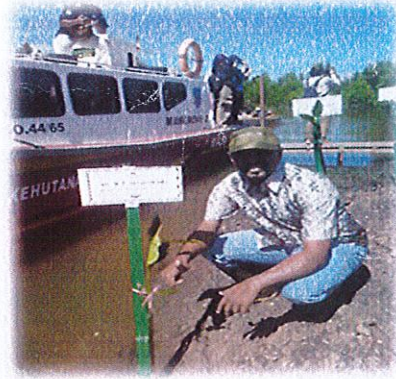


Climate Change Adaptation and Provincial Governance

Indonesian experiences on mangrove restoration & rehabilitation
measures



Study Tour Report
25.08.2025 - 30.08.2025

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1.0 Introduction

The report is aiming to describe the findings and experiences gaining from the study tour of Indonesia on the topic of "Climate Change Adaptation and Provincial Governance based on Mangroves Restoration interventions" that organized from August 25 to 30th of 2025. The tour has been conducted based on the Capital city Jakarta (state sector agencies), as well as Provincial and Rural setups of the North Kalimantan Province.

1.1 General Overview

Indonesia can be considered as a country is having with a series of Islands (more than 17,000 islands). It's weather pattern and some topographic nature is somewhat similar to the Sri Lankan context. It consists with a huge density of forest coverage. More than 23% of global Mangrove extent is belongs to the terrain of Indonesia and about 30% of land area of the country is covered by virgin forests.

Mangrove coverage is more than 3.44 million Hectares. Indonesia can be considered as a lung to the global mangrove based ecological scenario and country's Mangrove based ecosystem is a major agent to purifying the Carbon emission and can be considered as a global leader in Blue Carbon Initiatives.

The Mangrove based ecological system of Indonesia paves the way for storing Carbon up to the level of 1.016 MT Ton per Ha (Hectare) per anum. This is a wonderful destination to study about the Mangrove based Ecosystem with different Topographical Characteristics. Indonesia's Mangrove based Ecosystem service is a huge one in the global context. Approximately, it is estimated as 1-5 USD Billion per anum. It provides livelihood opportunities for a considerable amount for the grassroots level community.

2.0 Indonesia's Mangrove restoration measures

Indonesia's Mangrove restoration efforts include a 2020 goal to rehabilitate 600,000 Ha by 2024. Poor Planning of policy interventions, Low status of community engagements, are major hampers for that endeavor.

Community based ecological Mangrove restoration (EMR) and improved aquaculture practices are aiming to increase the local involvement and the resilience. World Bank and UNDP provide the support for that initiatives.

3.0 Confronted Challenges

- i. Limited availability of suitable Lands
- ii. Failures at the initiations
Failures due to the lack of ecological knowledge and poor understanding of the Coastal Lands Governance
- iii. Governance and Socio-Economic barriers
 - Land tenure disputes
 - Unclear mandates

Enacted Laws

Primary Legislation

- a). Law Number 41 of 1999 on Forestry
- b). Law number 6 of 2023 concerning job creation
- c). Government regulation number 23 of 2021 in forestry administration
- d). Government regulation number 27 of 2025 on protection and management of Mangrove Eco-systems
 - Weak Local Community incentives
 - Limited capacity building market access for women based livelihood initiatives
- iv). Site selection and Hydrology
 - Poor site selection and disrupted hydrological status
- v). Infrastructure Limitations

2.2 Current Initiations and Approaches

i). Community based Approaches

Projects and interventions are focusing on the participation of local communities in the processes of planning and implementation

ii). Integrated Models

Included Mangroves conservation, Restoration, and livelihood improvement to build sustainable solutions for local communities

As an example, Tarakan city and, in the vicinity of the area (Liagu village based participatory Mangrove restoration intervention and Siandau village based value added products development initiatives such as dried fish powder, Mangrove based products development), Mangrove based community livelihood development movements.

iii). Focusing on Mangrove restoration as an inner approach of the community by their own.

Growing and selling Mangrove seedlings or engaging in associated aquaculture.

iv). Conversion of previously constructed shrimp ponds as Integrated Livelihoods and Forest covering sites with Mangroves.

2.3 The World Bank is funding for some initiatives through the M4CR (Mangrove for Coastal Resilience) fund. Other International partners such as the Global Green Growth Institute (GGGI) and Wetlands International are also involved in implementing restoration projects in the Region.

3.0 Observations of the Study Tour

3.1 Study on the institutional arrangements to conserve and the restore of Mangrove Forests (at the Ministry of Forestry and Environment- Jakarta).

Ministry of Forestry and Environment of Indonesia involves to carrying out those Conservation and Restoration measures under particular Policy directives and Frameworks.

The total areas of Mangroves in Indonesia is about 3.3 million has. Approximately three quarters of which are gazette as Forest Zones and with the remaining dedicated to non-forest uses.

Peatland and Mangrove restoration agency plays the role as a key institution of a non-structural agency to carry out presidential regulations that could become a legal instrument for synchronizing Mangrove rehabilitation and restoration programmes between Ministries and Institutions at both central and grassroots levels, and particularly institutions under the Ministry of Forestry and Environment, the Ministry of Maritime Affairs and Fisheries.

Strong Institutional linking mechanisms have been introduced and incorporated with strong Climate Change based mitigate and Adaptive measures, Information sharing for timely decision making are emphasized under these institutional collaborative strategy.

3.2 Implementation Modalities Observation (North Kalimantan Province)

Collaborative efforts for these visit were been organized by the Ministry of Forestry and Environment in Indonesia and the Provincial Government of the North Kalimantan Province.

3.2.1 At the field observation, it was examined the success of the 15 Ha Mangrove Rehabilitation Demonstration Plots on abandoned Shrimp Ponds using the Ecological Mangrove Rehabilitation (EMR) method.

3.2.2 The Provincial Government Role

North Kalimantan provincial government plays a key role at the restoration of Mangroves. The governor of the province, who plays a pivotal role while coping up with all stakeholders such as government officials, community and the other implementing partners, etc. District level setups are also joining with that collaborative endeavor.

Private sector partners are also in the position to provide market opportunities to the products of rural people by providing enough Technical and Technological support to upgrade products as marketable ones.

3.3 Liagu area visit to observe the Mangrove Restoration

The visited location was previously brackish water pond with limited drainage and sediment supply due to the presence of embankments.

Through these restoration interventions, in the form of creating new tidal channels and raising the pond's surface elevation. Tidal forms converted in to normal and the drainage is managed in favor of the germination plants and the growing of Mangroves seedlings.

As the results of the upgradation of the marshy soil with the improved draining method, Biophysical factors of the soil are restored. The ultimate objective was to establish a more diversified, faster growing and more resilient natural Mangrove Forest.

This observation can be considered as an integrated intervention to learn the application of rehabilitation techniques on the Mangrove Restoration.

3.4 Community based Livelihood up gradation (Siandau village visit)

The village peoples are engaging with various livelihood activities based on the Mangroves system and based on the river and the lagoon. People's capacity building measures (in practical manner) were been observed. Among those it was observed that training provisions on aquaculture, processing practices of sea foods in-to ready, to-sell products to enhance economic skills.

A substantial number of women who engage with these livelihood activities after getting enough trainings through the programmes organized by the Global Green Growth Institute(GGGI), and Wetland International of Indonesia.

3.5 Mangrove based Eco-tourism promotion destinations visit

The urban forest of the Tarakan City having with Mangroves is home to the Mangroves in the Bekentan Conservation area, the only Mangrove forest in the Center of an Indonesian City. The forest provides a home to the Proboscis Monkeys and to the Black and Gray Monkeys. The park is recognized as a popular destination for the Tourism Industry and can be serving as a bustling hub for the Bio-diversity Conservation.

The Center provides the way to conducting researches and to promote as a Development center for the Eco-tourism.

4.0 Lessons learned and the applicability

4.1 The government's effort of Indonesia can be considered as vital role plays that can be adopted in the context of the Sri Lankan Mangrove restoration effort.

That should be focused on the involvement of the non-governmental organizations actions as a collaborative effort under the guidance of the Government of Sri Lanka.

In addition to that, some pre designed measures are essential to taken in to consideration as key tasks for focusing to the climate change resilience approach such as community

based approaches, ecological restoration measures, livelihood improvement and integration with the National Climate Action Strategies.

4.2 Policy interventions

The Ministry of Environment, Ministry of Forestry, Ministry of economic Development and Finance, Ministry of Public Administration and Provincial Councils as well as Local Authorities should involve for the setting and implementation of Mangrove based Climate Actions on Collaboration with respective Provincial Councils by setting targets as a part of the National Climate Policy.

4.3 Formation of a well-established Legal Framework

A sound legal framework that consisting with Forestry Conservation measures, Community-led restoration, is an inevitable that to enhance the climate actions to upgrade the Community based Mangrove Restoration.

4.4 Spatial Planning

Spatial planning is essential to regulate activities and to ensure the sustainable management of Mangrove Forests.

4.5 Declaration of Protected areas for Mangroves

The government has to establish and expand the marine protected areas designating Mangrove Eco-systems as protected areas under various regulations.

4.6 Obtaining International Support

International support obtaining is crucial for the funding, consultation as well research and analytical approaches to carrying out best practices (from ADB, WB, etc.).

4.7 Inclusion and the Capacity Building

Successful restoration requires increased inclusion of local communities, enhancing of the community capacity and a considerable amount of budgeting in terms of a pre-designed strategic framework as well as proper involvement of the Stake partners.

4.8 Adaptation for an integrated management approach

Development of an integrated management strategy by considering Social, Economic, and Environmental factors are essential to achieve for a long-term success.

Indonesian comprehensive Mangrove restoration approach can be taken in to consideration for the development of a Sri Lankan community based Mangrove conservation and restoration model.

Introduction of Eco-tourism Development models, adaption for Public-Private Partnership development strategies, Local authority involvement for forest and environmental protection, value chain development for the Mangrove based livelihood development interventions are vital for the sustainable restoration approaches.

4.9 People's active participation and Value Chains Development with their livelihood activities (Integration of all approaches)

In Tarakan, it was observed that, the production channels with Mangroves to produce products such as Jams, Cookies, and natural dyes from the fruits and leaves of Mangroves. In addition to that, some researches have been carried out to produce other items like soap and shampoos, as seen in similar initiations.

4.10 Provision of technical capacity improvement trainings to farmers and fishermen who are doing their livelihood on lagoons.

4.11 Local government support (Policy and Governance) to establish, livelihood improvement, capacity development and social protection measures for empowering communities in an accurate manner.

5.0 Confronted issues and challenges at the restoration and adaptability in Sri Lankan context

5.1 Un-organized an un-integrated nature of currently implementing Mangrove restoration measures.

5.2 Mangrove planting programmes are not showing a significant level of successful outcomes.

5.3 Green belts or conservation zones declaration is not in a proper way to conserve the existing population of various types of Mangroves.

5.4 Community participation and the involvement for the Mangrove rehabilitation and restoration endeavors are not in a significant level. (E.g. plants nursery preparation with the Community as a livelihood empowerment method is not practice).

- 5.5 Slow rate of practicing models complying with the national level policy adaptations. (E.g. implementation of the national policy on conservation and sustainable utilization of Mangrove ecosystems in 2020).
- 5.6 Less adaptability for a scientific and sustainable approaches (E.g. Technological ways and means to reduce sea wave's actions by establishing structures on scientific basis).
- 5.7 Solid waste dumping in highly sensitive, Mangroves growing areas. Pollution due to solid waste dumping in lagoons and estuaries is a significant threat to Mangrove health and the success of restoration interventions.
- 5.8 Constraints on Funding
- 5.9 Lack of stakeholders collaboration
- 5.10 Poor Monitoring - Inadequacy of enough monitoring (Monitoring of seedlings after restoration measures and poor selection of planting sites in terms of the respective environmental factors).
- 5.11 Weak inter-institutional collaboration to carrying out restoration, rehabilitation measures).

6.0 Suggestions and Recommendations

- 6.1 Preparation of sound policy measures by aligning with the national level forest conservation and Mangrove restoration policy scenarios.
- 6.2 Adaptation with a comprehensive and sound policy framework for the Mangrove forestry.
- 6.3 Aligning with the policies and practices of the Global Mangrove restoration frameworks.
- 6.4 From the national level up to the grass-root level, there should be an integrated and well-functioning steering mechanism by coping up with horizontal and vertical level

collaborations to implement, monitor and evaluate the policies, strategies, interventions as well as the results measuring.

6.5 Scientific and systemic approaches for the restoration by analyzing the hydrological measures and soil quality measures to naturally regeneration of mangrove forests.

6.6 Introduction of new innovative techniques are essential.

6.7 Community based restoration measures introduction and application is required to ensure the long-term sustainability by providing the partly ownership of interventions to the local community.

6.8 Adaptation for a sustainable integrated livelihood development approach is recommended by strengthening the community based organizations to provide micro loans, job trainings for the women and youth involvement.

6.9 Co-management

Preparation of strategies, road maps by aligning with the national Mangrove restoration policy frameworks to make collaboration between the government, provincial councils, local authorities, NGOs, and the community is required in a systemic way.

6.10 Develop and initiate Eco-tourism activities such as Mangrove tourism, Eco-lodges, Mangrove based products promotion can be generated income for local stakeholders and can be used to motivate people to protect Mangrove forests.

6.11 The government should focus to its interventions to getting support from the international community by complying with the carbon foot print measures as well as align with the terms and conditions declared by the international mangrove conservation and restorations flagships. (E.g. UN's principles for ecosystems restoration).

7.0 Recommended Strategies to be implemented

- 7.1 Mapping of potential restoration areas (National zoning map by identifying prioritized areas and activities).
- 7.2 Creating a national integrated monitoring platform and a national integrated data platform for Mangrove restoration and rehabilitation.
- 7.3 Focusing on the natural regeneration and community involvement approach to create sustainable, resilient ecosystem management.
- 7.4 Adaptive management approach for the using of information from monitoring programmes to adjust implementation and improve results over time.
- 7.5 Community and cross-sectoral involvement. Designing projects that involve for working with communities on sustainable livelihood based technological applications and relevant trainings.
- 7.6 Enhance the capacity and performances of all stakeholders for sustainable Mangrove ecosystem management, at the policy and the technical level.
- 7.7 To develop regulations for legal certainty. (At the national level and the provincial level).
- 7.8 Enhancing the understanding among stakeholders in facing common, regional and global challenges related to Mangrove ecosystem management.
- 7.9 Empowering strategies to strengthen the local community (people living in the vicinity of lagoons, estuaries and the coastal belt).
- 7.10 Strategies to upgrading the coastal based enterprises development and to strengthening the Private- Public partnerships development approaches.

