

## **Status of Mangrove and Mangrove Management in Northwestern Luzon: Challenges, Lessons and Ways Forward**

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### **Abstract**

This study aims to assess the status of mangroves and mangrove management in northwestern Luzon as part of an initiative to institutionalize biannual national mangrove status reporting. The study covered three administrative regions with nine provinces including two invited municipalities and one autonomous region. The study collated data, originally presented during the 1<sup>st</sup> State of the Mangrove Summit in October 2014, on the status of mangrove forests, issues and threats, species listing and mangrove management practices across sites. Among the highlights from the reports are the differing data on the status of mangrove forests from the local reports with that of the spatial analyses using remote sensing and the lack of a standard and specific monitoring system across the sites. The study generated a number of lessons that are valuable for mangrove resource management. This include the following: (1) institutional networking and linkaging is necessary to ensure continuous technical support and empowerment of mangrove managers; (2) pro-active and organized community participation is a significant factor in the sustainability of mangrove management programs; (3) ecotourism holds a promising role in enhancing mangrove areas; (4) and the use of strategic and scientifically-based means to reach optimal mangrove growth. These lessons lead us to new directions from obtaining baseline data for comprehensive and effective mangrove management to its increasing value in disaster risk reduction and carbon sequestration potentials. In the end, the study desires to highlight the importance of effective mangrove management strategies in building a resilient mangrove ecosystem.

### **Introduction**

Mangrove forests provide various ecological and socio-economic services. Most basic would be the provision of habitats for marine and terrestrial creatures and as sources of food and materials for human beings. In the past years, the interests on mangrove ecosystem services have increased due to its potential role in climate change reduction and adaptation. This would include protection against storms and strong waves as well as its role as an efficient carbon sink.

Various mangrove management programs, which aim to conserve this ecosystem already exist across the Philippines. Unfortunately, these management strategies are not well consolidated, which have resulted to confusing and often inconsistent mangrove data. In

order to maximize the potential of this resource, the team organized a mangrove summit, which envisions the institutionalization of a national State of the Mangrove biannual workshop. Through this summit, a regular of updating and sharing of data by mangrove managers may enhance the mangrove conservation and management strategies in the country.

## **Materials and Methods**

The 1<sup>st</sup> mangrove summit conducted last October 2014 was focused on Northwestern Luzon. It included the provinces of Bulacan, Bataan, Zambales, Pangasinan, La Union, Ilocos Norte, Ilocos Sur and Cagayan; and the autonomous region of the Subic Bay Freeport Zone. The municipalities of Bani, Pangasinan and Masinloc, Zambales were also invited to share their best practices in mangrove management. As the pilot region for the mangrove summit, the team found northwest Luzon to have significant and unique features. The northwest Luzon coastline measures about 8,600km and is home to several key biodiversity areas and marine corridors. The area accounts for 22% of fisheries production in the Philippines most of which originate from Pangasinan and Bataan. It has a substantial number of mangroves—about 2.34% of the total mangrove status of the country. But these are highly vulnerable to against anthropogenic and natural disasters. More importantly, the region has a rich history of employing various mangrove management strategies. This may be traced as far back as the 1940s when the Hundred Islands National Park (HINP) was first declared as a protected area.

In order to get initial data on northwest Luzon mangroves, the team sent out mangrove survey forms to the Office of the Provincial Government. These survey forms included the geographical and socio-economic data of each province, as well as the mangrove status of their area and their employed management strategies. During the summit proper, provincial oral presentations were conducted. All these data were consolidated by the organizers and from here, lessons and conclusions were drawn.

## **Summary and Implications**

Table 1 below provides comparative data on the status of mangroves as reported at the local level versus remote sensing data. Higher estimates were provided by the local mangrove managers compared with the remote sensing data from Pagkalinawan (2015) and Long et al (2010) with lower estimates.

To add to this, there are also inconsistencies on the survival rate and monitoring activities of each province. The provinces claimed the following survival rates: Bulacan (0–50% survival rate) (90% survival rate based on BFAR data), La Union (100% survival), Pangasinan (53% survival in river banks, 43% survival in intertidal flats), Bani, Pangasinan (34-64% survival rate), Subic Bay Freeport Zone, and Zambales (65–100% survival rate). These reported figures seem to be inaccurate given that mangrove cover should have increased by at least 200-300 ha compared to the reported mangrove cover.

The inconsistency of data informs us that there is a need to validate the existing mangrove status. We can maximize the aid of advanced technology i.e., remote sensing and couple it with the efforts of mangrove managers on the ground. It also invites is to standardize monitoring systems across the region and perhaps, across the country to come up with more consistent figures. These may be used to further the studies on the role of mangroves in climate change vulnerability.

Table 1. Comparative data on mangrove cover per province.

Province	Pagkalinawan 2015	Long et al. 2011	As per LGU
Bataan	42	172	282
Bulacan	33	265	294
Cagayan	1,655	4,737	5,336
Ilocos Norte	1	58	38
Ilocos Sur	0	40	169
La Union	78	44	79
Pampanga	56	132	159
Pangasinan	205	207	470
Zambales	89	217	604
<b>TOTAL</b>	<b>2,159</b>	<b>5,872</b>	<b>7,431</b>

Mangrove forest decline was attributed to issues and threats categorized into the following: (1) conversion of mangrove into aquaculture or residential areas; and (2) natural hazards. Seventy-three percent of the region reported that the main cause of mangrove decline was due to anthropogenic causes. Areas such as Bulacan, Zambales and Pangasinan would be prime examples. These areas were subjected to high human migration, which resulted to development of residential and aquaculture industries. A number of provinces also identified natural hazards as one of the causes of mangrove decline. The most serious threats would include typhoon damage, erosion, land subsidence and sea level rise.

These issues and threats are aggravated by unclear and conflicting policies. Examples of this would be in terms of classifying mangrove areas as well as the question of which government agency should take precedence in managing a mangrove resource.

The study generated a number of lessons that are valuable for mangrove resource management. This include the following: (1) institutional networking and linking is necessary to ensure continuous technical support and empowerment of mangrove managers; (2) pro-active and organized community participation is a significant factor in the sustainability of mangrove management programs; (3) ecotourism holds a promising role in enhancing mangrove areas; (4) and the use of strategic and scientifically-based means to reach optimal mangrove growth. These lessons lead us to new directions from obtaining baseline data for comprehensive and effective mangrove management to its increasing value in disaster risk reduction and carbon sequestration potentials. In the end, the study desires to highlight the importance of effective mangrove management strategies in building a resilient mangrove ecosystem.

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