 2.24%.

The primary sources of income of coastal communities are fishing and agriculture. Some are employed by industrial locators. Mangrove products like fish, prawns, crabs, and shellfish also provide livelihood to coastal residents in the western (Nasugbu, Calatagan and Lian) and eastern (Lobo and San Juan) parts of Batangas. Socio-economic problems in the coastal communities include poverty, underemployment (caused by underdeveloped tourism), decline of fish harvest due to overfishing from both municipal fisheries and commercial fisheries; and poor sanitation due to over population along the coastal area.

The prevalence of illegal fishing, destructive fishing and overfishing are among the major threats and problems on coastal environment that the province faces. Municipal waters have not been delineated, thus hampering enforcement of fishery laws. Other threats include habitat destruction, mangrove destruction (e.g. illegal cutting), siltation (from illegal quarrying upstream and upland deforestation), pollution (from inefficient drainage and sewage system and improper waste disposal); and unregulated human settlement (e.g. prevalent squatting on critical areas and danger zones).

Mangroves provide numerous tangible and intangible benefits, and are of prime importance in view of their productive, protective, and tourism values. Mangrove ecosystems are important in Batangas because it is a source of food and products for selling such as wood, fish, and clams. Ecologically, these ecosystems serve as a nursery ground for small fish and marine life. Mangrove structures also protect the shoreline from erosion and may buffer the effects of wind and waves (perhaps even extreme events such as typhoons and tsunami) on coastal areas. Lush mangrove forest areas also serve as tourist destinations.

Although clearing of mangrove forests for shrimp farming creates short-term profits for a few businessmen and farmers, the net benefits are not economically viable and are even disadvantageous for the entire community considering the consequences of mangrove destruction and ensuing water pollution.

II. STATUS OF MANGROVES IN BATANGAS

As of 2010, Batangas has an estimated total mangrove area of 610.94 ha. Around 517.27 hectares are old stands while 93.67 ha have been planted during the last ten years (Table 12).

Fig. 12 shows a map of the province indicating mangrove forest areas. The municipalities of Tingloy, Taal, San Luis, Lemery, and Lobo have 2.03 ha, 1.50 ha, 2.77 ha, 47.00 ha and 76.09 ha of mangroves, respectively. On the other hand, the municipalities of Lian, Nasugbu, San Juan and Calatagan have mangrove areas of 108.92 ha, 256.54 ha, 276.97 ha, and 506.76 ha, respectively.

Batangas has 12 mangrove species and 8 associate species. Mangrove species include *Avicennia alba*, *Avicennia marina*, *Avicennia officinalis*, *Bruguiera gymnorhiza*, *Bruguiera sexangula*, *Ceriops decandra*, *Ceriops tagal*, *Excoecaria agallocha*, *Rhizophora apiculata*, *Rhizophora mucronata*, *Rhizophora stylosa*, and *Sonneratia alba*. Mangrove associate species include *Acacia farnesiana*, *Dolichandrone spathacea*, *Hibiscus tiliaceus*, *Ipomoea pes-caprae*, *Morinda citrifolia*, *Pongamia pinnata*, *Sesuvium portulacastrum*, and *Terminalia catappa*. (Samson 2012).

Table 12. Estimated areal extent of mangroves in Batangas (ha).

Old stand	Secondary growth	Plantation
517.27	0	93.67

The degraded forest structure of mangroves in Batangas is aggravated by the destruction of other important coastal ecosystems. Mangrove conversion to fishponds have negative impacts. The decline of mangroves due to conversion to other uses brings about a consequent decline of the following ecological functions of mangroves: nursery grounds for fishes, prawns, crabs and shellfish; production of leaf litter and detritus material; protection of shore and estuaries from storm waves and erosion; pollution sink for near shore waters; wildlife habitat; and biodiversity. The conversion of mangrove swamps into fishponds simply means a substitution of formerly highly diverse and naturally productive ecosystem into simplified and highly input dependent ponds that are economically and ecologically unstable. Fishponds are plagued with problems such as diseases, acid soil, deteriorating water quality, seepage of water through dikes, and market fluctuations resulting in low production (Alcala 1982)

Threats to Mangroves Forests

The mangroves of Batangas are faced with threats such as clearing, overharvesting, river changes, overfishing, pollution, climate change, and destruction of coral reefs. These threats are mostly anthropogenic in nature. Clearing of mangrove forests may be blamed on the development of coasts for aquaculture, residential settlements and tourist facilities, and infrastructures.

III. MANGROVE PROTECTION AND MANAGEMENT

The province of Batangas has mangrove protected areas located in Calatagan (28 ha), Lobo (44 ha), and Calatagan (496 ha). In 2009, the Carretonan-Quilitisan Mangrove Forest Conservation Area was declared by the local government as the first mangrove protected area in the VIP. Since then, other mangrove forest conservation areas have also been established in San Juan and Lobo. In 2005, the Lobo Municipal Government declared the Submarine Garden a fish sanctuary. The existing mangrove stands in Calatagan are under the management of Calatagan Mangrove Forest Conservation Park "Ang Pulo"-PALITAKAN. In Lobo, the Lobo Mangrove Conservation Area and the mangrove stands in San Juan in Barangay Baruarte, Bataan, Nagsaulay, Subukin Mangrove Protected Area are managed by Barangay Management Council as well as the Catmon Mangrove Protected Area, Imelda Mangrove Protected Area, and Pinagbayanan Mangrove Protected Area.

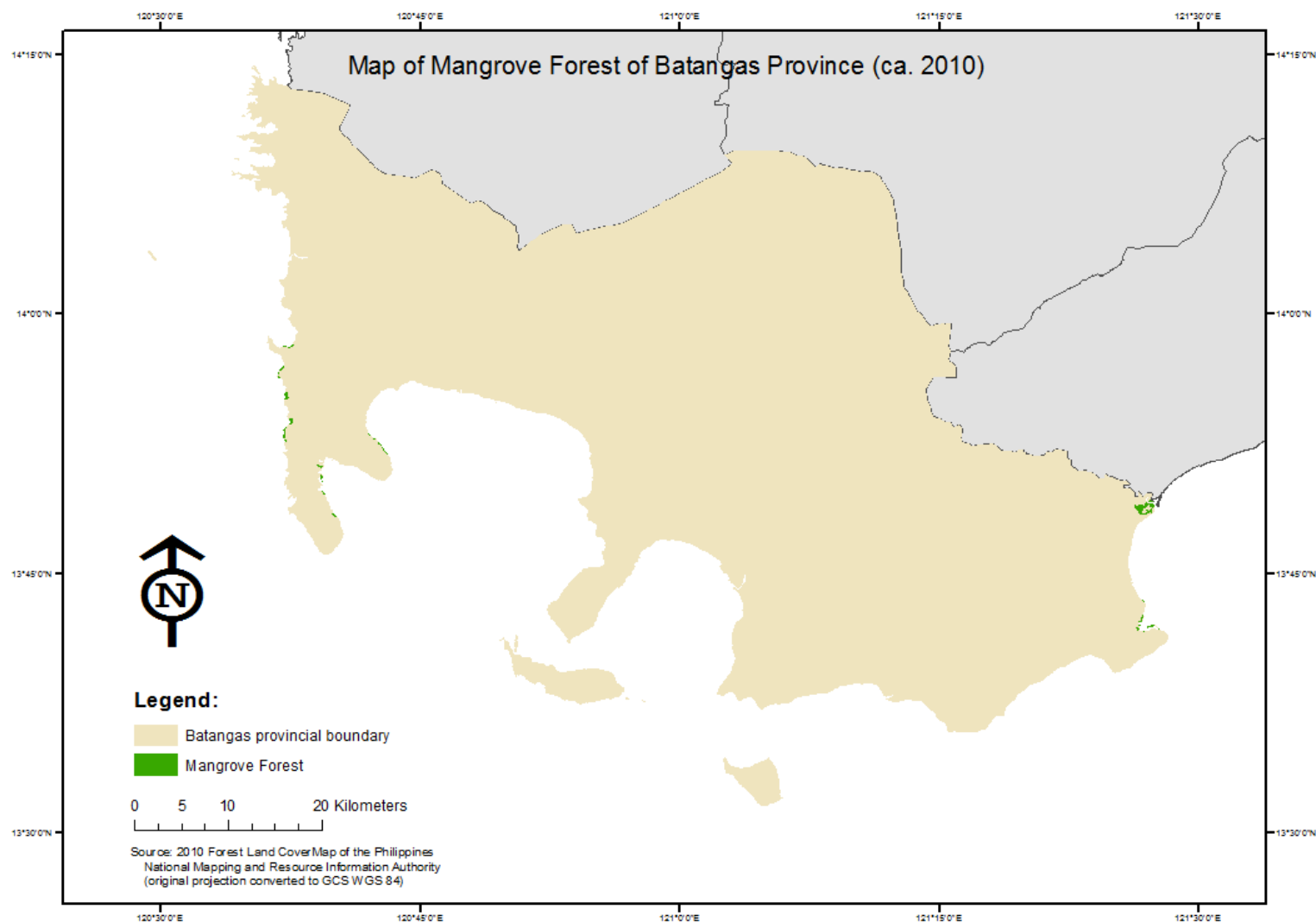


Figure 12. Mangrove map of Batangas Province

Mangrove Rehabilitation

Table 13 summarizes information on the Forest Management Projects in Batangas, which includes the implementing agencies, the budget allotted, number of hectares, survival rate of seedlings as well as the benefits and beneficiaries of the project.

Monitoring and Evaluation

Mangrove monitoring has not yet been established in the province. The groups who planted the mangroves are also the ones who monitor it. The plantation was monitored through counting. The survival of planted mangroves depends on the site. For example, in Lemery, survival ranges from 60 to 85%, while in San Luis where the site is directly facing the sea, the survival is around 10%.

Impacts of Mangrove Rehabilitation

The rehabilitation program aims to protect, restore, and manage mangroves to ensure sustainable benefits.

Its success depends on the coastal communities' understanding of the importance of mangroves.

Mangroves are slow to regrow from cutting and several species do not re-sprout at all. Once they have been cut down, they might never recover unless replanted. When a large section of mangrove forest is cut, the roots can no longer oxygenate the oxygen-deficient soil, and the large amount of bacteria in the soil begins to churn out hydrogen sulfide. This makes the soil extremely acidic. After that, the soil may not support any mangroves, even when they are replanted.

For coastal residents of the province, the conservation, management and reforestation of mangroves are needed. They are beneficial not only in providing food and livelihood, but also in protecting the surrounding environment they are in.

Table 13. Mangrove Rehabilitation Projects of Batangas

	Forest management project (mangrove rehabilitation and conservation)	Batangas province mangrove rehabilitation program
Kind of project	Rehabilitation – replanting in existing mangrove area	Planting in new areas Rehabilitation – replanting in existing mangroves areas Mangrove nursery
Duration of Project	November 2008 to present	November 2009 to present
Funding agencies/groups	Provincial Government of Batangas	Municipality of Calatagan, CI-Philippines
Implementing agencies/groups	PG ENRO MENRO	LGU (MAO) – financial and logistic assistance PO – Pro Mangrove Alliance and (implementing team), Kilitisan's Advocates of Nature (PALITAKAN, management body)
Other partner agencies/groups	NSTP, academe, different organizations - tree planting MENRO - maintenance First Gas - provision of seedlings Harbor Star CSR (San Luis)	Conservation International Philippines- financial and technical assistance
Budget allotted	Php 350,000.00/year	
Objectives of the project	<ul style="list-style-type: none"> Rehabilitate and restore the degraded mangroves in the coastal areas of Batangas . 	<ul style="list-style-type: none"> Protect, maintain and improve mangrove areas. Increase biodiversity and natural resources within the MPA. Develop the knowledge of the community on the management of ecotourism site and open opportunities for new livelihoods in field of service for tourism. Increase the level of awareness of fisherfolk on the importance of MPA in their livelihood.
Numbers of hectares planted/rehabilitated/protected	Lemery: 7.0 ha San Luis: 0.5 ha	Calatagan "Ang Pulo": 7.5 ha
Survival rate of re/planted mangroves	Lemery: 85% San Luis: 10%	
Species planted	Bakawan, Calapinay, and readily available species	
Cause of mortality of the seedlings	Typhoon and solid waste (upstream)	Typhoon and solid waste (upstream)
Was the project monitored	Yes. By job order personnel of PGB	Yes. By LGUs, POs, and NGOs
Subprograms introduced by the projects	Trainings and seminars	Formulation of business plan
How has the community benefitted from the project?	<ul style="list-style-type: none"> Thru selling of mangrove seedling to entities who conduct mangrove tree planting. Increase in crab and shrimp catch for personal consumption. 	<ul style="list-style-type: none"> Youth trained as tour guides and given allowance by the management.

IV. SUMMARY AND RECOMMENDATIONS

There is a Comprehensive Mangrove Development Plan for the Province of Batangas for 2015–2030 which was drafted by the Provincial Government of Batangas, Conservation International, the LGUs, NGAs and POs. There is a need to revisit, review or adopt this plan, and to ensure that the mangrove development and management strategies provide the following:

1. A platform of cooperation among the key players in the province;
2. Guidelines that respect the natural ecosystem of mangroves and adopted by all stakeholders; and
3. A common higher goal in which every stakeholder can contribute to and complement each other.

V. REFERENCES

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