

IMPLEMENTATION OF DEMONSTRATION ACTIVITY OF REDD+ IN MERU BETIRI NATIONAL PARK, EAST JAVA, INDONESIA

**A Technical Report of the Public – Private Partnership
Under the ITTO PD 519-08**

By
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PREFACE

REDD+ (Reducing Emission from Deforestation and Degradation+) is a carbon related mechanism to deal with global warming, which is currently being developed by the United Nations Framework Convention on Climate Change (UNFCCC). REDD is focussed on avoidance of deforestation and degradation, but later development also included forest conservation, sustainable management of forests and enhancement of forest carbon stocks enhancement of carbon stock, sustainable forest management and conservation as REDD+.

During readiness phase, some demonstration activities have been implemented as learning process before REDD+ full implementation. Meru Betiri National Park (MNP) located in Southern Part of East Java, Indonesia is one the National Parks which has been selected as the project site for REDD+ DA activities. *Seven and i Holdings Company* through the International Tropical Timber Organization (ITTO) has financially supported this DA activity as an effort to deal with global warming issue as well as the conservation of tropical forest.

The DA REDD+ in MNP was under ITTO Project Document Number PD 519-08 rev 1 (F), with title, Tropical Forest Conservation For Reducing Emissions from Deforestation and Forest Degradation and Enhancing Carbon Stocks in Meru Betiri National Park, Indonesia. The Executing Agency is Forestry Research and Development Agency (FORDA), with project proponents: Center for Climate Change and Policy Research and Development (Puspajak), The Office of MNP and NGO of Lembaga Alam Tropika Indonesia (LATIN). The Pilot Period was 4 years : 2010-2013. Total budget : US\$ 973,388, including contribution of inkind from the Government of Indonesia.

Objective of this program was to contribute to reducing emissions from deforestation and forest degradation and to enhancing forest carbon stocks through enhanced community participation in conservation and management of the Meru Betiri National Park. . This program has been set up for 4 years, and has been extended until early 2015. Up to the completion date, activities have been implemented with some adjustments to achieve the objectives The activities have provided lesson learned before REDD+ full implementation, especially related to role of conservation area, community involvement and MRV of carbon accounting.

This report is a synthesis of technical assessment from the implementation of DA REDD+ in conservation area of MNP, covering mainly technical aspects of carbon accounting and community involvement as well as biodiversity aspect of MNP.

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1. INTRODUCTION

Forest is an important natural resource that also plays important role in global climate mechanism. It is the only sector that can be a source of emission but at the same time has the capability to grow and has the function as carbon removal. In global level the contribution of land use and forestry (LUF) sectors to total emission is only 18%, with the highest (80%) from energy related sectors (Stern, 2007). However in some countries like Indonesia, the land use and forestry sectors including emission from peatfires have contributed to more than 50% to national emission (MoE, 2010).

REDD (Reducing Emission from Deforestation and Degradation) is a carbon related mechanism to deal with global warming, which is currently being developed by the United Nations Framework Convention on Climate Change (UNFCCC). REDD is focussed on avoidance of deforestation and degradation, but later development also included forest conservation, sustainable management of forests and enhancement of forest carbon stocks enhancement of carbon stock, sustainable forest management and conservation as REDD+.

In Indonesia, During readiness phase, some demonstration activities of REDD+ have been implemented as learning process before REDD full implementation. Meru Betiri National Park (MBNP) located in Southern Part of East Java, Indonesia is one the National Parks which has been selected as the project site for REDD+ DA activities. *Seven and i Holdings Company* through the International Tropical Timber Organization (ITTO) has financially supported this DA activity as an effort to deal with global warming issue as well as the conservation of tropical forest.

The total area of the Park is \pm 58,000 ha consisting of various vegetation types from mountainous to coastal areas. MBNP is rich of biological diversity and community living surrounding the forest which give both positive and negative effects to the sustainability of the forest. MBNP has been selected as the site for demonstration activities (DA) of REDD that represent conservation areas MBNP has been experiencing unplanned deforestation and degradation therefore the area is eligible for REDD+. MBNP as DA REDD+ would provide information required by international standard related to credible, measurable, reportable and verifiable (MRV) system for monitoring emission reductions from deforestation and forest degradation and enhancement of forest carbon stocks.

The DA REDD+ is under ITTO Project Document Number PD 519-08 rev 1 (F), with title, Tropical Forest Conservation For Reducing Emissions from Deforestation and Forest Degradation and Enhancing Carbon Stocks in Meru Betiri National Park, Indonesia. The Executing Agency is Forestry Research and Development Agency (FORDA), with project proponents: Center for Climate Change and Policy Research and Development (Puspijak), The Office of MBNP and NGO of Lembaga Alam

Tropika Indonesia (LATIN). The Pilot Period was 4 years : 2010-2013, and extended up to early 2015. Total budget was US\$ 973,388, including contribution of inkind from the Government of Indonesia.

Objective of this program is to contribute to reducing emissions from deforestation and forest degradation and to enhancing forest carbon stocks through enhanced community participation in conservation and management of the Meru Betiri National Park.

Specific objectives:

- (i) To improve the livelihoods of local communities living inside and in the surrounding area of the Meru Betiri National Park (MBNP) through participation in avoiding deforestation, degradation and biodiversity loss
- (ii) To develop a credible measurable, reportable and verifiable system for monitoring emission reductions from deforestation and forest degradation and enhancement of forest carbon stocks in the Meru Betiri National Park (MBNP).

This program has been set up for 4 years, and has been extended until early 2015. Up to the completion date, activities have been implemented with some adjustments to achieve the objectives. The activities have provided lesson learned before REDD+ full implementation, especially related to role of conservation area, community involvement and MRV of carbon accounting.

2. BRIEF DESCRIPTION OF MERU BETIRI NATIONAL PARK

2.1. General Conditions

MBNP is located in southern part of East Java province, Indonesia and surrounded by two districts of Jember and Banyuwangi with relatively high accessibility. Topographical condition is from hilly areas to lowland areas, coastal and mangrove facing to the Indian Ocean.



Figure 1. Location of Meru Betiri National Park in East Java Province of Indonesia

The Park area consists of tropical rainforest ecosystem with high diversity of floristic potentials (more than 500 identified plant species), such as medicinal plants, ornamental plants, bamboo and various small to relatively large animals. The area is divided into five zones according to the function, namely core zone, intact forest zone, utilization zone, rehabilitation and buffer zones. Each zone is managed specifically based on its specific function. Core zone with total area of 27.900 ha is strictly protected area and allowed only for research and education. Intact forest zone with total area of 22.622 ha is allowed for research and education, limited utilization for ecotourism. Utilization zone with total of 1.285 ha is for research and education, intensive but wise and sustainable utilization for highland and coastal ecotourism. Rehabilitation zone with total area of 4.023 ha is a zone where forest and land rehabilitation (agro-forestry cultivation) involving local community takes place to strengthen and protect inner zone. Current zoning system also included water (sea) area of MBNP.

Rehabilitation activities have been carried out in rehabilitation zone to restore forest cover from illegal conversion and illegal cultivation since early 1990s. Rehabilitation is carried out based on mutual benefit between the MBNP–Community by planting economically potential species in Agro-forestry plantation model for community benefits and protection-conservation for the MBNP. In this rehabilitation zone, six Agro-forestry models have been identified by LATIN in cooperation with Bogor Agricultural University. Several eco-tourism and agro-tourism activities and medicinal plant cultivation have been introduced in this area.

MBNP located in two districts Jember and Banyuwangi with the total number of villages directly bordered with the Park area is 11-12 villages and total population of 23.800 people. Most community living in these villages are as subsistence farmers and labors in the agriculture related activities. Some of the community members work in the Park rehabilitation activities as additional source of income. The population increases from year to year causing more dependency of community and consequently also threat to the MBNP.

The MBNP as other forest areas, is also facing serious threats causing degradation and reducing the value of its ecosystem functions. The major causes of the threat (especially forest degradation) are illegal harvest and encroachment. The illegal harvest of timber and non-timber forest product from the national park are mostly due to poor law enforcement in the implementation of sustainable forest management, forest protection and conservation, lack of awareness on forest function and economic pressure caused by poverty and the lack of sustainable source of income. This situation, directly or indirectly, contributes to degradation and deforestation of the Park area.

2.2. Biodiversity of MBNP

MBNP has beautiful landscape from sea to mountain. At least, five_ types of ecosystems occur in MBNP namely coastal ecosystems, mangroves, swamp ecosystems, rheophyte ecosystems and lowland rain forest ecosystems. This Park is the only natural habitat of the rafflesia flower (*Rafflesia zollingeriana*). There are also various other plants such as mangrove (*Rhizophora* sp.), api-api (*Avicennia* sp.), waru (*Hibiscus tiliaceus*), nyamplung (*Calophyllum inophyllum*), rengas (*Gluta renghas*), bungur (*Lagerstroemia speciosa*), pulai (*Alstonia scholaris*), bendo (*Artocarpus elasticus*), and several medicinal plants.

This Park is also home to several protected animals, including 29 species of mammal and 180 species of birds. MBNP has diversity of habitats that support a variety of important organisms, such as the endangered species of Banteng, Javan leopard and Javan hawk eagle. Meru Betiri National Park is known as the last habitat of the Javan

tiger (*Panthera tigris sondaica*) which is now a highly endangered and protected species. However, no traces of this tiger have been found for many years and it is feared to be extinct.

There are potential medicinal plants in MBNP area. The 77 species of medicinal plants have been used by the local community as medicine herbs. There is also utilization of rehabilitation zone. Rehabilitation zone in the national park area has been providing direct economic benefits for communities in the buffer zones

Meru Betiri does have other distinct characteristics. Sukamade Beach is a habitat of the leatherback turtle, the hawksbill turtle, the common green turtle, and the Pacific ridley turtle. Several simple breeding facilities have been constructed at this beach to ensure that the turtles do not become extinct.

MBNP has been developed to support the Observation-Based Ecotourism such as turtle nesting and bird watching, banteng observation, endemic flora observation (*Rafflesia zollingeriana*); and Activities-Based Ecotourism such as Mangrove tracking, agro-tourism, camping, wind surfing, canoeing, and rappelling

Ecotourism activities in the national park area has impact in the form of increased capacity (skills) and economic benefits for society (services for tourist guide, transportation and accommodation)





Figure 2. Some wildlife of MBNP

3. OUTPUTS, ACTIVITIES AND OVERALL ACHIEVEMENT

Activities have been implemented to achieve several outputs as determined in the project document (as a standard for ITTO project activities). The outputs include:

1. Community participation in conservation improved
2. Alternatives source of income to improve the livelihood of local communities living inside and in the surrounding area of Meru Betiri National Park (MKNP) developed
3. Capacity in resource base inventory and carbon accounting improved in measurable, reportable and verifiable (MRV) form
4. Establishment on comprehensive baseline data and estimation of emissions reduction and carbon enhancement of the National Park prepared
5. System for monitoring emission reduction and enhancement of carbon stocks established and validated

To achieve the above outputs, the activities have been carried out basically according two major issues, (1) related to community and (2) related to MRV of carbon accounting. Summary of activities are as follows:

1. Activities related to community in relation with REDD+:
 - Awareness raising, socialization, extension
 - Training (MRV of carbon, forest protection, resource based inventory)
 - Facilitation and support of equipment (eg for mushroom cultivation) and seedlings
 - Facilitation of cooperation and establish partnership
2. Activities related to MRV of carbon accounting.
 - Establishment and measurement of PSP
 - Land cover change analysis
 - Preparation of baseline and carbon database
 - Preparation of SOP for carbon measurement, biodiversity and implementation of DA in conservation area
 - Assessment of methodology
 - Preparation of Project Document according to VCS, with VM-0015 methodology and Plan Vivo
 - Registration by Ministry of Forestry of the Republic of Indonesia

REDD+ program in MKNP is one of the demonstration activities in Indonesia, as a learning process before full implementation of REDD+. There are about 80 DA's have been developed in Indonesia. However, only a few have been officially registered (three in conservation areas) including DA REDD+ in MKNP. This approval from

Ministry of Forestry is a legal basis for continuation of activities including towards result based DA that can get compensation.

Current assessment showed that there are some potential markets/incentive mechanism for REDD+ including:

- Compliance Market under the UNFCCC through negotiation of COP. So far the market is not ready yet.
- Voluntary Market; with examples; VCS, Plan Vivo, CCBS. These voluntary market are relatively small and with difficult mechanism/requirements.
- Regional/Bilateral Market: such as Joint Crediting Mechanism (JCM) with Japan and now is under development to include also South Korea
- National mechanism such as establishment of FREDDI mechanism, National Carbon Market, (Pasar Karbon Nusantara), Fiscal/incentive mechanism, and CSR of private companies,
- Supported NAMAs: REDD+ as a part of NAMA (Nationally Appropriate Mtigation Actions) or INDC (Intended Nationally Determined Contribution).

Dissemination of DA REDD+ in MBNP

DA REDD+ in MBNP that represents conservation area in Indonesia has been disseminated through availability some published materials including technical reports, technical guidance, brief info, video and others. The issuance of Indonesia National Standard (SNI) No.7848 / 2013 on Implementation of DA REDD, has been made also from contribution of DA REDD+ in MBNP, as a Conceptor Team. During project implementation, some publications and networking have been produced and developed. As learning process, the following publications have been available:

- Review existing scemes and lesson learned from surrounding areas
- Stakeholder consultation to determine the most viable scheme of community and other stakeholders to be applied at MBNP
- Determination of project boundary to facilitate measuring and monitoring of carbon stocks
- Review existing methodology of resourcebased inventory for measuring reporting and verifying (MRV) carbon accounting for reducing emission from deforestation and forest degradation and enhancing carbon stock in Meru Betiri National Park (MBNP), Indonesia
- Standard Operating Procedures (SOPs) for Field Measurement of Carbon
- The Completion of GIS Analysis Activity in Meru Betiri National Park
- Landcover change analysis using remote sensing and GIS:
- Developing Partnership for Conservation at Meru Betiri National Park

- Analysis of Land Use, Land Cover Change and the Association Carbon Stock Change to Establish Project Baseline
- Review on Methodology of Voluntary Carbon Standards for Application of REDD+ project in Meru Betiri National Park, East Java
- Review on Illegal Logging as a Threat to Forest Resources and Implementation of REDD in Indonesia
- Standard Operational Procedure For Biodiversity Survey In Conservation Area
- Carbon potential in Meru Betiri National Park
- A Verified Carbon Standard (Vcs) Version 3, Project Description (PD) Avoiding Unplanned Deforestation and Enhancing Carbon Stock in Meru Betiri National Park, East Java, Indonesia
- Plan Vivo Project Idea Note (PIN): Local Community Participation For Carbon Stock Enhancement In Meru Betiri National Park
- [Http://www.puspijak.org](http://www.puspijak.org).
- Video : REDD+ in MBNP

Site Visits and Research/studies by Variety of Institutions

Some studies have been made by many institutions to learn about the implementation of DA REDD in MBNP. Studies for higher degree have been made by students from Indonesia University (UI), Bogor Agricultural University (IPB), Birmingham University, Wageningen University, Korea University, United Nations University (Tokyo). Visits have been made to FORDA by delegations from Japan, FRIM (Malaysia), Thailand (Katsersart University), University of Washington, Asean Member Countries through AfoCo activities and other institutions.

4. TECHNICAL ASPECTS OF CARBON ACCOUNTING TO SUPPORT MRV

4.1. Establishment of PSP and Carbon Stock

Monitoring and estimating CO₂ emissions from deforestation and forest degradation become a key element for any activities of REDD+. As in DA REDD+ of MBNP, one of the main objective is to establish credible system for the measuring, reporting and verifying (MRV) of carbon stocks in project area. System should be developed involving also community. The activities have been carried out to collect information of carbon stocks in project areas, and to set up institutional system for monitoring forest carbon stocks. As this is required to support exit strategy after project completion.

Some 40 permanent sample plots have been constructed. Carbon pools measured were based on IPCC Guideline (2006), consisting of (1) Aboveground Biomass (under

storey, seedlings, saplings, poles and trees), (2) Necromass Biomass (3) Litter Biomass and (4) Soil organic carbon. The study referred to the SNI (7724/2011): Measurement and calculation of carbon stocks – Field measurement for estimating forest carbon stocks. Additional PSP's were also made in on rehabilitation zone

Number of PSP on each zone consisted of core zone with 17 PSP, on area of 27.915 ha, Forest zone 14 PSP, area 22.622 ha, Utilization Zone 4 PSP, area 1.285 ha, Intensive Use Zone, 2 PSP, area 2.155 ha and Rehabilitation Zone, 3 PSP, area 4.023 ha. Measurement has been made on rectangular plots measuring at 20-100 m for trees. Undergrowth and seedlings were measured in small plots through destructive methods. The dead organic matter pool (woody necromass) including dead fallen trees, and other coarse woody debris above the soil surface were measured on the plots.

The placements of PSPs for monitoring forest carbon stocks in Meru Betiri National Park were as follows:

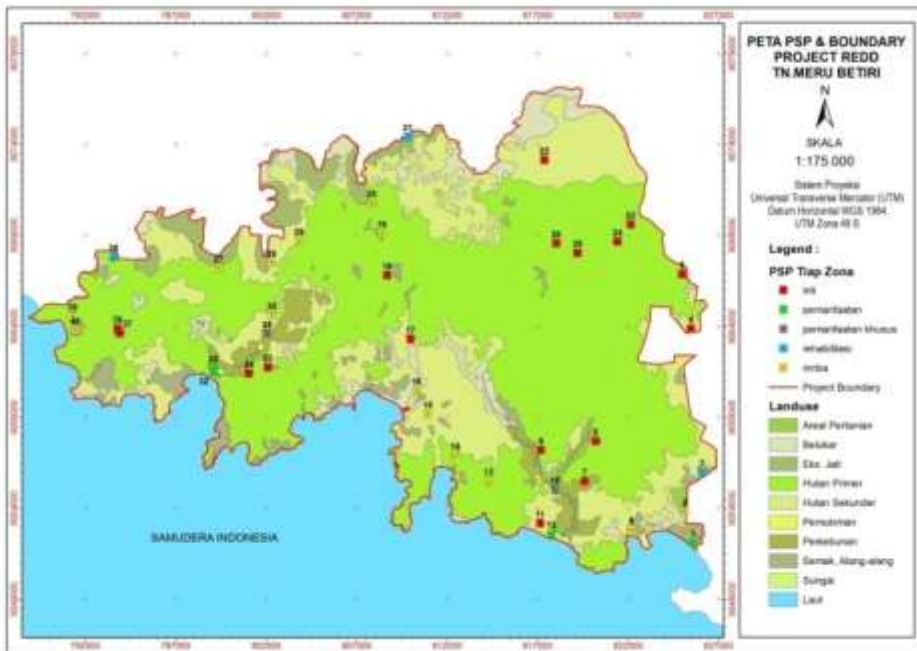


Figure 3. Permanent Sample Plots in MBNp to estimate carbon stock

Results of measurement were as follows:

Table 1. Estimated above ground carbon stock at several land cover types in MBNP based on measurement on 40 PSP

| No | Land cover | Carbon stock (Ton/ha) |
|----|------------------|--------------------------|
| 1 | Primary forest | 135,02 |
| 2 | Secondary forest | 166,63 |
| 3 | Plantation | 98,8 |
| 4 | Bushes | 93,38 |
| 5 | Agroforestry | 28,7 |
| 6 | Shrub | 24,08 |

Estimation of carbon from additional 15 plots on core and forest zones showed that in average the forest contains high carbon stock or average of 277 ton C/ha. Most plots are dominated with big trees. The dominant tree species with high carbon content include: langsep (*Lansium domesticum*), walangan (*Pterospermum diversifolium*), sentul (*Sandroricum koetjape*) pancal kidang (*Aglaian heptandra*), beringin (*Ficus benyamina*). Other species include Bayur (*Pterospermum javanicum*), Winong (*Erythropsis colorata*), Bungur (*Lagerstroemia speciosa*), Garu (*Antidesma montanum*) and Glintungan (*Bischofia javanica*).

Initial PSPs on rehabilitation zone have been measured and showed average carbon stock of 28.7 ton/ha. Additional measurement of 30 plots on rehabilitation zone showed that based on estimation of carbon stock, rehabilitation zone had carbon stock of 16,89 – 34,63 ton/ha. Most trees on rehabilitation were small trees with age of < 10 years, and planted in low density. Therefore this area is potential to be develop and planted through agroforestry system involving community to gain more carbon stocks. Potential tree species to be planted include: kemiri (*Alleurites moluccana*), alpukat (*Persea americana*), melinjo (*Gnetum gnemon*) and langsep (*Lansium* sp.)

Requirement that has been identified to establish institutional system for C stock monitoring included; Standard Operational Procedure (SOP) for field measurement (including guidance book, tools and equipment), availability of budget, qualified staff, hardware and software in each section and in Balai, web and internet connection as well as regular training. The system should also available for use by other stakeholders and to support MRV system for district, province and national. The system can also be used for monitoring of other information such as forest protection and biodiversity as well as community condition. However, there are some possible barriers that should be overcome such as: lack of resources (budget, equipment and human resources), lack of incentive, inaccurate estimation (over or under estimate), lack of skills, no clear requirement for national/province level.

4.2. Remote Sensing Analysis

Monitoring and estimating carbon dioxide emissions from deforestation and forest degradation at the national scale becomes a key element that has to be considered in Reducing Emission from Deforestation and Forest Degradation (REDD) activities. The measuring, reporting and verifying (MRV) system of REDD is based on the general requirements set by the United Nation Framework Convention on Climate Change (UNFCCC) and the specific methodologies for the land use and forest sectors provided by the Intergovernmental Panel on Climate Change (IPCC) (GOFC-GOLD, 2009).

Jember University and FORDA have been conducting analysis on landcover mapping of MBNP by using different satellite imageries and classification techniques. Supervised classification was used by Jember University and visual interpretation had been applied by FORDA for landcover mapping of MBNP. The results were quite different but one of the most prominent factor was due to different boundary map that were used by the two institutions. Further analysis was carried out mostly using from the results by FORDA.

Deforestation rate for successive years of forest cover mapping was calculated according to FAO method. Annual deforestation rate for each period was found to be maximum in the period of 2005-2007 (0.08) and followed by the period of 2007-2010 (0.03).

Table 2. Deforestation rate in MBNP from 1997-2010

| Period | Annual Deforestation rate (%) |
|-----------------------------------|-------------------------------|
| 1997-2001 | 0.30 |
| 2001-2005 | 0.07 |
| 2005-2007 | -0.08 |
| 2007-2010 | -0.03 |
| Average deforestation rate | 0.065 |

The results of land cover classification from Landsat analysis were shown in the following Figure 4.

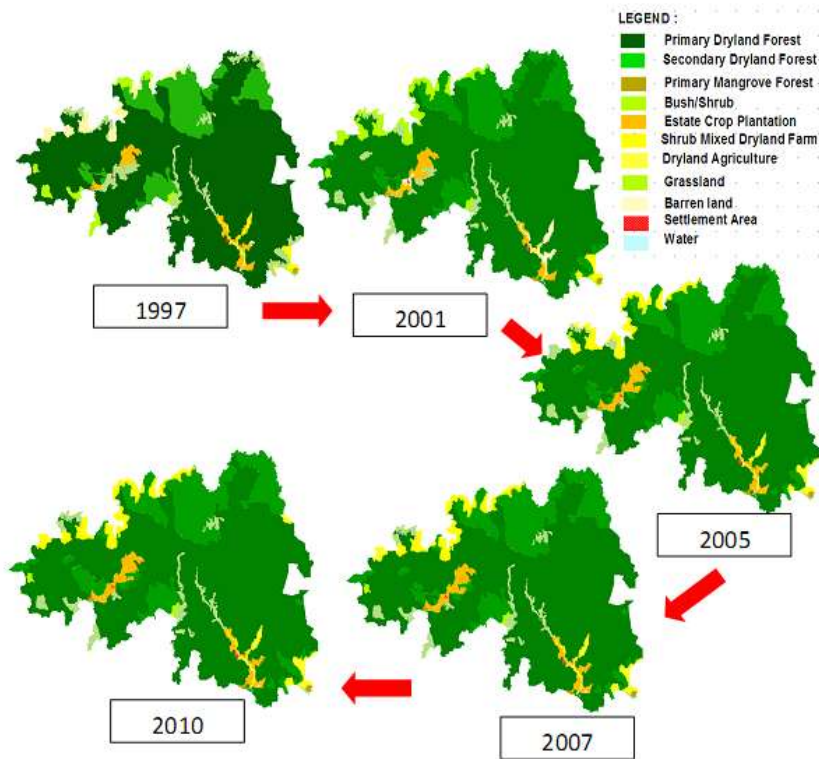


Figure 4. MBNP land cover classification from Landsat 1997, 2001, 2005, 2007 and 2010

Activity data have been calculated by FORDA by generating Landuse Change Matrix (LCM) for the year 1997, 2001, 2005, 2007 and 2010 based on 6 land categories of AFOLU IPCC GL 2006. The LCM indicates that Forest land tends to dominate the landcover in MBNP, followed by Crop land, Grassland, Other land and Settlement. Landcover mapping has been conducted for Meru Betiri National Park using Landsat TM 5, Landsat ETM 7, SPOT 4, ALOS PALSAR and ALOS AVNIR from 1997 to 2010. Landuse Change Matrix (LCM) was then generated using 6 land categories based on 2006 IPCC GL. The LCM indicates that Forest land tends to dominate the landcover in MBNP, followed by Crop land, Grassland, Other land and Settlement.

The area and percentage of each land category according to IPCC GL 2006. Forest land was dominating the whole land cover through the study period. Its coverage from 1997 until 2010 amounted 89% of the total area. Conversion of land into forest land fluctuates and the highest value was found in 2001 (944 ha). This phenomenon could be as a result of intensive reforestation and rehabilitation programme conducted in the

rehabilitation zone where in 1997 the area was classified as shrubs/bushes and bare land. Within 4 years period, the shrubs/bushes were grown as a secondary forest which is the most likely to be the dominant factor of the increase of forest land in the North Eastern part of MBNP.

Recapitulation of Land Change Matrix of MBNP. Cropland area showed a distinct increase from 2001 to 2005. The changes occurred mostly in the rehabilitation zone in the Northern part of MBNP. Reforestation programme in the rehabilitation zone provided the involvement of local community where they could plant agricultural plants between the wooden trees or which is called as intercropping. As a result, in 2005 the shrubs/bushes class which covered a quite large amount in the rehabilitation zone had been converted into cropland (shrub mixed dryland agriculture).

Table 3. Land change matrix for MBNP area in 1997-2010

| Category | Data source (Landsat TM 1:50,000) | | | | | | | | | |
|-------------------------|-----------------------------------|-----|-------|-----|-------|-----|-------|-----|-------|-----|
| | 1997 | | 2001 | | 2005 | | 2007 | | 2010 | |
| | Ha | % | Ha | % | Ha | % | Ha | % | Ha | % |
| Total area | 54562 | 100 | 54562 | 100 | 54562 | 100 | 54562 | 100 | 54562 | 100 |
| Land category | | | | | | | | | | |
| A. Forest Land (FL) | 47793 | 88 | 48372 | 89 | 48501 | 89 | 48426 | 89 | 48381 | 89 |
| 1. FL remaining FL | 47793 | | 47428 | | 48216 | | 48316 | | 48324 | |
| 2. Land converted to FL | 0 | | 944 | | 284 | | 110 | | 56 | |
| B. Crop Land (CL) | 1565 | 3 | 1526 | 3 | 3806 | 7 | 4077 | 7 | 4118 | 8 |
| 1. CL remaining CL | 1565 | | 1186 | | 1496 | | 3684 | | 4016 | |
| 2. Land converted to CL | 0 | | 340 | | 2311 | | 393 | | 101 | |
| C. Grass Land (GL) | 3738 | 7 | 4109 | 8 | 2174 | 4 | 1967 | 4 | 1967 | 4 |
| 1. GL remaining GL | 3738 | | 2377 | | 2150 | | 1862 | | 1967 | |
| 2. Land converted to GL | 0 | | 1733 | | 23 | | 105 | | 0 | |
| D. Wetland (WL) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1. WL remaining WL | 0 | | 0 | | 0 | | 0 | | 0 | |
| 2. Land converted to WL | 0 | | 0 | | 0 | | 0 | | 0 | |
| E. Settlement (S) | 28 | 0 | 28 | 0 | 28 | 0 | 33 | 0 | 38 | 0 |
| 1. S remaining S | 28 | | 28 | | 28 | | 28 | | 33 | |
| 2. Land converted to S | 0 | | 0 | | 0 | | 5 | | 4 | |
| F. Other Land (OL) | 1438 | 3 | 527 | 1 | 52 | 0 | 59 | 0 | 59 | 0 |
| 1. OL remaining OL | 1438 | | 77 | | 52 | | 52 | | 59 | |
| 2. Land converted to OL | 0 | | 449 | | 0 | | 6 | | 0 | |
| G. No Data (ND) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1. ND remaining ND | 0 | | 0 | | 0 | | 0 | | 0 | |
| 2. Land converted to ND | 0 | | 0 | | 0 | | 0 | | 0 | |

Land converted to Grassland and to Other Land area tended to decrease. Basically this could be used as one of a parameter to measure the success of reforestation programme in MBNP. While settlement was quite stable through the study period because there was almost no settlement expansion in MBNP.

4.3. Baseline (Reference Level)

Setting Reference Level is important activity for REDD project. Total emission reduction from project activity is set from the reference level. It is usually estimated from historical data of emission. For DA REDD+ projects in MBNP, reference level was set based on estimation of carbon stock from ground measurement through establishment of 40 permanent sample plots and remote sensing data to analyse land cover change. Carbon stock in MBNP varied from 28.7 to 166.63 ton C/ha with the highest carbon stock in secondary forest.

Baseline has been established based on historical data of emission from 1997 to 2010. Regression analysis was made to make prediction up to the year 2020. Average emission was also used to estimate future prediction. The following steps and assumption were made to establish reference level:

- Preparation of land cover change matrix (LCM) for the period of 1997-2010 into six land categories namely: forest land, crop land, grass land, wet land, settlement and others land
- Estimation of annual rate of forest conversion to other land uses for the period of 1997-2010 that was 28,02 ha
- Collection of data for forest disturbance caused by illegal logging, forest fire and land encroachment. Forest disturbance was estimated from data of report of Meru Betiri National Park during 1997-2010. Logging was 56,367.75 m³/year (1997-2001), 18,803.43 m³/year (2001-2005), 17,493.84 m³/year (2005-2007) and 26,171.75 m³/year (2007-2010). Wood densities used in this analysis were 0.52 ton/m³ (primary forest), 0.48 (secondary forest) and 0.69 ton/m³ (mangrove forest). Biomass expansion factor used in this analysis was 0.7.
- Fuel wood consumption was estimated to be about 180 m³/year (data from report of Meru Betiri National Park)
- Emission from mineral soil due to land cover changes was not taken into account
- Above ground biomass of each forest type was estimated using allometric equation. Mean annual biomass increment was based on data in IPCC Guideline 2006.
- All data are used to calculate emission using worksheet of IPCC Guideline 2006.
- Regression was applied using data of number of population and deforestation rate in 1997-2010 to estimate emission/sequestration prediction until 2020.

- Interpolation of emission/sequestration data of CO₂ from 1997-2010 was made to estimate emission/sequestration of CO₂ from 2010 until 2020.

Analysis was performed using 2006 IPCC methodology. The result showed that there was no CO₂ emission during 1997-2010 in MBNP. The potency of CO₂ sequestration was higher than CO₂ emission, therefore from historical data of emission Meru Betiri National Park was net sinker. Details of CO₂ sequestration from land cover changes in Meru Betiri National Park during 1997-2010 are shown in Table 4.

Table 4. The carbon emission and carbon sequestration from land cover changes in Meru Betiri National Park during 1997-2010

| Source of Green House Gas and Sink Category | Emission (Ton CO ₂ eq /year) | | | |
|---|---|-------------|-------------|-------------|
| | 1997-2001 | 2001-2005 | 2005-2007 | 2007-2010 |
| A. Forest Land (FL) | | | | |
| A.1. FL - FL | -189.335,59 | -313.356,63 | -329.042,49 | -300.951,24 |
| A.2. Land - FL | -18.811,03 | -5.607,98 | -3.122,31 | -855,65 |
| B. Crop Land (CL) | 0,00 | 0,00 | 0,00 | 0,00 |
| B.1. CL - CL | 16.042,77 | 20.685,72 | 84.310,42 | 60.149,69 |
| B.2. Land - CL | -322,26 | 13.465,21 | 40.989,85 | 14.252,77 |
| C. Grass Land (GL) | 0,00 | 0,00 | 0,00 | 0,00 |
| C.1. GL - GL | 0,00 | 0,00 | 0,00 | 0,00 |
| C.2. Land - GL | -13.408,60 | 347,75 | 4.440,30 | 0,00 |
| D. Wet Land (WL) | 0,00 | 0,00 | 0,00 | 0,00 |
| D.1. WL - WL | 0,00 | 0,00 | 0,00 | 0,00 |
| D.2. Land - WL | 0,00 | 0,00 | 0,00 | 0,00 |
| E. Settlement (Set.) | 0,00 | 0,00 | 0,00 | 0,00 |
| E.1. Set. - set. | 0,00 | 0,00 | 0,00 | 0,00 |
| E.2. Land - set. | 0,00 | 0,00 | 689,52 | 379,35 |
| F. Others Land (OL) | 0,00 | 0,00 | 0,00 | 0,00 |
| F.1. OL - OL | 0,00 | 0,00 | 0,00 | 0,00 |
| F.2. Land - OL | 14.843,47 | 0,00 | 413,20 | 0,00 |
| Total Emission | -190.991,24 | -284.465,98 | -201.321,56 | -227.025,08 |

Remark : negative (-) means negative emission or sequestration

The BAU scenario assumed constant parameters until 2020. It assumed annual sequestration of 2,196,04 tCO₂eq/year with cumulative sequestration in 2020 will be 264.420,40 tCO₂eq/year. A scenario has been performed to consider efforts in rehabilitation activities. It was assumed that rate of CO₂ sequestration gained from rehabilitation was 24.859,63 tCO₂eq/year.

Table 5. Forecasting analysis on rate of CO₂ sequestration (tCO₂eq/year) in Meru Betiri National Park during 2010-2020

| Year | Business as Usual | Scenario with Rehabilitation |
|----------------|--------------------------|-------------------------------------|
| 2010 | 242.460,05 | 242.460,05 |
| 2011 | 244.656,08 | 267.319,68 |
| 2012 | 246.852,12 | 292.179,31 |
| 2013 | 249.048,15 | 317.038,95 |
| 2014 | 251.244,19 | 341.898,58 |
| 2015 | 253.440,22 | 366.758,21 |
| 2016 | 255.636,26 | 391.617,85 |
| 2017 | 257.832,29 | 416.477,48 |
| 2018 | 260.028,33 | 441.337,11 |
| 2019 | 262.224,36 | 466.196,75 |
| 2020 | 264.420,40 | 491.056,38 |
| Average | 253.440,22 | 366.758,21 |

Estimation of emission was carried out using IPCC Guideline 2006. The analysis showed that there was sequestration or no emission during the period of analysis in 1997-2010. The sequestration during 1997-2001 was 211.715,56 ton CO₂-eq/year, in 1997 and 242.460,05 in 2010 with annual average of 226.158,75 ton CO₂-eq/year. Sequestration in MBNP during the period of 1997-2010 was mainly contributed from low deforestation rate and even there were land changes from other land to forest land due to activities in rehabilitation zone. Meanwhile, from the official report, there were small figures of logging and fires as sources of emission.

Reference level as Business As Usual (BAU) for emission up to the year 2020 was estimated based on average emission from 1997-2010. Regression analysis was performed to identify the relationship, however, there was no model fit for the existing data. Therefore, scenario of emission from MBNP in the future was made based on possible deforestation. Based on forecasting analysis in BAU, CO₂ sequestration will increase during 2010-2020 from 242.460,05 ton CO₂ eq in 2010, to 264.420,40 ton CO₂eq in 2020, with average of 253.440,22 ton CO₂ eq/year. If efforts are put on rehabilitation activities, a scenario could assume the rate of CO₂ sequestration gained from rehabilitation, which is 24.859,63 tCO₂eq/year, resulted in total sequestration of 491.056,38 ton CO₂-e in 2020. .

These results showed that carbon emissions in Betiri Meru National Park were negative or sequestration, due to small rate of deforestation and vegetation growth. Therefore, for national park as conservation area, REDD+ should be focused on maintaining conservation or biodiversity and improvement of community awareness and welfare. Voluntary standard of Community and Climate Biodiversity (CCB) is available for REDD+ project focusing on biodiversity and social safeguards.

Although if referred to past emission there was very small or no emission, in Meru Betiri National Park from historical data. MBNP as conservation area will have potential threat in the future such as from population growth and human activities. Because of that, enhancement of carbon stock through rehabilitation and conservation through protection of natural forest can be regarded as important additionally in REDD+.

4.3. Identify Measures to Enhance the Sustainable Emissions Reductions and Enhancement of Carbon Stocks in Meru Betiri National Park

This activity has been conducted to identify various activities that directly or indirectly influence the reduction of GHG emissions, the increase GHG uptake and the increase of carbon stocks. As conservation area that has been confirmed through Minister's Decree, probably source of emission from deforestation would not be high, however due to the increasing number of human population and their activities, there would be significant threat to the national park. As an important carbon pool, identification of sources of emission and removal of the national park is necessary.

In general, emission from land change and forestry sector is from deforestation and degradation, as major threat to the national park. Deforestation is permanent change of land cover from areas categorized as forest land to other land categories. Degradation is defined as reduction of carbon stock in the same land category. The National Park experienced loss or deforestation during political transition period in 1998. At the time, teak looting occurred in areas now as rehabilitation zone. The looting of teak woods was conducted not only by local inhabitants but also outsiders. The loss has caused changes from formerly teak forest into now as open and agroforestry areas.

Analysis for the past ten (10) years was applied for the data of land cover from 2001 to 2011. The result showed that forest land (natural forest) converted to non forestland (cropland and grassland) from 2001 to 2011 was about 282 ha. The annual deforestation rate was 28.2 ha/year. This figure shows that threat of the national park due to deforestation has been low, with average of 28.2 ha/year.

Other source of emission was degradation. The major causes of forest degradation were illegal logging and encroachment. The illegal harvest of timber and non-timber forest products from the national park were mostly due to poor law enforcement in the implementation of sustainable forest management, forest protection and conservation, lack of awareness on forest function and economic pressure caused by poverty and lack of sustainable source of income. This situation directly or indirectly, contributed to degradation and deforestation of the Park. For examples, some farmers who live in five villages namely Wonoasri, Curah Nongko, Andongrejo, Sanenrejo and Curah Takir, along the national park border, collect forest products for sell to get additional income, take some woods from MBNP for housing, and firewood for household and small industry.

MBNP has a huge amount of carbon stock. From estimation, total carbon stock in MBNP was as follows:

Table 6. Carbon stock in MBNP

| Land cover | Area (ha) | Carbon stock (ton C/ha) | Total (ton C) |
|---------------------|-----------|-------------------------|---------------|
| Core Zone | 27,915 | 133.69 | 3,731,956.35 |
| Forest Zone | 22,622 | 145.98 | 3,302,359.56 |
| Utilization Zone | 1,285 | 118.34 | 152,066.90 |
| Special Use Zone | 2,155 | 98.80 | 212,914.00 |
| Rehabilitation Zone | 4,023 | 28.70 | 115,460.10 |
| Total | 58,000 | | 7,514,756.91 |

Possible activities that can reduce emission and increase Carbon stocks include:

- Conservation; Total forest area of MBNP is 58.000 ha, with stock of 7,514,756.91 ton C. This stock might grow or increase. Note that natural growth can be assumed to grow by 0,25 t/ha/year.
- Avoiding deforestation; Total emissions that can be reduced by stoping deforestation practices during crediting period until 2030 is about 295,036 tCO₂e
- Avoiding degradation; Forest degradation is potential source of emission from LULUCF. In MBNP, activities of avoiding degradation include control of firewood collection, illegal logging, forest encroachment, and forest fire control.
- Enhancing carbon stock; Current condition in rehabilitation zone has tree density of 124 trees/ha. Total GHG removals by planting trees on scenario 160 trees/ ha is 1,020,966 t CO₂-e, 200 trees/ha is about 1,189,387 t CO₂-e, and 300 trees/ha is about 1,610,441 t CO₂-e.
- REDD+ has important benefits in addition to carbon, namely social and environmental benefits. Implementation of REDD+ should be done by also

improving community livelihood. As this will minimize or reduce the rate of deforestation and forest degradation, since poverty has been the key source of threat to conservation. The failure to accommodate community's interest in conservation will result in the overall failure of REDD+ program.

- Moreover, in term of carbon benefits, enhancement of carbon stock can be done also by establishment of plantation. In MBNP, this is possible through activities of planting in rehabilitation zone. Facilitation of community to involve in planting will have multiple benefits, it will increase carbon stock, increase community income through several crops yield, and keep the sustainability of conservation

4.4. Selection of Methodology for DA REDD+ in MBNP

As REDD+ is a mechanism where payments depend on actual emission reductions, countries will be required to quantify these reductions in REDD+. Therefore, it is a key priority for countries to establish robust and transparent forest monitoring systems. One of the key elements for REDD+ implementation is the development of transparent, comparable, coherent, complete and accurate measurement, reporting and verification (MRV) systems. These systems are a guarantee that parties will effectively meet their respective mitigation commitments.

The principle of MRV should be applied for estimation of emission reduction in implementation of REDD. Criteria of MRV applies methodology can use IPCC GL 2006 that is internationally recognized with higher tier (Tier 2 or 3) by considering availability of resources. REDD+ is approached from national level with sub national implementation.

While the REDD+ mechanism under compliance market is still under negotiation, some voluntary standards are available such as Verified Carbon Standard (VCS), Plan Vivo and CCBA for REDD activities. These standards are referred by some demonstration activities in Indonesia and available to follow for carbon trading and to produce carbon credits. However, there has been no methodology for conservation. MBNP as conservation area has relatively high carbon stock, therefore methodology to support REDD+ especially in conservation is important to explore. Lesson learnt from this conservation area, especially related to methodological aspect for degradation and conservation would provide usefull information for negotiation of REDD+ in the UNFCCC.

From some available voluntary standards. The most common applied for DA REDD+ in Indonesia include Voluntary Carbon Standard (VCS), Plan Vivo and CCBA for REDD activities. For REDD activity in MBNP, based on remote sensing data analysis, deforestation rate in MBNP has been quite low, although there has been threat from forest degradation due to illegal logging and encroachment. VCS that provided several methodologies have been reviewed and considered appropriate to be applied in MBNP.

To follow the requirement for voluntary carbon standard, a PDD should be prepared. Basic information from MBNP is required to prepare PDD, including : information on description of the project, VCS methodology applied to the project activity, assessment and demonstration of additionality, monitoring, GHG Emission Reductions, Environmental Impact, Stakeholders comments, Schedule, and Ownership.

4.4.1. Application of VCS methodology for DA REDD+ in MBNP

Although REDD mechanism under compliance market is still under development, some voluntary standards are available such as Verified Carbon Standard (VCS), Plan Vivo and CCBA for REDD activities. These standards are referred by some demonstration activities in Indonesia and available to follow for carbon trading and to produce carbon credits. These voluntary carbon standards usually refer to reduction of emission.

The selection of appropriate methodology from VCS was conducted through review of available methodologies and selection of methodology according to MBNP conditions. In selecting methodology, VCS provides guidance as shown in Figure below:

| | | | |
|--|----------------------------------|--|---|
| Is the forest land expected to be converted to non-forest land in the baseline case, or expected to be subject to authorized conversion to a managed tree plantation in the baseline case? | | | |
| YES¹ | | NO | |
| Is the land legally authorized and documented to be converted to non-forest or a managed tree plantation? | | Is the forest in the baseline expected to degrade by fuelwood extraction or charcoal production? | |
| YES² | NO | YES | NO |
| Avoiding planned deforestation/planned degradation | Avoiding unplanned deforestation | Avoiding forest degradation | Proposed project is not a VCS REDD ³ activity currently covered by the |
| Is part of the land non-forest land or with degraded forest? | | | |
| YES | | NO | |
| Suitable for ARR | | No additional activity | |

Figure 5. Guidance to select methodology for VCS

Eligible activities according to VCS are as follows:

- * ARR Afforestation, Reforestation and Revegetation (establishing, increasing or restoring vegetative cover)
- * ALM (Agricultural Land Management)
- * IFM : RIL (Conversion from conventional logging to reduced impact logging), LtPF (Conversion of logged forests to protected forests), LtHP (Conversion of low-productive forests to high-productive forests) and ERA (Extending the rotation age of evenly aged managed forests)
- * REDD : APD (Avoided Planned Deforestation), AUFDD (Avoided Unplanned Frontier Def and Deg), AUMDD (Avoided Unplanned Mozaic Def and Deg.)

Table 7. Available Methodologies according to VCS

| NO | ID | Methodologies |
|----|--------|---|
| 1 | VM0003 | Methodology for Improved Forest Management through Extension of Rotation Age, v1.0 |
| 2 | VM0004 | Methodology for Conservation Projects that Avoid Planned Land Use Conversion in Peat Swamp Forests, v1.0 |
| 3 | VM0005 | Methodology for Conversion of Low-productive Forest to High-productive Forest, v1.1 |
| 4 | VM0006 | Methodology for Carbon Accounting in Project Activities that Reduce Emissions from Mosaic Deforestation and Degradation, v1.0 |
| 5 | VM0007 | REDD Methodology Modules (REDD-MF), v1.1 |
| 6 | VM0009 | Methodology for Avoided Mosaic Deforestation of Tropical Forests, v1.0 |
| 7 | VM0010 | Methodology for Improved Forest Management: Conversion from Logged to Protected Forest, v1.0 |
| 8 | VM0011 | Methodology for Calculating GHG Benefits from Preventing Planned Degradation, v1.0 |
| 9 | VM0012 | Improved Forest Management on Privately Owned Properties in Temperate and Boreal Forests (LtPF), v1.0 |
| 10 | VM0015 | Methodology for Avoided Unplanned Deforestation |

To follow the requirement for voluntary carbon standard, a PDD has been prepared. Basic information in PDD includes: information on description of the project, VCS

methodology applied to the project activity, assessment and demonstration of additionality, monitoring, GHG Emission Reductions, Environmental Impact, Stakeholders comments, Schedule, and Ownership. DA REDD+ in MBNP has followed the requirement of Verified Carbon Standard (VCS) by applying approved methodology of VM0015 (Avoiding Unplanned Deforestation).

This VM0015 methodology makes possible to gain carbon benefits from avoiding unplanned deforestation (frontier deforestation) and to establish plantation as enhancement of carbon stock in areas categorized as forest that would be deforested under business as usual (BAU). The methodology of VM-0015 has been applied to prepare Project Document that is now ready for validation. This standard has made possible for REDD project to be implemented with project cycle of 20-100 years.

4.4.2. Potential of Plan Vivo Scheme for DA REDD+ in MBNP

REDD + is an effort to mitigate climate change in forestry sector through compliance scheme which is still being developed in global level. During the readiness phase, in Indonesia there have been many Demonstration Activities (DA) of REDD + that refer to the various methodologies/standards. Until now the incentive schemes for REDD + has not been developed despite the various financing options available including international resources such as , ICCTF (International Climate Change Trust Fund), the Carbon Fund, Joint Crediting Mechanism (bilateral with Japan) and voluntary schemes such as VCS, Plan Vivo and CCB. At the national level several institutions and initiatives are expected to be alternative sources of funding such a scheme of FREDDI run by REDD Agency, National Carbon Markets, national fiscal mechanisms and CSR of various companies.

Plan Vivo is a voluntary international standard that could be an alternative source of funding / incentive and can be applied to DA REDD + activities in the meru betiri national park (MBNP). In international voluntary scheme, some necessary requirements include the presence of (i) baseline and measurement; (ii) additionality; (iii) permanence; and (iv) leakage.

Plan Vivo has been developed since 1994, by the Edinburgh Centre for Carbon Management (ECCM), as part of DFID. In 2002, it was transferred to an independent non-profit organization (Bio-Climate R and D) and in 2008 became the Plan Vivo Foundation, a registered charity. Plan Vivo provides a standard for "reducing emissions by communities by promoting sustainable livelihoods". Credits generated is verifiable emission reduction credits (VER) which is equivalent to 1 ton of CO₂. Scope of activities: reforestation and afforestation, agroforestry, forest restoration and prevention of deforestation.

Participants of the project are small-scale communities in developing countries. Some countries that follow this scheme are: Mexico, Tanzania, Indonesia, Sri Lanka, Ethiopia, Nicaragua, Uganda, Mozambique, Fiji, Sierra Leone, Bolivia, Malawi, India, Kenya, Nepal, Burkina Faso, Solomon, Rwanda, the Philippines, Liberia, Angola, Cameroon, and Mongolia. For Indonesia, some activities are being and will be developed. Those that have been registered in Plan Vivo in the form of Project Identification Note (PIN) are activities initiated by the FFI, in Lombok, activities by Warsi, in Jambi, by Pundi, in Jambi and by JCF, in Sulawesi.

In the international market, some buyers of Plan Vivo certificates are: Antalis, Arla Foods, Blue Green Carbon, Camco, Ceramica Sant Agostina SPA, City of London, Classic Africa Safaries, the Coop, CO2Focus, Creative Artists Agency, Embassy of Denmark, DFID, Enviromarket, EValue, FIA Foundation, Folksam, Global Cool, Hambleside Danelaw, IIED, Its the Planet, Live Climate, Man Group, Marks and Spencers, Max Hamburger, Nedbank, Piqqo, Puma, Reforestamos Mexico, One World International, Save the Children, Tetra Pak, U & W, Uganda Carbon Bureau, the World Bank. Approximately 1.6 million Plan Vivo certificates have been issued. The Plan Vivo provides a carbon price for each certificate emission reduction of USD 6-15 per tonne of CO₂ eq. From this activity, it is required that at least 60% of the carbon incentive is for the community.

The present of Rehabilitation zone in the area of MBNP that involve the community in the management allows for the community to get an incentive of Plan Vivo scheme for their implementation of activities that generate carbon benefits. Plan Vivo Project Idea Note (PIN) titled Local Community Participation for Enhancement of Carbon Stock Betiri In Meru National Park, is being prepared by the Indonesian PES Community Consortium (by executing of LATIN and KAIL) in cooperation with KPSHK-ICCO. ITTO PD 519/08 has been supporting the assignment for special zone as a traditional use zone for Plan Vivo scheme in rehabilitation zone of MBNP.. The goal is to get the carbon benefits of the activities of rural communities around the national park to manage the rehabilitation zone. The target groups are the Village Farmers Group of JAKETRESI in Curahnongko village, which manage the rehabilitation zone of Meru Betiri of 400 ha, to produce carbon environmental services with a Plan Vivo scheme. Main activity is the rehabilitation with the target of 400 plants per hectare with institutional support activities that facilitate the rehabilitation by JAKETRESI farmers, continuing incentive schemes that have been tested and facilitate the preparation of the management plan to rehabilitate the area of 400 ha (up to 30 years) as well as to support the business of jackfruit chips, banana, medicinal plants and development of cooperatives that have long been applied in rural communities around the national park.

Plan Vivo Activity scheme focuses on the development of partnerships with the community. The village is the Curahnongko village involving farmers who are

members of the network of 17 farmer groups named JAKETRESI. Until now, several activities involving community have been done and supporting data related to socio-economic conditions have been available. Local NGOs and DA REDD+ activities have also been conducting empowerment/dissemination to the community. Access to land is also supported by the MoU between communities and the national park in order to utilize the rehabilitation zone.

Information on the potential of carbon stock and baseline has been available through the establishment and measurement of PSPs. In addition, supporting data related to socio-economic conditions have also been available. For the enhancement of carbon stocks, there will be developed combination of selected woody species that primarily consist of species of *Parkia speciosa* (pete), *Artocarpus heterophylla* (jackfruit), *Durio zibethinus* (durian), *Persea americana* (avocado), *Gnetum gnemon* (mlinjo), and other species. The area to be treated includes an area of about 400 ha, with a cycle of 30 years. The activities of agroforestry development will increase the carbon stocks of 28.7 tonnes C / ha to 80-90 tonnes C / ha or 9.383 tons of CO₂-e per year.

Plan Vivo is an alternative incentive scheme, as the voluntary market that is small and prioritized for community. The procedure is relatively simple and a lot of activities are eligible. This scheme is potential to be developed in the MBNP. For that, in MBNP, it is a need to assign a special zone for long-term public access in MBNP region. The activity of PD 519/08 of DA REDD+ in MBNP has been facilitating the process of assignment of traditional use zone for MBNP, including to accommodate the Plan Vivo scheme.

4.5. Monitoring System of Carbon Stock

The system for carbon monitoring in Meru Betiri National Park was assessed based on the Regulation of the Minister of Forestry regarding the organization and administration of the National Park. For Carbon Stock Monitoring System, analysis was performed based on field experiences in establishing permanent sample plots and measurement of carbon pools within the national parks involving also community. Involvement of community in monitoring carbon stock has been possible because during the DA REDD+ activities, community has been given awareness raising, socialization, and training for carbon measurement.

Information on possible barriers and advantages were gathered based on field experiences and analysis that include requirement to establish MRV system in management unit level related to monitoring of carbon stock to support mitigation action in land use and forestry sector through implementation of DA REDD+ activities.

Meru Betiri National Park Structure

According to the Regulation of the Minister of Forestry No. P.03/Menhut-V/2007 on 1 February 2007 regarding Organization and Administration of the Meru Betiri National Park Authority, the National Park has category of type A national park with the organizational structure. The management in the field is divided into three sections, namely Section I, Sarongan, Section II, Ambulu and Section III, Kalibaru. Each section consists of some resorts, as in Figure 6.

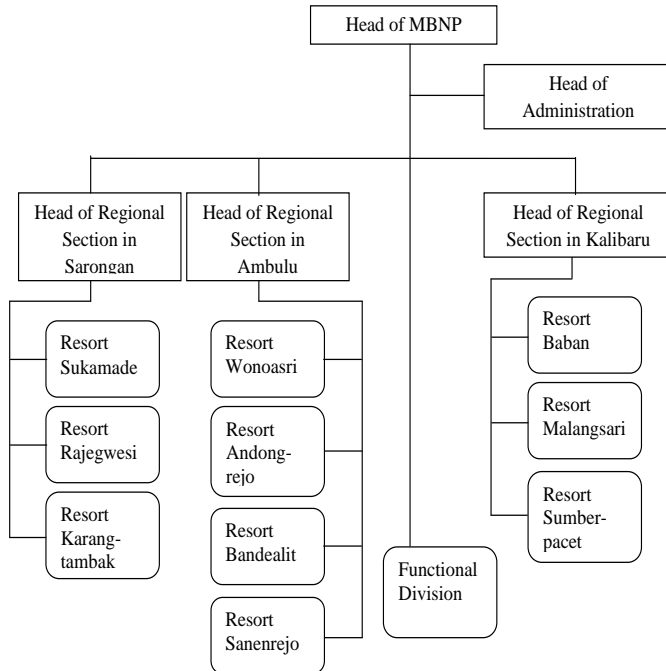
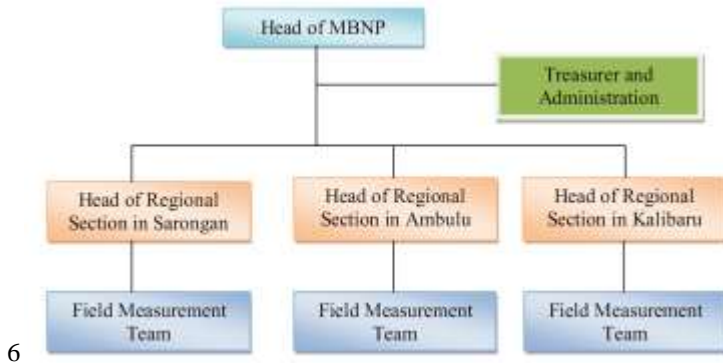


Figure 6. Organizational structure of Meru Betiri National Park

Carbon Stock Monitoring System

The structure of organization for monitoring forest carbon stock is the configuration of the hierarchical levels and specialized units and positions within the organization of MBNP. Field measurement team should be well-organized to better synergize all field measurement activities. The organizational structure of carbon field measurement in MBNP is shown in Figure 7.



6

Figure 7. The organizational structure of field measurement in Meru Betiri National Park

Field measurement team consists of team leader, field crews and labors. Number of field team personnel (field crew/labor) depends to budget and time available. Number of personnel could be added if there is enough budget and time.

For data management, the scheme is shown in Figure 9. The establishment of monitoring database of forest carbon stock is very important for data availability and data organization. It is expected that monitoring database can be accessed by all stakeholder fastly in term of support the forest carbon monitoring in Meru Betiri National Park. Availability of database in forest management unit is very important information to support measurable, reportable and verifiable (MRV) system of carbon accounting in province and national level.

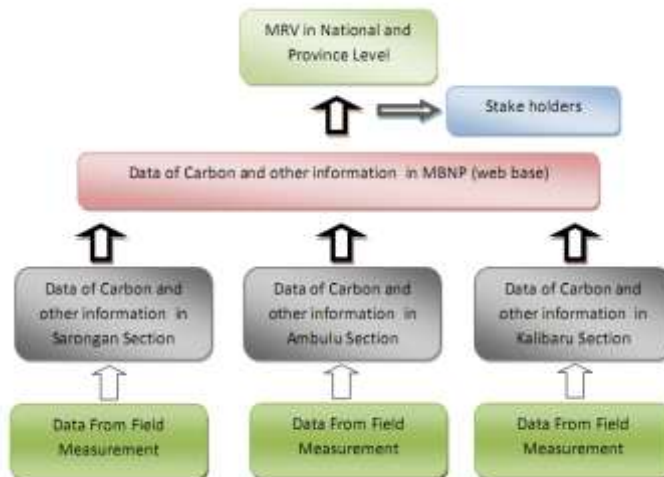


Figure 8. Data management for carbon and other information in MBNP

The involvement of community is an important lesson learned from implementation of DA REDD+ in MBNP. Community has been provided socialization, training and skill to conduct field measurement of carbon in the field. Based on community condition, and surrounding villages of Meru Betiri National Park, it is very important to involve the villagers in field measurement and monitoring of carbon stock as well as other environmental data. Involvement of community will increase security of national park area and also they will get incentive from their involvement in forest carbon stock monitoring.

Some tasks that can be done also with community include:

- Mapping the boundaries of the forest, and cultivated land.
- Establishing a system of permanent sample plots and regular measurement of the standing biomass stock in each of the sample plots.
- Field measurement including diameter, height, collection of destructive sampling, soil samples and other field works.
- Monitoring of environmental variables such as biodiversity changes and other forest disturbances such as illegal logging, fires and hunting (though this need not necessarily be quantitative).

Advantages and Possible Barriers

Establishment system for monitoring carbon stock in forest management unit of MBNP will give advantage to support MRV national system for carbon accounting. Information on carbon stock of natural forest such as MBNP will also provide description on high value of conservation area as carbon stock. Although current incentive mechanism of REDD+ still lack of recognition to conservation area. Information from conservation area can be a lesson learned to protect natural forest and to provide possible incentives through voluntary or national mechanism.

In relation to involvement of community in monitoring and measurement of carbon, there are some advantages as follows:

- A significant workforce can be recruited to facilitate collection of large amounts of data.
- Villagers or local people surrounding the national park area can complement scientific endeavors with their skills and knowledge that scientists may lack and they can also provide crucial ecological data in national park areas where academic studies have not been executed. They are much more knowledgeable about the local area in Meru Betiri National Park.

- Local labor from villagers surrounding the national park area may be partly voluntary and cost will be low and efficient

However, some possible barriers may arise such as a need to improve community skill through training, because field measurement can be high source of error. Training is needed to ensure that the procedures approved by the IPCC or the others procedures are followed. To assure reliability of data measured by community, supervision may be required in early stages.

Institutional system of C-stock monitoring has been established in MBNP from field level/field team, section level and Balai Level, as a contribution from management unit level to support MRV system in province and national level. However, the system of C stock requires resources that can be potential barrier. The system can also be used for other purposes not only carbon, but also for community information, protection and biodiversity.

5. SOCIAL-ECONOMY ASPECTS OF COMMUNITY IN IMPLEMENTATION OF DA REDD+ IN MBNP

5.1. Socio-Economic of Community In Meru Betiri National Park

Disturbances in the area of MBNP can not be separated from the conditions of the community in surrounding area that utilize a wide range of forest products to fulfill their needs. This can be harmful to the forest in MBNP that might impact to forest sustainability and effort of climate change mitigation through REDD+. Socio-economic conditions of communities in surrounding MBNP area as the baseline have been identified to determine and to monitor the successful implementation of the DA REDD+ program in MBNP conservation area.

Baseline preparation was carried out through the methods of questionnaires and direct interview to community. Data collection has been conducted in the buffer villages of MBNP namely Curahnongko, Sanenrejo, Wonoasri, Kebonrejo and Kandangan. Interviews have been conducted directly by providing appropriate questions through the questionnaire in groups of 10-15 people.

Table 8. Population density of community in villages around the MBNP area

| No. | Village | Area (km2) | Total population | Density (people/km2) |
|-----|-----------------|------------|------------------|----------------------|
| | Jember District | | | |
| 1 | Curahnongko | 283,390 | 5.716 | 20,17 |
| 2 | Andongrejo | 262,790 | 5.509 | 20,96 |
| 3 | Wonoasri | 6,180 | 9.606 | 1554,37 |
| 4 | Curahtakir | 77,863 | 11.425 | 146,73 |
| 5 | Sanenrejo | 88,946 | 5.870 | 65,99 |

| | | | | |
|---|--------------------------------|--------|-------|--------|
| 6 | Kab.Banyuwangi Ds. Sarongan | 27,001 | 5.870 | 217,40 |
| 7 | Ds. Kandangan | 18,064 | 8.628 | 477,64 |

Based on sources of income, most population in villages of MBNP areas were farmers and estate crops employees/labor (74%), small traders (6%), and others including sugar makers, casual workers, handy men and others (20%). For the level of education, 50 - 80% of respondents (from five villages) only educated up to primary/elementary school level.

Income of most people in 2010 were quite low, with average of Rp. 505 601, - up to Rp. 1,215,093, - per person per month (about USD 50-121). This income was within the range of the Minimum Wage for Jember District in 2010 which was Rp. 875.000,-/month (USD 87). In 2014, there were significant increases of income as shown in the following Table. In 2014, the Minimum Wage for Jember District was Rp. 1.270.000,-/month (USD 127). Therefore, average income in Andongrejo was still lower than standard minimum wage for Jember District.

Table 9. Income of community in villages around the MBNP area

| Income | Income (Rp) in Village of | | | | | | |
|------------------------------|---------------------------|--------------|-------------|-----------|-----------|-----------|-----------|
| | Wonoasri | Curah-nongko | Andong-rejo | Sanenrejo | Sarongan | Kebunrejo | Kandangan |
| Total Income (year) | 463.560 | 140.800 | 329.925 | 526.925 | 1.005.800 | 662.200 | 218.520 |
| Respondents (persons) | 29 | 25 | 30 | 30 | 35 | 30 | 21 |
| Income/person/ year | 15.985 | 11.733 | 13.838 | 17.564 | 28.737 | 22.073 | 19.865 |
| Income/person/ month in 2014 | 1.333 | 2.347 | 1.154 | 1.463 | 2.395 | 1.839 | 1.655 |
| Income/person/ month in 2010 | 506 | 1.055 | 1.055 | 820 | 1.215 | 822 | 1.215 |

Meru Betiri National Park area has provided great benefits for communities in buffer villages. Lives of people depend on the area of the national park directly or indirectly. Directly, rural communities utilize forest products such as wood, bamboo, rattan,

honey, and fruit. While indirectly, they get the benefits of clean air, clean water, soil and other natural conditions.

The REDD+ activities have contributed to the increase of income of community in surrounding MBNP area. Through facilitation, community has gained better skill for post harvesting process and access to improve income. Some equipment has been gained by community such as food processing for jackfruit and medicinal plants. Through MoU, community has been given right to make cultivation of food crops and planting of NTFP trees in rehabilitation zone of MBNP. TNMB rehabilitation activities apply the patterns of collaborative/partnership involving the communities around the national park by through written mutual agreement that is mutually beneficial and is supported by various parties. Furthermore, support was also provided to some community groups for cultivation of cover crop and oyster mushroom to increase their income. Activities in planting of agroforestry can add additional income of Rp 7.000.000 – Rp. 30.000.000/ha/year (USD 700-3.000/ha/year). Note that highest income was from combination of agroforestry and medicinal plants.

5.2. Community Planting

Important objective of the project is to gain carbon benefits as much as possible. Therefore, activities are aimed to reduce unplanned deforestation/degradation although from historical data has shown slow rate of deforestation. Other important activities include enhancement of carbon stock as an important option to be implemented in order to enhance sink of carbon. According to zoning system of MBNP, there is rehabilitation zone in MBNP consisting area of about 4.000 ha. This area is possible for sink enhancement through the establishment of agroforestry system, as partnership between community and MBNP. Initial MoU has been signed as the basic regulation of such activities. The concept is cooperation between community and MBNP, where community utilize the land for agricultural or NTFP meanwhile the trees are maintained as conservation and carbon enhancement purposes.

Forest rehabilitation or tree planting in forest area of Meru Betiri National Park rehabilitation zone is a way to enhance carbon stock in the context of REDD+. This activity has been involving the whole local communities including students. Supports of facilitation and seedlings have been provided not only from the REDD+ project, including support of seedlings from CSR of *Seven and I Holdings Company*, but also from MBNP office and support by many stakeholders including NGO.

Other activities included planting of trees involving students and improving partnership through cooperation with RECOFTC to conduct adaptation study of climate change in Curahnongko village

5.3. Improvement of Community's Income

- **Cultivation of Oyster Mushroom**

An activity has been implemented to improve community income through cultivation of oyster mushroom. In facilitating local community demand to cultivate oyster mushroom, the MBNP through the program of REDD+ has facilitated activities of training of the oyster mushroom cultivation to local community. The objective was to reduce the community pressure to forest area of MBNP, through improvement of skills of the community, improvement of the effectiveness of capital assistance that has been previously provided and ultimately to increase community income.

The activity of training on oyster mushroom cultivation for the community living in buffer villages of Meru Betiri National Park were implemented in the Laboratory of the Faculty of Agriculture, University of Jember. Comparative study was conducted to producers of oyster mushroom seeds in Malang - East Java. Autoclave equipment and gas stove were provided to support the mushroom cultivation by community.

After the training, the community is expected to be more independent and successful in mushroom cultivation, therefore their income will also increase. With the increase of community incomes as well as their activities, it is expected that pressure and disturbance of the community to Meru Betiri National Park will decrease. This is due to their less dependent on the forest in fulfilling their daily needs. Note that successful oyster mushroom cultivation can produce average of 10 kg of mushroom everyday per household unit with price of Rp.10.000,-/kg. (USD 1/kg).

- **Community Forest Partnership Programs.**

This program has been facilitated by LATIN to enhance potential economic activities through community forest partnership programs of community in villages surrounding MBNP as recommendation from the result of consultation with related stakeholders, especially in relation to REDD+ activities in MBNP.

Mapping of agroforestry types and assessing economic and ecological values of agroforestry types

Mapping activity was carried out through collaboration of community, NGO and officer of MBNP. Coverage of mapping includes; types of agroforestry in rehabilitation zone of MBNP managed by farmer groups of Curahnongko village. Mapping of boundaries of agroforestry managed by farmer groups or individuals. Mapping

activities have three benefits, (1) the results of mapping describe all locations of individual land in more detail, including the boundary, species and the number of trees in particular land. Therefore, the results of mapping automatically described the distribution of agroforestry type and its owner. (2) the result of mapping would be useful as source for economic and ecological study of each agroforestry type. And (3) the result of mapping would be used as compliment or appendix for MOU or cooperation agreement between farmers and management of MBNP.

Inventory in rehabilitation land also found six types of land rehabilitation through agroforestry scheme. The type of agroforestry with dense trees + medicinal undergrowth has shown as the highest economical and ecological values.

Table 10. Six types of agroforestry with its economic value

| No. | Type of Agroforestry | Density (tree/ha) | Number of species | Income/year/ha (Rp) |
|-----|--|-------------------|-------------------|---------------------|
| 1 | No trees, crops only | 0 | 0 | 12.630.000 |
| 2 | A few trees + crops | < 50 | < 5 | 19.780.000 |
| 3 | Rather dense trees + crops | 51 - 100 | 6 to 10 | 7.902.000 |
| 4 | Dense trees + crops | 101-150 | 11 to 15 | 6.960.000 |
| 5 | Dense trees + medicinal undergrowth* | 151-200 | 16 to 20 | 30.749.200 |
| 6 | Dense trees without crops and medicinal undergrowth* | > 151 | > 11 | 10.440.000 |

*) empon-empon

Table above shows that type number 5 has the highest economical value and high density and number of trees. Moreover, under the land, some medicinal herbs are also planted. Therefore this the typical type of agroforestry which has high economic and ecological values.

Supporting the assurance of legal aspect for community that utilize rehabilitation zone of MBNP.

Legal assurance for community to have access of lands that have been rehabilitated through agroforestry is very important. Through legal assurance, community can have guarantee to gain benefits from agroforestry system that has been developed such as fruits, grass and medicinal plants. Effort has been done to facilitate cooperation agreement between community groups in Curahnongko village with MBNP that is going to be developed in other villages in surrounding MBNP. Through the lengthy process, finally the MOU was signed between farmer groups in Curahnongko village

which is joined in a group called JAKETRESI (Network of rehabilitation farmers) with MBNP.

Promoting Program PINTAR

Local NGO (LATIN/KAIL) has developed a program called PINTAR. Pintar Program is a program initiated by NGO to provide incentive to community who has made conservation efforts and made forest species plantation. The program has been introduced also to get support from local Indonesia private companies.

5.4. Training

Several training activities have been implemented during the program. Training on carbon accounting has been undertaken in collaboration with Brawijaya University. This activity has been undertaken on two phases, first phase was undertaken in Jember district while the second phase was undertaken in Kalibaru, Banyuwangi district. Each training was undertaken on 3 stages, namely: 1) Discuss and sharing experience between the participants and resource person related to natural resource management, 2) Field visit and measuring tree biomass in the dry land, 3) Analyzing and interpreting the data.

As initial activity before the participants learned about measuring and accounting the carbon stock in the field, the participants were given some materials related to MRV, namely: 1) Definition of climate change, the cause and effect of its, 2) Definition of emission, sequestration, adaptation, mitigation, land change, and land use, 3) REDD+, 4) MRV activity and carbon accounting using RaCSA (Rapid Carbon Stock Appraisal).

Training on resource based inventory was conducted in cooperation between Forestry Research and Development Agency (FORDA), Meru Betiri National Park and the Faculty of Agriculture, Brawijaya University. The trainings were conducted in two stages, in Jember district and in Kalibaru, with participants from Banyuwangi.

In the training, materials included, Techniques of Inventory for Farmer's Resource, Policies of local government to support community empowerment in surrounding National Park, and introduction of maps and simple mapping .

During the training, participants conducted field practice based on previous materials provided. Participants applied field inventory of resources on farmer's land and produced a simple map based on the inventory. Then, they estimated economic value of the land and assessed the best composition of plants that could produce optimum profits for the short and long term while still maintaining trees as carbon stocks.

Other materials of training was conducted by the Team from Faculty of Agriculture, Brawijaya University led by Prof. Kurniatun Hairiah. Participants were provided understanding on optimum species composition and function of agroforestry and they were actively involved in discussion regarding the function and role of agroforestry. Understanding on the role of forest as carbon stock for climate change mitigation was provided through field practice on how to measure forest carbon stock consisting of above ground biomass, below ground biomass, necromass, litter and soil.

The next material was field practice of the role of agroforestry in hydro-ecology to prevent erosion and flood, with instructor Dr. Widiyanto From Brawijaya University. To identify the role of agroforestry on water storage, participants were provided simulation on three different conditions of land covers namely bare land without vegetation cover, land with undergrowth and litter, and land with dense undergrowth surrounded by trees. Participants made comparison from the result of surface run-off. Objective of this simulation was for the participants to compare the quantity and quality of water resulted from each land cover. During this simulation session participants were actively involved in discussion and question related to the role of forest on hydrology.

Forest protection training has been undertaken twice (two periods). The participants were trained on how to protect MBNP from the threats and damages by giving them knowledge and skills for investigation technique, forestry extension technique, fauna protection, management and policy of MBNP, as well as climate change issue.

Participants consisted of related stakeholders from MBNP areas especially community and leaders, police and local government staff. The resource persons were from Ministry of Forestry, MBNP, Police, Universities, Local Governments, and Parliament Member.

5.5. Awareness Raising

Activities to increase public awareness and stakeholders to support the sustainability of REDD + and Meru Betiri National Park are expected to be one of the communication medium between management of MBNP with related stakeholders in order to maintain the sustainability of national park forests. Many lessons can be learned from this activity, including that the social approach in order to reduce or prevent the pressure from the public to the national park area is very important and fundamental, either through to the public directly or community leaders. One of the efforts that is effective in reducing the pressure of people to the forest of national park is empowering them through creative and sustainable economic development. For further activities as an effort to reduce illegal logging, it can be more emphasis on the

development of commitment among stakeholders related to law enforcement in the forestry sector.

Awareness raising program has been addressed to reduce illegal logging and land encroachment through awareness raising on importance of maintaining ecosystem function. Awareness raising has been undertaken for related stakeholders and communities several times involving multi stakeholders, including community, community leaders, police, Forestry Officials, local NGO, Perhutani, and parliament members. This activity is important also after project completion.

Activities were carried out to collect information related to community especially related to project area in villages near rehabilitation zone and to prepare the establishment of plantation with high carbon content. Activities were also carried out also to increase awareness of local community including students, to increase enhancement of carbon stock through planting of various tree species and to develop network and partnership to support local communities for planting trees.

To increase awareness of local community including students, there have been conducted training for young people, including young “Dalang”, wayang puppet show that inserted the topic of climate change issue, training on introduction of climate change impact for women group, and “Pengajian Akbar” or great pray that inserted climate change issue.

In relation with illegal logging, a review on Illegal Logging as a Threat to Forest Resources and Implementation of REDD in Indonesia has been prepared as basic information on the issue of illegal logging and its impact to REDD+ project.

5.6. CSR of Seven and I Holdings Company

The DA of REDD+ in MBNP has been supported financially by *Seven and i Holding Companies* through ITTO Program of PD 519/08 rev 1 (F). In addition to this support, *Seven and i Holding Companies* has also conducted the activity undertaken by the company's CSR department. In early 2012, the CSR Department though the web site, circulated the questionnaire about the company through the contribution of the readers of CSR reports. For any reader who filled out the questionnaires about CSR report would contribute to the planting of one tree in the Meru Betiri National Park. Until the deadline for submission of the questionnaire, a total of 153 questionnaires have been responded by mostly Japanese citizens. Procedure of implementation has been carried out by converting the value of the tree in the U.S. dollar and to the Indonesian rupiah. The company then sent the amount of money to the account of LATIN as the executor of field planting with the involvement of community.

In terms of physical number, may be the planting of 153 trees does not mean too much. However, the spirit of awareness and efforts involving the public and companies to contribute to the global issue of climate change and conservation of tropical forests is something that should be highly appreciated. This could be the lessons for other companies or parties that would contribute to the efforts to address global issues such as climate change and forest conservation.

5.7. Biodiversity as an important part of REDD+ mechanism benefit

Reduce Emissions from Deforestation and Degradation (REDD) is the initiation of global climate change where developed countries and private sectors are expected to provide payment as compensation to developing countries that manage their forests sustainably. REDD is a new approach to climate change mitigation, which gives greater recognition of the importance of protection and management of tropical forests resource in developing countries. Current progress showed that REDD has been expanded its scope to REDD+ that include conservation, sustainable forest management and sink enhancement.

Survey of biodiversity is required to demonstrate the existence or non-existence of conservation values such as species that are globally threatened and to develop a biodiversity monitoring plan to assess impact of REDD+ during the project activities. Sustainability of biodiversity is an important additional benefit or co-benefit for each activity or REDD projects.

Biodiversity plays an important role in maintaining ecosystems at present and future. However, until recently, Biodiversity resource in natural ecosystems and managed ecosystems have not provided tangible benefits to local communities, so this has resulted in local communities are not interested in conservation efforts.

Biodiversity refers to species, abundance of species, genetic composition and communities, ecosystems and landscapes. Other definition has simplified the biodiversity as a life in its all types and levels. Life in its all types includes plants, animals, fungi and other micro-organisms. Regarding REDD activities, basic questions related to biodiversity in particular area are: what kinds of plants and animals exist in particular area and, how is the impact of REDD+ (positive or negative) to the biodiversity.

Conversion of forests to intensive agriculture and homogeneous species will result in loss of biodiversity in each landscape. REDD+ with effort to maintain the existence of biodiversity should get incentives and can be incorporated into the scheme such as Payment for Environmental Services (PES). This scheme is being sought and tested in

all conditions as a way to involve communities in conservation practices. (ICRAF, 2010).

For the implementation of REDD +, information regarding biodiversity is needed as baseline and further monitoring as required by the voluntary standards such as The Climate, Community and Biodiversity Alliance (CCBA). Involvement of the community to access biodiversity is expected to improve public awareness and community involvement in REDD activities that will ultimately provide benefits to both society and the environment.

MBNP has been selected as one of the DA REDD activities in conservation areas. The results of studies showed that the historical emissions from deforestation and degradation in the park are relatively low. Some important species of vegetation and wildlife have been found in MBNP, therefore REDD mechanism mainly related to the conservation aspect should have more attention. International mechanism should be established by providing rewards or incentives for conservation areas that have been successful to maintain their biodiversity.

6. LESSON LEARNED AND CHALLENGES

6.1. Lesson Learned

Lesson learned from the activities of DA REDD+ in MBNP has been disseminated through several workshop involving broad stakeholders. During workshops, several topics were presented including Overview of the implementation of DA REDD + in MBNP, Preparation of the Project Design Document (PDD), MRV in the estimation of carbon, Implementation of REDD + in the conservation area, Empowerment of Community, Readiness of the Meru Betiri National Park in the implementation of DA REDD+, REDD+finance and benefit sharing , Training to the community, and Lessons learned from the implementation of other DA.

During the workshops, discussion of technical aspects produced some important points to consider in developing REDD+ at the national park, namely:

- Implementation of DA may end up as a learning DA or results-based DA. To achieve the result based DA, a Project Design Document (PDD) following the framework of Voluntary Carbon Standard (VCS) has been prepared. The results of discussion showed a trend that DA REDD + in MBNP can proceed as a results-based DA REDD+. PDD that has been prepared could be used to negotiate with any interested parties to finance conservation activities in the conservation area.
- Related to the development of Monitoring, Reporting and Verification (MRV) system of REDD DA. Some 40 permanent plots have been established for carbon monitoring that refer to the method of IPCC Guideline 2006.
- DA REDD+ in Meru Betiri National Park should be linked with the big picture of national REDD+ strategies that put REDD+ as a new way of thinking of conservation management beyond carbon. This is related to the value of biodiversity and the low additionality of the national park that would be a disincentive for REDD+ activities in the conservation area.
- The main issues of REDD + is a payment system that is not yet clear. Nevertheless, the result of the DA can be one input to develop REDD+ reference system in the country that can be used for negotiation with buyers/potential donors.

Discussion of social and institutional aspects produced some important points to consider in developing REDD + at the national park, namely:

- Community is an important stakeholder in the implementation of DA REDD+. Empowering community to achieve objectives of DA REDD + in MBNP has been implemented through training, skill enhancement and incentive programs.
- Community's role in measuring and monitoring forest carbon is very strategic to generate enough data reliably with relatively low cost and enhance community

capacity. The challenge is how to train people to understand climate change and forest carbon and to have the basic skills of forest carbon measurement. With regards to training, necessary companion during training is required to transfer knowledge from the facilitator to the farmers.

- In relation with tenurial issue in the national park, community basically understands that the land and existing trees in national park are state-owned, while fruits and intercropping plants are their right. People who already understand their rights and obligations are a huge potential for security of forest adjacent to their residence. This will greatly help the security system that still lacks of rangers in the national park.
- MBNP has been willing and ready to support the implementation of DA REDD+ as a result based DA REDD +. The Directorate general of PHKA has very important role in the implementation of the DA in the conservation area. Rules relating to community involvement in the activities within the national park in the rehabilitation zone are necessary to emphasize that community gets legal certainty in the use of land in the national park rehabilitation zones
- Lessons from Berbak National Park suggested that REDD+ activities produce greater carbon benefits in the area of peatland. REDD+ schemes are based Voluntary Carbon (VCS) and combined with the Community, Climate, and Biodiversity Standard (CCBS) for optimizing social and environmental safeguards.

From the overall implementation of DA REDD+ in MBNP, This program has provided lesson learned for the whole implementation of DA REDD+ in Indonesia as follows:

- DA REDD+ have been established representing various geographical/forest conditions, with scope of FMU, District, Province
- A need for clear guidance for the future of DA, such as on Registry, Monitoring, Reporting, Verification, contribution to national emission reduction, Incentive/Results Based Payment
- They have been running by themselves, some have completed
- End up as learning DA, how to continue as result based DA (SNI: DA REDD+)
- A need for more role of Govt, to register, to provide media for communication, finance scheme (carbon right and benefit sharing), and future direction.

Particularly from the implementation of DA REDD + in MBNP, some lesson learned include:

- DA REDD+ in MBNP representing DA in FMU of Conservation Area (National Park)
- Conservation forest in MBNP is relatively in good condition, high in carbon stock and has important biodiversity value

- DA in Conservation Areas have been facilitated through DG PHKA regulation/guidance, and some have been registered, including DA REDD+ in Berbak National Park, Sebangau National Park and MBNP.
- Actually activities of DA REDD+ relate to the duty of MBNP as conservation institution, which is to support conservation for sustainable forest. Therefore, after project completion some activities are still required to support forest SFM and these activities basically will be conducted by the MBNP with budget source from state budget
- Particular zone is needed to accomodate community activities and to increase C-stock

DA REDD+ Activities Related to Carbon

- Conservation forest in MBNP is relatively in good condition, high in carbon stock and has important biodiversity value
- Provide information on carbon stock of national park as conservation area, MRV system for monitoring carbon stock and low rate of deforestation
- Emission Reduction in MBNP: Avoiding Deforestation and degradation, enhancement of C-stock: in rehabilitation zone
- PSP's are required to monitor carbon stock in forest areas (increase/decrease)
- Additionality in REDD+: Current mechanism of REDD+ gives advantage for areas with high deforestation rate, meanwhile conservation area has small deforestation rate and high conservation value (biodiversity).
- A need of reward / incentive mechanism for areas with good conservation effort
- Availability of some voluntary standards, no mechanism yet for compliance scheme

DA REDD+ Activities Related to Community

- Community in and surrounding the MBNP is important stakeholder for REDD+ program.
- So far they have proven their willingness to participate in the program.
- The success of the program depends on community awareness and participation, therefore mechanism of REDD+ should consider community as main stakeholder, and the program should provide short and long term benefits to the community.
- Community needs long term assurance for their activity in MBNP areas under particular agreement with MBNP
- Community involvement as important inputs for development of MRV system for the national level or other REDD program.

- This REDD+ program has also provided lesson that community needs long term assurance for their activity in MBNP areas under particular agreement with MBNP to fulfill their daily needs.

6.2. Challenges

DA REDD+ program in MBNP has been designed with main focuss to contribute to emission reduction through activities on community empowerment and MRV related to carbon accounting. There has been a challenge for REDD activity in MBNP to achieve its objective in emission reduction, because based on remote sensing data analysis, deforestation rate in MBNP has been quite low, although there are threats from forest degradation due to illegal logging and encroachment.

Community is important stakeholder of REDD+ in MBNP. They make the park vulnerable to any disturbances caused by their activities such as illegal logging and encroachment. The program has been set to overcome the issue of community through activities of empowerment to improve their awareness, income and their participation in MRV. For the program, it is a real challenge to provide legal basis for community participation in national park management and to improve their prosperity towards mitigation

With current progress of negotiation in COP meeting and available mechanism of voluntary markets, REDD+ mechanism still considers emission reduction as main target of the program, meanwhile biodiversity and social safeguards are considered as co-benefits only. DA REDD+ in MBNP has shown small emission from historical data of deforestation and degradation. Therefore, it is a challenge that conservation is recognised for incentive in global level.

REDD+ as compliance mechanism is still in progress, therefore there is still lack of international guidance regarding its implementation especially related to carbon accounting and MRV. Meanwhile MRV system for national level as a reference is also still under development. However, DA REDD+ in MBNP has provided best practice in development of MRV system that can be used as inputs for other places and at national level.

- Current mechanism of REDD+ gives advantage for areas with high deforestation rate, therefore it is a challenge and learning process for REDD+ in conservation area with small deforestation rate and high conservation value (biodiversity). A need of reward / incentive mechanism for areas with good conservation efforts.
- Although current mechanism of REDD+ in compliance scheme is still under development, actually there are many potential mechanism and incentives

available, including national fiscal mechanism, CSR from private companies and even bilateral cooperations to support SFM.

7. CLOSURES

REDD is still in readiness phase and DA's provide lesson learned for REDD+ before full implementation. The DA is an example of a public-private partnership, can be Learning DA or result based DA.

Demonstration Activities (DA) of REDD+ in MBNP through the ITTO project of PD 519-08 rev 1 (F) and financial support from *Seven and i Holdings Company* have been implemented and achieved the objectives to contribute to emission reduction and to support the sustainability of tropical forest. This DA represents conservation area in forest management unit level. In particular, the activities provide lesson learned related to MRV of carbon accounting and community involvement.

Conservation forest in MBNP has been relatively in good condition, high in carbon stock (7.5 million ton C) and has important biodiversity value (including the last remaining habitat for Javan Tiger). However, current mechanism of REDD+ gives advantage for areas with high deforestation rate, therefore it is a challenge and learning process for REDD+ in conservation area with small deforestation rate and high conservation value (biodiversity). A need of reward / incentive mechanism for areas with good conservation effort.

MBNP represents conservation area (national park) with small deforestation rate. it is a need for incentive/reward for areas with high conservation value (not only carbon benefit, but also to consider biodiversity and community). Some possible alternatives of incentives for conservation areas include from national sources through national fiscal mechanism, CSR from private companies and even bilateral cooperations to support SFM

Community in and surrounding the MBNP has been important stakeholder for REDD+ program. So far they have been provided information, facilitation and support by REDD+ activities. They have proven their willingness to participate in the program. The success of the program depends on their awareness and participation, therefore mechanism of REDD+ should consider community as main stakeholder, and provide short and long term benefits to the community. Community needs long term assurance for their activity in MBNP areas under particular agreement with MBNP to fulfill their daily needs.

This program provides lesson on application of REDDS+ in Conservation Area, showing small deforestation rate and high conservation value (biodiversity). REDD+ mechanism should provide reward / incentive for areas with good conservation effort. It provides information on carbon stock of national park as conservation area, MRV system for monitoring carbon stock as well as low rate of deforestation and community involvement as important inputs for development of MRV system for the national level or other REDD program.

After project completion; the DA may end as learning DA or result based DA. Some activities related to carbon benefits, community and conservation would be required for forest sustainability. MBNP office as project proponent has been preparing budget and activities to support forest sustainability including REDD+ activities. For result based DA, options for incentives/future funding are required, including from international support, national budget mechanism or other possible supports.

Plan Vivo scheme that has been initiated by local NGO to get carbon benefits particularly for community in rehabilitation zone should be continued and supported by all stakeholders. This could be a good example of PES for carbon in relation with REDD+ mechanism by enhancing carbon stock.

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MINISTRY OF FORESTRY
OF THE REPUBLIC OF INDONESIA

CERTIFICATE OF APPRECIATION
AWARDED TO
SEVEN AND I HOLDINGS COMPANY

For the Contribution in Sustainability of Tropical Forest Through the Demonstration Activity of
Tropical Forest Conservation for Reducing Emissions from Deforestation and Forest Degradation and
Enhancing Carbon Stocks in Meru Betiri National Park, Indonesia.

JAKARTA, 30 DECEMBER 2014
DIRECTOR GENERAL
FORESTRY RESEARCH AND DEVELOPMENT AGENCY (FORDA)


PROF. DR. IR. SAN AFRI AWANG, M.Sc

Certificate by
Forestry
Research and
Development
Agency
(FORDA) to
*Seven and i
Holdings
Company*

SOME PHOTOS



Photo 1. Involvement of students and stakeholders in nursery and planting activities



Photo 2. Involvement of females in awareness raising of forest conservation through puppet show and religion gathering



Photo 3. Training workshop and awareness raising on climate change and REDD+ to local community

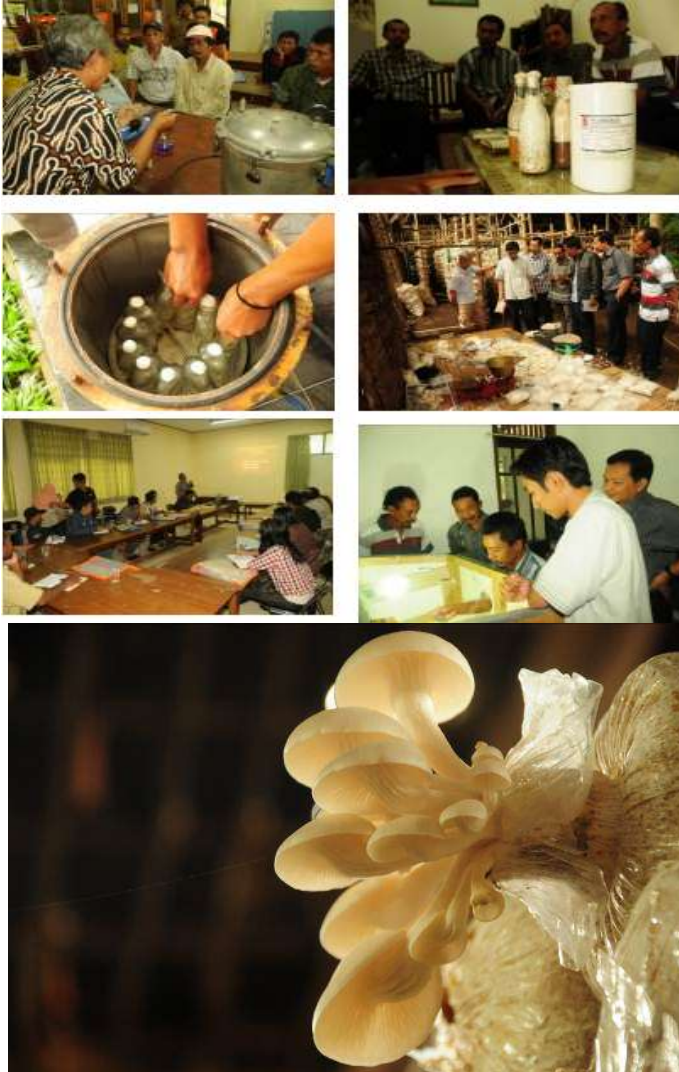


Photo 4. Training on oyster mushroom cultivation for community



Photo 5. Site visit by *Seven and I Holdings Company* and ITTO involving school children



Photo 7. Visit from FRIM (Forestry Research Institute, Malaysia and IJ-REDD



Photo 6. Rehabilitation zone planted with agroforestry and medicinal plants



Photo 7. PSC meeting