# PROJECT COMPLETION REPORT
A Public-Private Partnership
of Tropical Forest Conservation for Reducing Emissions
From Deforestation And Forest Degradation and Enhancing
Carbon Stocks in Meru Betiri National Park, Indonesia.
**ITTO Program PD 519/08 Rev 1 (F)**

**Implementing Agency**
Center for Climate Change and Policy Research and Development
Jl. Gunung Batu No. 5, Bogor, West Java, Indonesia
Phone: +62-251-8633944, Fax: +62-251-8634924
Website: www.puspijak.org

**Executing Agency**:

FORESTRY RESEARCH AND DEVELOPMENT AGENCY (FORDA)
Ministry of Environment and Forestry,
Gedung Manggala Wanabhakti, Bock I, 11 th floor,
Jl. Jend Gatot Subroto, Jakarta,
Phone: 62-21-573-0398, Fax: 62-21-572-0189
Email: secforda@forda-mof.org, Website:www.forda.go.id

**Ministry of Environment and Forestry,
of the Republic of Indonesia
Bogor, 2015**

# PROJECT COMPLETION REPORT

**Title:**
**TROPICAL FOREST CONSERVATION FOR REDUCING EMISSIONS FROM DEFORESTATION AND FOREST DEGRADATION AND ENHANCING CARBON STOCKS IN MERU BETIRI NATIONAL PARK, INDONESIA**

**Project  Number:**
**PD 519/08 Rev 1 (F)**

**Host Government:**
**INDONESIA**

**Starting Date:**
**JANUARY 1st, 2010**

**Duration (months):**
**48**

**Project Cost:**

| | |
|---|---|
| **ITTO** | **US$814,590** |
| **GOI (direct and in kind contribution)** | **US$158,798** |
| **Grand Total** | **US$ 973,388** |

**Project  Coordinator : Mr. Ari Wibowo**

**Implementing Agency**
**Center for Climate Change and Policy Research and Development**
**Jl. Gunung Batu No. 5, Bogor, West Java, Indonesia**
**Phone: +62-251-8633944, Fax: +62-251-8634924**
**Website: www.puspijak.org**

**Bogor, JULY 2015**

# LIST OF CONTENT

## LIST OF TABLES

# LIST OF FiGURES

**EXECUTIVE SUMMARY**

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 (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 DA REDD+ in MBNP 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. Financial support was provided by *Seven and i Holdings Company.*  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.  Total budget : US$ 973,388, including contribution of inkind from the Government of Indonesia.

**Objective** :   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.

**Activities** :  Activities have been implemented to achieve several outputs as determined in the project document (as a standard for ITTO project activities). To achieve the utputs, the activities have been carried out basically according two major issues, (1) related to community and (2) related to MRV of carbon accounting.  Activities related to community in relation with REDD+ include:Awareness raising, socialization, extension, Training (MRV of carbon, forest protection, resource based inventory),  Facilitation and support of equipment (eg for mushroom cultivation) and seedlings  as well as Facilitation of cooperation and establish parnership  Activities related to MRV of carbon accounting include: Establishment and measurement of PSP , Land cover change analysis , Preparation of baseline, Preparation of SOP for carbon measurement, biodiversity and implementation of DA in conservation area , Preparation of carbon database, Assessment of methodology for REDD in Conservation area, Preparation of Project Document according to VCS, with VM-0015 methodology,

preparation of PIN for Plan Vivo scheme and registration by Ministry of Forestry of the Republic of Indonesia

**Results** : Activities have been designed to cover involvement of community in relation with REDD+ and MRV for carbon accounting. The 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 provided to community such as food processing for jackfruit and medicinal plants, also support for cultivation of cover crop and oyster mushroom to increase their income. Through MoU, community has been given right to access the rehabilitation zone of MBNP to make cultivation of food crops and planting of Non timber forest products (NTFP) trees through agroforestry system. TNMB rehabilitation activities apply the patterns of collaborative/partnership involving the communities around the national park through written mutual agreement and supported by various parties. 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 women and students. Supports of facilitation and seedlings have been provided from the REDD+ project, including support of seedlings from CSR of *Seven and I Holdings Company*, from MBNP office and support by many stakeholders including NGO.

Monitoring and estimating $CO_2$ emissions from deforestation and forest degradation become a key element for any activities of REDD+. REDD+ 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. Some 40 permanent sample plots (PSP) have been constructed and additional PSP's were also made in rehabilitation zone. Carbon pools measured are based on IPCC Guideline (2006), consisting of five carbon pools, Aboveground Biomass (undergrowth, seedlings, saplings, poles and trees), Below ground biomass (roots), Necromass Biomass, Litter Biomass and Soil organic carbon.

MBNP has a huge amount of carbon stock. From estimation, total carbon stock in MBNP is 7,514,756.91 ton C. Possible activities that can reduce emission and increase carbon stocks include conservation, avoiding deforestation; avoiding degradation; and enhancing carbon stock which is possible in rehabilitation zone

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.

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 web Http://www.puspijak.org.

Some studies have been made by many institutions to learn about the implementation of DA REDD+ in MBNP. Sudies 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, AfoCo (Asean delegates through a Korean funded project) and other institutions.

**Challenge**: 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 vurnerable 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 biodivertsity 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. 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.

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.

**Lesson Learned** : The activities have provided lesson learned. For the whole implementation of DA REDD+ in Indonesia, this program has provided lesson learned that (1) DA REDD+ have been established representing various geographycal/forest conditions, with scope of FMU, District, Province (2) 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 (3) They have been running by themselves, some have completed (4) End up as learning DA, how to continue as result based DA (SNI: DA REDD+) and (5) 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 (1) DA REDD+ in MBNP representing DA in FMU of Conservation Area (National Park) (2) Conservation forest in MBNP is relatively in good condition, high in carbon stock and has important biodiversity value (3) 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. (4) 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 and (5) Particular zone is needed to accomodate community activities and to increase C-stock

Lesson learned of DA REDD+ Activities Related to Carbon include (1) Conservation forest in MBNP is relatively in good condition, high in carbon stock and has important biodiversity value (2) Provide information on carbon stock of national park as conservation area, MRV system for monitoring carbon stock and low rate of deforestation (3) Emission Reduction in MBNP: Avoiding Deforestation and degradation, enhancement of C-stock: in rehabilitation zone (4) PSP's are required to monitor carbon stock in forest areas (increase/decrease) (5) Additionallity 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). (6) A need of reward / incentive mechanism for areas with good conservation effort and (7) Availability of some voluntary standards, no mechanism yet for compliance scheme

Lesson learned of DA REDD+ Activities Related to Community include: (1) Community in and surrounding the MBNP is important stakeholder for REDD+ program, so far they have proven their willingness to participate in the program (2) The success of the program depends on community awareness and participation, therefeore mechanism of REDD+ should consider community as main stakeholder, and the program should provide short and long term benefits to the community (3) Community needs long term assurance for their activity in MBNP areas under particular agreement with MBNP (4) Community involvement as important inputs for development of MRV system for the national level or other REDD program and (5) 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.

From implementation of DA REDD+ in MBNP, it can be concluded that Conservation forest in MBNP is relatively in good condition, high in carbon stock (7.5 million ton C) and has important biodiversity value (including the last remaining habitat for Java Tiger). Community in and surrounding the MBNP is 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 has also provided 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. For result based DA, options for incentives/future funding are required, including from international support, national budget mechanism or other possible supports.

# 1. PROJECT IDENTIFICATION

## 1.1. Context

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 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 ± 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+ in MBNP 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.  Up to the year 2014, most activities have been implemented to achieve the objectives. This project has been set up for 4 years (2010-2013), and has been extended until early 2015.  The program basically consists of two focus activities, related to community and MRV of carbon accounting.  The activities have provided lesson learned before REDD+ full implementation, especially related to role of conservation area, community involvement and MRV of carbon accounting.

## 1.2. Origin and Problem

Forest in Indonesia consists of various types, and based on its functions the forest is divided into production forests, conservation forest, protection forest and forests that can be converted to other uses.  The total area of conservation forest is approximately 23 million ha, which consist of National Parks, Nature Reserves and Recreation Forest.  Undisturbed conservation forests, store significant carbon, and therefore avoiding emission to the atmosphere. However, illegal logging and forest encroachment as threats to conservation forest would increase carbon emission to the atmosphere.

The project has been intended to enhance tropical forest conservation to promote  emissions reduction and enhancement of forest carbon stocks through enhancing local community participation  in Meru Betiri National Park (MBNP). MBNP is located in the southern part of East Java, facing into the Indian ocean (Figure 1). It has total area of approximately 58,000 ha, rich in biological diversity across the landscape which consist of several vegetation types, such as highland vegetation, lowland and coastal vegetation, swamp and mangrove. The area of MBNP is divided into five zones namely : core zone, intact forest zone, utilization zone, rehabilitation zone  and buffer zone.  Each zone is managed specifically according to its function, such as for protection, conservation, research, education, culture, recreation, and others.



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

Considering the important role of conservation forest not only for conserving biodiversity, but also conserving carbon stocks on one side, dependency of local community to the product and services provided by the MBNP and potential role of local community to better protection of the MBNP on another side, the project intervention contributed to the three strategic global issues on conservation, climate change, and poverty. These three issues are very relevant with existing problems that need to be addressed in conservation areas such as MBNP.

The use of forest resources in Indonesia follows the rules applied to each of the four forest functions/categories. First, conservation forest, managed to conserve biological diversity, the source of genetic resources needed for food crops, medicinal plants, wood and non-wood forest species domestication. Second, protection forest, important to maintain hydrological function, watershed protection and soil conservation. Third, production forest, provides timber and non-timber products, and is managed through selective cutting for natural forest and clear cutting for plantation forests. The forth category is conversion forest, forest area which can be converted for other land uses.

Deforestation or conversion of forest land into other land categories is the main cause of forest destruction. Deforestation occurs due to conversion of forest to other purposes such as estate crops, mining, settlements, and forest disturbances such as encroachment, fires, illegal logging and others. Indonesia has lost approximately 1.7 million ha of its forest per year during the period of 1985 – 1997, The highest forest lost occurred during 1997-2000, reaching the figure of 2.8 million ha per year. The latest published data (MoF, 2012) showed that net forest lost during 2000-2005, reached about 1.1 million ha, and tended to reduce in 2009-2011 by 450.000 ha.

Report by MoE (2010) showed that in Indonesia, forestry and land use sector contibuted the highest emission compared with other sectors. To deal with climate change issue especially in land use and forestry sector. Indonesian Government has issued several regulations and establishment of institutions. The regulations include PP. 61/2011 on National Action Plan of GHG, PP.71/2011 on Inventory of GHG, Presidential Decree No 46/2008 on the establishment of National Council for Climate Change, which is directly coordinated by Presidential Office and Perpres 57/2013 on the establishment of REDD Management Agency. Latest development showed that the Ministry of Forestry has been merged with the Ministry of Environment to become Ministry of Environment and Forestry (MEF). There is Directorate General of Climate Change Control within the MEF, therefore the BP REDD and DNPI are incorporated within the DG of CC of MEF. In the National Action Plan of GHG, forestry and peatland have the highest target to reduce emission until 2020.

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+.

Several initiatives have also been implemented such as LOI between Indonesia and Norway with commitment from Norway to support USD 1 billion fund for effort in emission reduction, The FCPF World Bank with Carbon Fund program, IAFCP, Forclime, FIP and others. Moreover, during readiness phase, some DA of REDD+ have been established accros Indonesia representing seven bio-regions and applied in forest management unit, district and province levels. Meru Betiri National Park (MBNP) in East Java, Indonesia is one the National Parks which has been selected as the project site for REDD+ DA activities with fund support from *Seven and i Holdings Company* through the International Tropical Timber Organization (ITTO). This DA is as an effort to deal with global warming issue as well as the conservation of tropical forest.

Problems to be addressed

Conservation forests are ecosystems with high carbon stocks and rich in biodiversity. They have been assigned as protection areas to conserve key biodiversity resources and other environmental goods and services that these forests provide. In the broader landscape, conservation forest is one of a mosaic of forest, that interact with other zones such as agriculture and settlement zones. Because of the size and role of the conservation forest, the way these forested areas are utilized and regarded, by national, provincial and local governments as well as the local communities and industry around them, will be a critical factor in the effective efforts on reducing emissions and enhancing carbon stocks.

Promoting sustainable community development is consistent with the goals of climate change convention to stabilize atmospheric greenhouse gas concentration and to support sustainable development. It is a major challenge to find ways of ensuring that local communities, can continue to get benefit from the forests, or that alternative livelihoods or paths of economic development are open to them. Local communities are dependent on the ecosystem services of natural forests to maintain their way of life, and they also play a crucial role in sustainable use and conservation of forests. It is therefore essential to protect biodiversity, safeguard the interests of local communities as well to mitigate climate change in land use and forestry sector.

The above challenges are relevant to the present condition faced by most tropical forest management in the developing countries, which are still under pressure and threat by communities due to lack of access to land, poverty and limited resources. This conservation forest area of Meru Betiri National Park (MBNP) as described earlier has been selected as a representative of conservation area with many of the challenges usually faced in maintaining the sustainability of forest areas, reducing emission and enhancement of carbon stocks and poverty reduction of community living surrounding the forest.

As an incentive mechanism of mitigation action of climate change in forestry and land use sector, REDD+ is still in readiness phase before its full implementation. DA REDD+ in MBNP in conservation areas therefore will address several issues including:

- Sustainability of conservation forest to support mitigation action
- Local community as important stakeholders, as potential source of threat to the forest but also as potential contibutors to reduction of emission and forest sustainability
- Methodology related to measurable, reportable and verifiable (MRV) of carbon accounting.

In Indonesia, based on its function, the forests are devided into conservation forest, production forest and protection forest. MBNP is a National Park as a conservation area mainly to protect important biodiversity. Moreover, forest laso has the function as important sources of carbon to deal with the issue of global warming. Forests including areas are under threats due to population growth and lack of land for human activities. Therefore the mechanism of REDD+ to avoid deforestation and degradation is in line with the effort of SFM, while also reducing emission.

Lack of community participation in avoiding deforestation, degradation and biodiversity loss is inter-related with the absence of readily applicable scheme, currently presence but not effective, poverty due to lack of alternative sources of income for living, lack of awareness and poor law enforcement. The more serious threat for deforestation and degradation in the case of MBNP is in the utilization zone with total area of 1.285 ha, rehabilitation zone (4.023 ha) and buffer zone (2.155 ha). Threat by illegal logging and illegal harvest of genetic resources also occurs in the strictly protected area (Core and Intact Forest Zone). According to the Strategic Plan document, the threat by local community to the Park area includes illegal harvesting of biodiversity, unsustainable collection of firewood and hunting of wildlife species, and forest encroachment for planting agricultural crops. Poverty seems to be the strongest driver for illegal harvest of biodiversity and forest encroachment in this area. This condition has become impediment in conservation forest management to sustain ecosystem function and conservation of biological diversity. In addition, the awareness on the importance of maintaining the environmental role in providing good and services including for carbon offset is still lacking. With proper project intervension, community can also support the effort to SFM and mitigation action.

REDD+ in global level is still under development. In Indonesia REDD+ is in readiness phase with many activities including the development of several DA REDD+. As an incentive mechanism REDD+ requires MRV to be applied in mitigation action. So far there is still lack of knowledge and understanding by many stakeholders related to carbon accounting to support MRV in mitigation action as well as lack of methodology of REDD+ for conservation area.

For MBNP, unavailability of system to monitor biodiversity and other resources including carbon stocks is caused by several factors, ranging from weak institutional and human resource capacity to the absent of suitable methods for the area.. The methods used for resource base inventory and carbon accounting need considerable improvement to obtain reliable results in a cost effective way. This condition has caused the existing baseline data of the MBNP are incomplete and in many cases are no longer valid. Other data, such as rate of deforestation, degradation and biodiversity loss, climate change related data are still not

available or not regularly up-dated. Lack of baseline data could cause some difficulties in monitoring changes of forest condition including carbon stocks in this conservation forest.

In order to maintain and restore goods and services of forest ecosystem in the Park, including its function to store carbon, project intervention was critically important. This ITTO project become the important stimulus or accelerator to achieve the overall goal of reducing emissions from deforestation and forest degradation (REDD) in Indonesia and become a pilot project for reducing emission and enhancement of forest carbon stocks through the empowerment of local institution and community participation in conservation area management.

## 2. PROJECT OBJECTIVES AND IMPLEMENTATION ATRATEGY

### 2.1. Project Objectives

The development objective of this project 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 as an integral part of the larger landscape in which they live.

The specific objectives of the project were as follows:

(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).

### 2.2. Project Strategy

For all ITTO Projects, the initial strategies are set in Project Proposal Documents that have been approved. All activities have been set to achieve outputs. Main outputs for this ITTO project included:
Output 1.1 Community participation in conservation improved
Output 1.2 Alternatives source of income to improve the livelihood of local communities living inside and in the surrounding area of Meru Betiri National Park (MBNP) developed
Output 1.3 Illegal logging and forest encroachment reduced and reported
Output 2.1 Capacity in resource base inventory and carbon accounting improved in measurable, reportable and verifiable form
Output 2.2 Report on comprehensive baseline data and estimation of emission reduction and carbon enhancement of the national park prepared
OUTPUT 2.3: System for monitoring emission reduction and enhancement of carbon stocks established and validated

To achieve the objectives, and outputs the activities have been set through the following strategies:

1. A thorough overview of the existing conditions including the forests, wildlife and other natural resources in the whole area of MBNP and community living inside and in the surrounding the area, existing methodologies for ground-based forest inventory, estimating and monitoring carbon stocks changes, current status of conservation and law enforcement.
2. Collect and analyze baseline data in the selected area including on the existing efforts related to enhancement of carbon stocks and emission reduction, and biodiversity conservation and utilization.
3. Conduct stakeholder consultations and participatory discussions with local communities and other relevant stakeholders.
4. Involvement of integrated stakeholders for the implementation of activities including Central Government, Local Government, NGO, Community, Universities, Consultant and others
5. Carry out training workshops to improve community and institutional capacity, community awareness and coordination to enable effective management of MBNP and in addressing climate change issues.
6. Facilitate community involvemet in management of MBNP and provide necessary equipment and skill to enhance community skill and to gain more income.
7. Expand the community participation initiatives and good practices of overall program implementation as lessons learned to other regions and other country.

The project has mobilized local community participation in the implementation of project activities through stakeholder consultation meetings, community gathering in the preparation of activities, direct involvement in field activities, such as protecting the conservation forest areas, income generating activities, and other related field implementation of the project.

Moreover, this project has explored existing methodologies and applied analysis to identify changes of forest cover and carbon stocks in relation to reducing emissions from deforestation and forest degradation. To develop MRV in carbon stock monitoring systems, the existing methodologies such as those developed by Intergovernmental Panel on Climate Changes (IPCC), Voluntary Carbon Standard (VCS) and the Climate Community and Biodiversity Alliance (CCBA) guidelines have been reviewed. Qualified expert both national and international have been involved in the project to achieve the overall objectives.

## 3. PROJECT PERFORMANCES

Summary of project implementation that consists of outputs, activities, responsible party, time schedule and budget is shown in the following Table.

**Table 1.** Outputs, activities, responsible party, time schedule and budget for project implementation

| OUTPUTS/ACTIVITIES | Responsible Party | Budget (USD) | Time Frame |
|---|---|---|---|
| Output 1.1 Community participation in conservation improved | | | |
| Activity 1.1.1 Review existing schemes and lesson learned from the surrounding area | FORDA and IPB | 12.100 | Completed in 2010 |
| Analysis of potential REDD+ markets in global / national level, and benefit sharing mechanism (during extension) | FORDA | 7.500 | |
| Activity 1.1.2. Carry out stakeholders consultation to identify the most viable scheme MBNP | LATIN | 15.000 | Completed in 2010 |
| Activity 1.1.3 Establish partnership for conservation of MBNP | LATIN | 15.000 | Completed in 2010 and 2011 |
| Activity 1.1.4 Scale up lessons learnt and good practices gained and disseminate them | FORDA /Local Government/ University/ MBNP | 11.100 | Completed in 2013 |
| Workshop for dissemination overall lesson learned of DA REDD+ implementation | FORDA | 8.000 | Completed in 2014 and 2015 |
| Output 1.2 Alternatives source of income to improve the livelihood of local communities living inside and in the surrounding area of Meru Betiri National Park (MBNP) developed | | | |
| Activity 1.2.1. Enhance potential economic activities through community forest partnership programmes | LATIN | 19.000 | Completed in 2011 |
| Activity 1.2.2. Promote community-based forest enterprises for domestication and plantation of potentially valuable species of the MBNP | LATIN | 15.400 | Completed in 2011, in 2013 |
| Output 1.3 Illegal logging and forest encroachment reduced and reported | | | |
| Activity 1.3.1 Conduct awareness raising programmes | MBNP/ Local Government | 9.000 9.000 9.000 | Completed in 2010, in 2012, in 2013 and in progress 2014 |
| Activity 1.3.2 Conduct training for community leaders, police and other local government staff on MBNP protection | MBNP | 10.400 10.400 | Completed in 2010, in 2014 |
| Activity 1.3.3 Enhance community level institutions to reduce illegal logging and empower them | MBNP | 10.000 | Completed in 2011, in 2013 |

| Output 2.1 Capacity in resource base inventory and carbon accounting improved in measurable, reportable and verifiable form | | | |
|---|---|---|---|
| Activity 2.1.1<br>Review the existing methodologies of resource base inventory for carbon accounting | FORDA and IPB | 10.200 | Completed in 2010 |
| Activity 2.1.2<br>Develop standard operation procedures for field measurement | FORDA | 10.000 | Completed in 2010, 2011 |
| Activity 2.1.3<br>Organize and conduct training workshops on resource base inventory for related stakeholders | FORDA, Brawijaya University and MBNP | 16.500 | Completed in 2011 |
| Activity 2.1.4<br>Organize and conduct training workshop on carbon accounting for related stakeholders | FORDA, Brawijaya University and MBNP | 16.500 | Completed in 2010 |
| Output 2.2 Report on comprehensive baseline data and estimation of emission reduction and carbon enhancement of the national park prepared | | | |
| Activity 2.2.1 Conduct remote sensing analysis | Jember University, FORDA, CERindo | 15.000 15.400 | Completed in 2010, 2011, 2012 |
| Activity 2.2.2<br>Determine project boundary to facilitate measuring and monitoring of carbon stock change | MBNP and FORDA | 18.500 | Completed in 2010 |
| Activity 2.2.3<br>Establish the project baseline to analyze a land-use and land cover change and associated carbon stock change | FORDA MBNP | 14.700 | Completed in 2011 |
| Activity 2.2.4<br>Estimate net emissions reductions and enhancement of carbon stocks in the MBNP to prepare PDD | (IPB, CERindo) | 31.400 | Completed in 2012 |
| Prepare PIN for Plan Vivo Scheme | KPSHK | 9.000 | Completed in 2015 |
| OUTPUT 2.3: System for monitoring emission reduction and enhancement of carbon stocks established and validated | | | |
| Activity 2.3.1<br>Set up institutional system for monitoring forest carbon stocks | FORDA and MBNP | 9.000 | Completed in 2013, 2014 |
| Activity 2.3.2<br>Review methodology, and conduct pre validation to assess the applied methodologies by a selected standard system | Consultant IPB, CER, Epic Sustainabi-lity | 10.500 | Completed in 2011, 2014 |
| Activity 2.3.3.<br>Identify measures to enhance the sustainable emissions reductions and enhancement of carbon stocks in the MBNP. | FORDA and MBNP | 8.000 | Completed in 2014 |

**Description of each activity is as follows:**

**Output 1.1 Community participation in conservation improved**

**Activity 1.1.1a. Review Existing Schemes and Lesson Learned from the Surrounding Area**

In reviewing the communities' schemes on community forest conservation, web search, reports and journals have been carried out to obtain publications and literatures. The review then was compared with the nature of MBNP that is surrounded by 12 villages, 8 villages located in Jember district, and 4 villages in Banyuwangi district, with the most income was generated from farming activity and plantation workers.

There have been some schemes or activities that might be applied inside and around MBNP engaging communities in order to achieve the goal of conservation, including community rehabilitation program, collaborative forest management, development of family's medicinal plants, live stock assistance program, and collaborative forest management. It is concluded that (i) MBNP Official cannot work independently to empower its surrounding communities in order to improve their livelihood and economically independent, support and synergism for cooperation with local governments including local district government of forestry, estate, industrial, privates, and micro finance institution are needed, (ii) the success of scheme implementation would likely depend on potential reward from schemes, absence of threat for losing rights from the scheme, and guardianship, (iii) designing good schemes requires clear understanding of land ownership, planting systems, and commodity involved accompanied by promoting community self-regulation, self-documentation, and self-monitoring, and (iv) generate and disseminate of simple information and communication system for self-educating in conservation, agroforestry system, and processing agricultural products.

**Activity 1.1.1b. Assessment of Potential Financing for REDD+ and Benefit Sharing Mechanism**

REDD+ is one of the efforts to mitigate climate change of land use change and forestry sector that is still at the stage of readiness. REDD+ is a mechanism that is being developed at the international level that offer incentives to developing countries that reduce emissions from deforestation and forest degradation as well as conservation, sustainable management of forests and enhancement of carbon stocks.

There are various funding initiatives and mechanisms for carbon trading in the international and national-level mechanism to finance REDD+. Until now Indonesia has not been able to take advantage of these schemes to the optimum, which is caused by insufficient regulation, institutions and mechanisms governing the proper funding that could be used for REDD+.

The funding sources include market based fund such as compliance markets and voluntary markets, as well as non- based-market with domestic sources such as fiscal mechanisms, as well as foreign sources such as Joint Crediting Mechanism (JCM) with Japan, Forest Carbon Partnerhip Facilities (FCPF), World Bank, and International Climate Change Trust

Fund (ICCTF) . Until now, compliance scheme for REDD+ has not been applied and still under negotiation through CoP of UNFCCC.

Government budget is a potential source of REDD+ funding. The role of the government budget in funding REDD+ is as a stimulus and leveraging of funding for REDD+ from other sources. In this case, REDD+ can use a scheme of grants (Special Allocated Fund/DAK and Sharing Fund for Decentralization/ DBH) and grants to the region. The use of the government budget in funding REDD+ is more possible despite limitations due to the limited amount and sustainability of the government budget

Potential funding schemes for DA REDD+ in Indonesia including DA REDD+ of Meru Betiri National Park are voluntary schemes through standards such as VCS, CCB and Plan Vivo. REDD+ funding mechanism through FREDDI is still waiting for the further development of the funding scheme due to the merger of REDD+ Management Agency to Ministry of Environment and Forestry. Schemes that are also potential for funding are national fiscal mechanisms that enable protected areas to obtain sufficient funds to preserve forests and to provide access for the public to participate and to increase their revenue.

Given the compliance scheme is still not agreed upon, mechanisms need to be developed at the national level. In addition to domestic fiscal mechanisms, the role of the private sectors through Corporate Social Responsibility (CSR) funds can be increased to support forest conservation, climate change mitigation and biodiversity benefits to the environment and society.

## Activity 1.1.2. Carry out Stakeholders Consultation to Identify the Most Viable Scheme to MBNP

Stakeholder consultation processes have been considered as important start for REDD+. Stakeholder consultation has been undertaken through various form and methods including in person discussion, Focus Group discussion (FGD) and multi-stakeholders workshop. The consultation involved five target groups (1) Local Governments Official, (2) Local community nearby and inside the Park, (3) Management Officials of MBNP, (4) Local NGOs, academicians, teachers and religion leaders, and (5) Private and state-owned companies.

It was revealed that support from other stakeholders such as private sectors and local government was still needed for post harvesting processing and channeling their product especially during high season. Regular meeting to provide technical guidance regarding planting and cultivation technique is also required for most potential species such as *kedawung* (*Parkia roxburghii G.Don*) and *Pule Pandak* (*Rauvolia serpentine L.*).

Partnership was still limited, therefore there were still threats toward MBNP, such as encroachment and illegal logging. Better participation was needed through: Establishment of mechanism of communication, facilitating Legal Aspect for local community engagement in rehabilitation program in MBNP and supporting community in activities of marketing, drying, and packaging training to the community, to increase the added value of rehabilitation land products (fruits and medicinal plant). Those activities need to be supported by local government and private. While management of MBNP plays the role as a mediator between local governments, private, and community.

**Activity 1.1.3. Establish partnership for conservation of Meru Betiri National Park**

This activity has been carried out to establish multi stakeholders mutual partnership to manage MBNP, enhancing carbon stock, facilitating the development of partnership forum, arranging partnership program of MBNP, and facilitating the preparation of MoU.

Establish partnership is a part of efforts to increase local prosperity through increased participation in preventing or overcoming forest degradation and deforestation and extinction of biodiversity. Building a partnership aimed to encouraging community to make mutually beneficial cooperation between stakeholders, as well as facilitating the formation of the partnership forum. Partnerships should be built among partnerships to improve the welfare of the community, tackling encroachment and forest rehabilitation. Results achieved include:

- Program of activities proposed by communities has been proposed to the service offices/agencies at Jember and Banyuwangi Districts to be integrated into regional development program, as well as the Meru Betiri Management. There were some proposals that have already approved and supported by the management of Meru Betiri, such as integration program to reduce illegal logging and encroachment in the form of SPKP (Rural Forestry Extension Center), and establishment of nursery.
- Criteria and indicators for participation and partnership.
- Process of developing partnership in Meru Betiri in the context of REDD+ program has attracted other parties such as the FKKM and Hyogo University from South Korea.
- Challenges in partnership development included unclear role, responsibility and authority of stakeholders with regard to Meru Betiri management when they are involved in partnership for management of Meru Betiri National Park. Lack of policies or regulations concerning community involvement in management of national parks in Indonesia.

**Activity 1.1.4. Scale up lessons learnt and good practices gained and disseminate them**

Lesson learned and Dissemination Workshop on the Implementation of DA REDD+ in Meru Betiri National Park was held at IPB International Convention Center, Bogor. The workshop was attended by ± 60 people from various backgrounds, including relevant government agencies, the Ministry of Forestry, local governments, donors, international agencies, universities, NGOs, and the private sector.

This activity was a part of the ITTO PD 519/08 rev 1 (F) entitled "Conservation of tropical forests to reduce emissions from deforestation and forests degradation and enhancement of carbon stocks in Meru Betiri National Park, Indonesia". Title of the activities (1.1.4): Scale up lessons learned and good practices gained and disseminate them. The objective was to disseminate to a broader scale for the implementation of DA REDD+ in MBNP related to community involvement in the MRV of carbon estimation, and seek input to solve the issues found in the implementation of activities in the field

The workshop was held for one day, opened by the Director for the Center of Climate Change and Policy Research and Development who also gave an introduction speech at the workshop. The Workshop consisted of two sessions, with topics presented by the speakers were:

- Overview of the implementation of DA REDD+ in MBNP (Ari Wibowo-Project
- Coordinator)
- Preparation of the Project Design Document (PDD) (Prof. Rizaldi Boer - IPB)
- MRV in the estimation of carbon (Dr. I Wayan Susi Dharmawan - Puskonser)
- Implementation of REDD+ in the conservation area (Secretariate of Directorate General of Forest Protection and Nature Conservation)
- Empowerment of Community (Nurhadi-LATIN)
- Readiness of the Meru Betiri National Park in the implementation of DA REDD+ (Mr. Pratono Puroso-Head TNMB)
- Training to the community (Prof. Kurniatun Khairiah – Brawijaya University)
- Lessons learned from the implementation of the DA in Berbak National Park (Mr. Erwin Perbatakusumah-ZSL)

Discussion of technical aspects in the first session 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 in the second session 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.

**Output 1.2.    Alternatives source of income to improve the livelihood of local communities living inside and in the surrounding area of Meru Betiri National Park (MBNP) developed**

**Activity 1.2.1. Enhance   potential economic activities   through community forest partnership programmes**

Activities and review have been made to enhance potential economic activities through community forest partnership programs of community in villages surrounding MBNP as one of the needs recommended  from the result of consultation with related stakeholders, especially in relation to REDD+ activities in MBNP. This program has been facilitated by LATIN. Results of the activities included:

- Mapping 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 in preparation of MOU or cooperation agreement between farmers and management of MBNP.

- Assessing economic and ecological values of agroforestry types in Curahnongko village.

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 2.** 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 |

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 herns 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 improtant. 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, finaly the MOU was signed between farmer groups in Curahnongko village which is joinned in a group called JAKETRESI (Network of rehabilitation farmers) with MBNP. This agreement was still in general form and should be improved to more specific agreement for particular activities. For instance, rehabilitation activity will be made in more detail agreement by utilizing the results of inventory in rehabilitation zone.

**Activity 1.2.2.  Promote community-based forest enterprises for domestication and plantation of potentially valuable species of the MBNP**

Important objective of the REDD+ 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.

Information has been collected related to community in villages near rehabilitation zone, to prepare the establishment of plantation with high carbon content. Activities were also carried

out also 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. Some multipurpose tree species that have been selected and preferred by community include jackfruit, avocado, candle nut and pakem.

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.

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.

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.


## OUTPUT 1.3. Illegal logging and forest encroachment reduced and reported

### Activity 1.3.1. Coduct awareness raising program

MBNP as national park has been experiencing threats especially due to the increase of the number of community and their activities resulting in illegal activities such as forest encroachment and illegal logging. Awareness raising program has been considered as important activities to reduce threat to forest and at the same time to provide alternative income to community.

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 to increase public awareness and stakeholders to support the sustainability of REDD+ and Meru Betiri National Park have also been 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.

One of the activity was conducted in Jajag - Banyuwangi, in the form of FGD (Focused Group Discussion) involving stakeholders from local government, State Forestry Company (Perhutani), Community Leaders (Muspika), MBNP office and surrounding communities especially from Banyuwangi District.

Resource persons at the event consisted of:

1. Head of MBNBP with topic, the importance to keep sustainability of MBNP and future benefits to community
2. Head of of School SPTN III, Kalibaru, with topic, Empowerment effort in order to reduce pressure on the national park area.
3. Community Leader with topic, Efforts to increase public awareness and to change of behavior of community to be more concern to the national park, and sense of belonging to the national park
4. Conservation cadre/ Lecturer with topic, The impacts of climate change and the danger and threat to MBNP and community's livelihood.

Participants in this activity were 60 people consisting of representatives of the Regional Office of Agriculture, Forestry & Estate Plantation of Banyuwangi District, Perhutani of West Banyuwangi Forest District, Management Section of MBNP, Police Office (Gambiran, Kalibaru and Pesanggaran), Subdistricts of Pesanggaran and Kalibaru, Local Army Office of Kalibaru and Pesanggaran, Villages (Sarongan, Kandangan, Karangharjo, Kebunrejo, and Kalibaru Manis), SPKP (from villages of Sarongan, Kandangan, Karangharjo, and Kebunrejo), Rural Community (Sarongan, Kandangan, Karangharjo, Kebunrejo, and Kalibaru Manis), Head of Resorts (Sukamade, Karangtambak, Sumberpacet, Malangsari and Baban) and the Administrator of Estate of PT. Trablasala and PT. Sukamade Baru

**Activity 1.3.2. Conduct training for community leaders, police and other local government staff on MBNP protection**

MBNP protection training has been undertaken twice (two periods) with objective to improve stakeholders capacity if forest protection towards the sustainability of national park. The participants were trained on how to protect MBNP from the threats and damages by giving them knowledge especially related to the role and function of national park, climate change and the effect of climate change of 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.

**Activity 1.3.3.    Enhance Community Level Institutions To Reduce Illegal Logging And Empower Them.**

This activity had objective to support the reduction of illegal logging and encroachment in MBNP through : (1) collection of secondary and primary data of illegal logging and encroachment in MBNP for the last five years (2) to carry out extension and forest protection as efforts to prevent illegal logging and encroachment activities (3) to strengthen the instutution of SPKP and community as forest guard partner to reduce the activities of *illegal logging* and other disturbances to threat the sustainability of MBNP.

The activity has been carried out for three years.  It has been carried out extension to community regarding efforts to reduce illegal logging in six villages namely Kebunrejo, Karangharjo, Pace, Mulyorejo and Kalibaru Manis. Materials of extension covered, general law regarding forestry, the importat role of forest especially MBNP to community, and punishment for those who make any disturbances to national park such as forest fire, illegal logging and forest encroachment.

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.  Outputs of the activity for three years also included availability of data of forest disturbances (illegal logging, forest encroachment and others), improvement of capacity of SPKP institutions in buffer villages of MBNP to support forest sustainability.

One activity was implemented related to increase community income and skill through cultivation of oyster mushroom. One of the activites was carried out in the Laboratory of the Faculty of Agriculture, University of Jember, to learn on how to produce mushroom. Comparative study and training were also conducted to producers of oyster mushroom seeds in Malang - East Java. Autoclave equipment and gas stove as the most difficult to procur, were provided in SPKP office of Curahnongko Office. Total participants in the training were 20 people from village communities in surrounding the MBNP.

Comparative study was conducted to producers of oyster mushroom seeds in Malang - East Java. In the study, training was also carried out, facilitated by mushroom business man that also sells autoclave. In this training, the community gained more understanding on how the the processs of mushroom seed production should be implemented with simple tissue culture method, by using tool which is easily found in the market.

To support the community in cultivation of oyster mushroom, the Head of MBNP has provided aid through the program of DA REDD+ ITTO PD 519/08 REV.1 (F) in the form of autoclave and gas stoves to the Head of the SPKP Curahnongko village.

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 decrase.  This is due to their less dependent on the forest in fulfilling their daily needs.

**OUTPUT 2.1.     Capacity in resource base inventory and carbon accounting improved in measurable, reportable and verifiable form**

**Activity 2.1.1. Review the existing methodologies of resource base inventory  for carbon accounting**

The objectives of this study were to review a credible, measurable, reportable and verifiable (MRV) system for monitoring emission reductions from deforestation and forest degradation (REDD) and enhancement of forest carbon stocks (REDD+) which would be aplicable to Meru Betiri National Park (MBNP).  As a starting point, Ministerial of Forestry Decree No. 30/2009 about Mechanism for REDD in Indonesia provided general answers to develop  MRV system for REDD+.

Several methods that meet international standards for MRV were explained in great detail, including Intergovernmental Panel Climate Change (IPCC), and Voluntary Carbon Standard (VCS) for further investigation and feasibility for application.  For IPCC methods, there are two basic elements needed for the inventory, namely (i) activity data, i.e. Data on the magnitude of a human activity resulting in emissions or removals taking place during a given period of time and  and (ii) emission factor, a coefficient that quantifies the emissions or removals of a gas per unit activity. Emission factors are often based on a sample of measurement data, averaged to develop a representative rate of emission or removal for a given activity level under a given set of operating conditions.  Activity data is grouped six land use categories i.e., Forest Land, Cropland, Grassland, Wetlands, Settlements, and Other Land. These land categories are further sub-divided into land remaining in the same category and land converted from one category to another.

To establish MRV system, use of IPCC GL, taking into consideration step wise guidelines fromVoluntary Carbon Standard (VCS) is needed to provide  simpler, high certainty,  and verifiable. VCS  explained in great detail steps by steps guidelined for designing MRV involving communities and relevant stakeholders, while IPCC 2006 GL provide guideline on how to undertake forest inventory and estimate emission reduction or removal of GHGs.

It is proposed that MRV system need to undertake steps as follows:  (i) determination boundary of activity, including carbon pool that would be measured, (ii) established baseline, (iii) stratify the area,  (iv) identify relevant carbon pool, (v) design sampling framework, (vi) assess and manage potential leakage, particularly from socio and economic driven factors, and (vii) estimation, monitoring and reporting emission reduction or enhancement of removal GHG. To determine boundary of activity, a visualisation of medium and high resolution of remote sensing data need to be undertaken. In addition, a representative amount  of permanent sample plot need to be established for ground truthing to check the accuracy, and increase reliability of data. Approached to determine baseline vary from the simplest to the complex methods. However they  are linked to historic emission. Potential risk for leakage need to be assessed and managed. While estimation and reporting of emission reduction or removal are guided by IPCC 2006 method.

**Activity 2.1.2. Develop standard operation procedures for field measurement**

A Standard Operating Procedure (SOP) is defined as a set of written instructions or protocols or worksheet that document a routine or repetitive activity followed by an organization. SOPs can be seen as an integral part of a quality system as it provides information to do a series of job properly, and facilitates the consistency of quality and integrity of a product from the beginning to the end result.

The Standard Operational Procedure (SOP) has been prepared to support improving capacity in resource base inventory in measurable, reportable, and verifiable form. The SOP is based on review, lesson learned and field experience. This SOP is intended to be a reference in conducting biodiversity survey, especially in conservation areas to support REDD activities.

SOP for carbon accounting has been prepared. The SOP covered methodology for estimation of 5 carbon pools. The SOP was also prepared for biodiversity assessment to support REDD. The biodiversity surveys were carried out in order to (1) provide necessary biodiversity baseline data to satisfy requirements for validation with regards to biodiversity assessment and monitoring; (2) identify species of vegetation and animals for prioritization in future conservation efforts; and design a biodiversity monitoring plan for the REDD site for the lifespan of the project. SOP of biodiversity survey included survey of vegetation, mammals, birds, hepertofauna, insects and sea turtles. Some methods explained include transect method (line, strip, point), mapping, also special method for birds, hepertifauna, insects and sea turtles

**Activity 2.1.3. Organize and conduct training workshops on resource base inventory for related stakeholders**

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, First stage was implemented in meeting hall of Curahnongko village, Andong Rejo Sub-district, Jember district with 20 participants from the districts of Jember. The second stage was conducted in September 2011 in Kalibaru, with participants from Banyuwangi.

In both training, material of the first day included: Techniques of Inventory for Farmer's Resource by Forda, Policies of local government to support community empowerment in surrounding National Park by Head of Community Empowerment Office of Jember District, and in Banyuwangi by officer of Banyuwangi District. introduction of maps and simple mapping were explained by MBNP staff.

On the second day of the training, participants conducted field practice based on materials provided on the first day in the field. 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.

The third day 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. Undertanding 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 grond biomass, necromass, litter and soil.

The next material was field practice of the role of agrofotestry in hydro-orology to prevent erosion and flood, with instructure Dr. Widianto 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.

## Activity 2.1.4 Organize and conduct training workshop on carbon accounting for related stakeholders

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).

## Output 2.2. Comprehensive baseline data and estimation of emissions reduction and carbon enhancement of the national park prepared

## Activity 2.2.1. Conduct 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, 2010).

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 3.** 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 |

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.

**Figure 2.** MBNP land cover classification from Landsat 1997, 2001, 2005, 2007 and 2010

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 occured 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 4.** 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.

## Activity 2.2.2. Determine project boundary to facilitate measuring and monitoring of carbon stock change

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.

Boundary of activity has been established, based on remote sensing analysis and Ministry of Forestry decree. Design and establishment of 40 Permanent Sample Plots (PSPs), were based on zoning system, land use cover and type of vegetation. Measurement of five carbon pools

within the PSP was carried out to identify carbon stock of MBNP on various land cover and zoning of MBNP. This was also to support MRV system of carbon accounting.
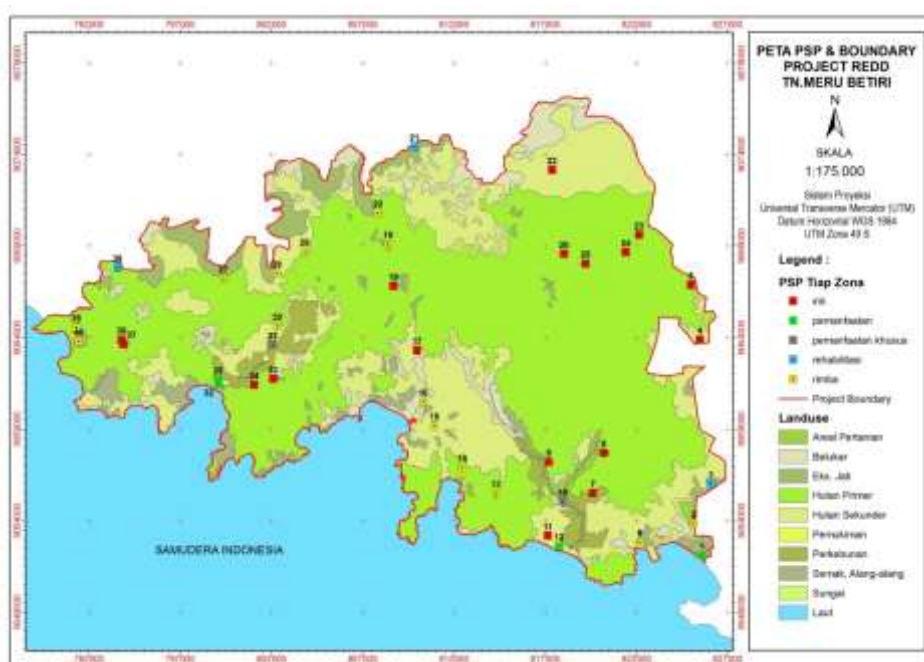


**Figure 3. Boundary of MBNP and 40Permnent Sample Plots**
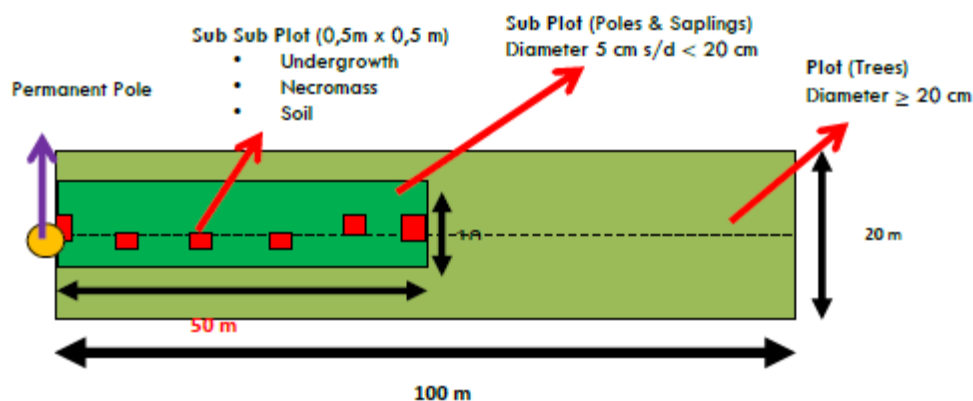


**Figure 4.** Design of PSP in MBNP

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.

**Table 5.**

| 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 tress 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.)

**Activity 2.2.3. Establish the project baseline to analyze a land-use and land cover change and the associated carbon stock change**

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 $CO_2$ from 1997-2010 was made to estimate emission/sequestration of $CO_2$ from 2010 until 2020.

Analysis was performed using 2006 IPCC methodology. The result showed that there was no $CO_2$ emission during 1997-2010 in MBNP. The potency of $CO_2$ sequestration was higher than $CO_2$ emission, therefore from historical data of emission Meru Betiri National Park was net sinker. Details of $CO_2$ sequestration from land cover changes in Meru Betiri National Park during 1997-2010 are shown in Table xxx.

**Table 6**. 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 CO₂ 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 $tCO_2eq$/year with cummulative sequestration in 2020 will be 264.420,40 $tCO_2eq$/year. A scenario has been performed to consider efforts in rehabilitation activities. In was assumed that rate of $CO_2$ sequestration gained from rehabilitation was 24.859,63 $tCO_2eq$/year.

**Table 7**. Forecasting analysis on rate of $CO_2$ sequestration ($tCO_2eq$/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 ware 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+.

**Activity 2.2.4 Estimate net emissions reductions and enhancement of carbon stocks in the MBNP to prepare PDD**

Before the activies of PDD preparation according to selected standard, an expert meeting was carried out, to explore potential and applicable methodology and standard for implementation of DA REDD+ in MBNP, and to have information on procedures to prepare Project Design Document (PDD). The participants were stakeholders/experts that deal with climate change issue especially for forestry and land use sector, and familiar with REDD+ mechanism. They were from private companies, NGO, International Organization, Government, Universities and others.

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 internationaly 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.

Before selecting particular methodology for DA REDD+ in MBNP, review on available methodology has been done. 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.

The selection of appropraite 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? | | | |
|---|---|---|---|
| YES[1] | | 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? | |
| YES[2] | 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 that consists of 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)
* RED tahat consist of APD (Avoided Planed Deforestation), AUFDD (Avoided Unplaned Frontier Def and Deg) and AUMDD (Avoided Unplaned Mozaic Def and Deg.)

**Table 8.** 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 |

Based on review on methodologies, VCS methodology namely VM 0015, Methodology for Avoided Unplanned Deforestation, has been considered as the most feasible to be applied for conditions in MBNP. For VCS requirement, a Project Desgn Document (PDD) or for VCS, the name is Project Description should be prepared. 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).

Preparation of Project Document (PD) was the overall activities to document the activities of DA REDD+ by following requirement from voluntary standard (Verified Carbon Standard, VCS). This project description is important to describe carbon benefits of the project, or net emissions reductions and enhancement of carbon stocks in the MBNP. The preparation of Project Description following the VCS methodology VM-0015 was carried out after several recommendations for improvement from technical meeting and project steering committee meeting. The PD covered Project Details, Application of methodology of VM0015 (Methodology for Avoid Unplanned Deforestation), quantification of GHG emission reductions and removals, quantification of GHG emission reductions and removals, and others. Carbon benefits or emission reduction will basically gained from reducing deforestation and enhancement of carbon stock through planting in rehabilitation zone of MBNP.

The PD of VCS referring to VCS methodology of VM-0015 has been prepared. The Project Document was then pre-validated by official validator. However, carbon benefits from this project has been quite small due to small figure of deforestation. Moreover, the voluntary

standard of VCS has made possible for REDD project to be implemented with project cycle of 20-100 years.   Meanwhile the support of the project only for 4 years and relatively small carbon benefits, therefore the process of PD validation was discontinued.  It is a lesson learned that conservation area should be given incentive or rewards that is not based on carbon benefits from additionality compared with baseline conditions, but high carbon stock and biodiverity value should also be recognised for better sustainability in the future.

### 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 instutions 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 $CO_2$. 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 Leonne, 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 $CO_2$ eq. From this activity, it is required that at least 60% of the carbon incentive is for the community.

Based on Plan Vivo standard, it is possible for community in MBNP to obtan benefits from small scale carbon activities by planting involving 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. Acces 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 asnd 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 $CO_2$-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 of assignment of traditional use zone for MBNP, including to accomodate the Plan Vivo scheme.

**OUTPUT 2.3.      System for monitoring emission reduction and enhancement of carbon stocks established and validated**

**Activity 2.3.1. Set up institutional system for monitoring forest carbon stocks.**

Monitoring and estimating $CO_2$ 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. Objective of this activity was to to set up institutional system for monitoring forest carbon stocks.  As this is required to support exit strategy after project completion.

Institutional 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 permanen 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 raining, socializtion, and traning for carbon measurement.

Information on possible barriers and advantages were gathered based on field experiences and analysis that include ruqirement to establish MRV system in management unit level related to monitoring of carbon stock to support mitigtion action in land use nd 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.
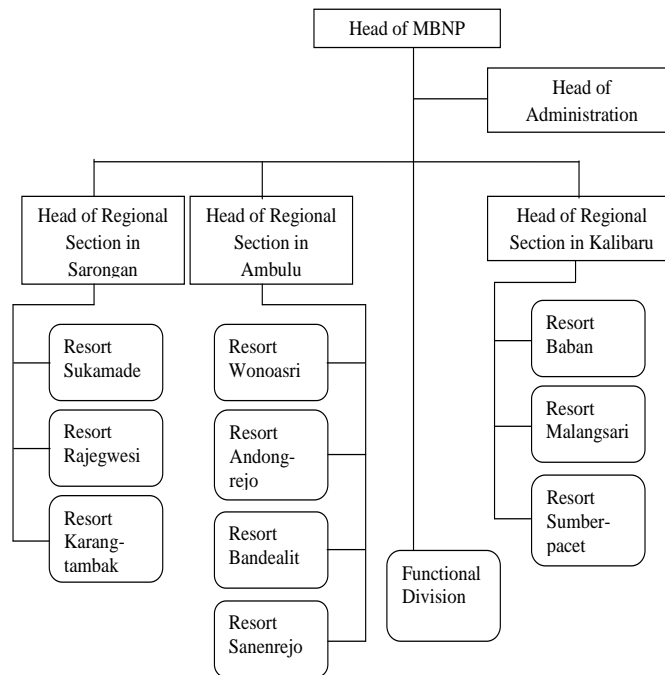
**Figure 6.** Organizational structure of  Meru Betiri National Park

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 xx.
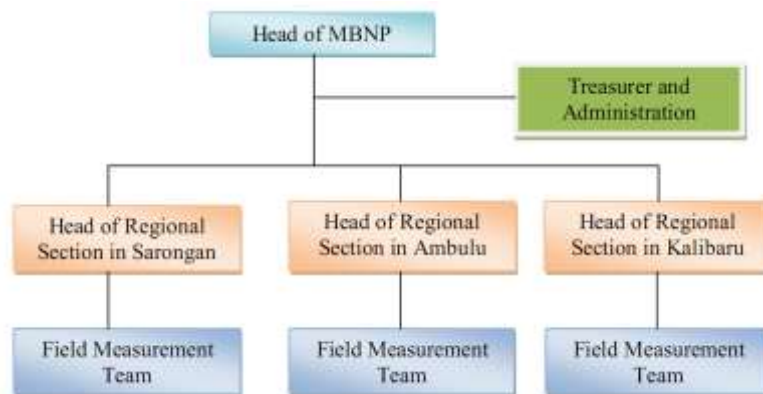


**Figure 7.**  The organizational structure of field measurement in Meru Betiri National Park

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 xx.  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.
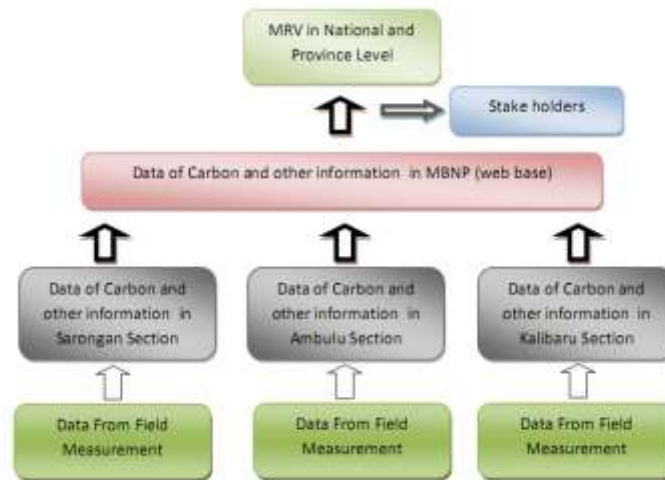


**Figure 8.** Data management for carbon and other information in MBNP

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 diam eter, 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 (Berkes et al., 2000) and they can also provide crucial ecological data in national park areas where academic studies have not been executed (Doswald et al., 2007). 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 (Moller et al., 2004)

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.

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.

## Activity 2.3.2. Conduct Validation to Assess the Applied Methodologies by a selected standard system

Independent verifier has been identified to conduct pre-validation (EPIC Sustainability). Pre-validation has been conducted by sending the document Project Document. The purpose of the pre-validation was to have an independent third party assessesment of the project design. In particular, the project's baseline, the monitoring plan (MP), and the project's compliance with relevant VCS and host country criteria are validated in order to confirm that the project design as documented is sound and reasonable and meets the stated requirements and identified criteria.

EPIC's validation process consisted of the following phases:
i) Desk review of the project design documents against the requirements of the applicable methodology and ii) Preparation of Gap Assessment report to identify corrective actions and clarifications for improvement of the project

During the validation, non-fulfillment of the validation protocol criteria or identified risks to the fulfillment of project objectives were raised as either Corrective Action Requests (CAR) or Clarification Requests (CL). Corrective Action Requests (CAR) were issued, where i) mistakes had been made that directly impacted on the project results; or ii) VCS requirements had not been met; or iii)  there was a risk that the project would not be accepted as a VCS project or that emission reductions will not be certified.

Eight  Clarification Requests (CL) were issued where additional information was needed to clarify issues, and 15 Forward Action Requests (FAR) for issues relating to project implementation that required review during the first verification of the project activity.

## Activity 2.3.3.  Identify measures to enhance the sustainable emissions reductions and enhancement of carbon stocks in the MBNP

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 teakwoods 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 9.** 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 area due. to decrease pressure from community to the forest areas.

## 4. PROJECT OUTCOME

Project outcome should be achieved based on projct objectives as stated in the project document. 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. With specific objectives (1) 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 and 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 been carried out basically according two major issues, (1) related to community and (2) related to MRV of carbon accounting. Summary of the 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 parnership

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
   - Registration by Ministry of Forestry of the Republic of Indonesia

REDD+ program in MBNP is one of the demonstration activities in Indonesia, as a learning process before full implementation of REDD+. There were 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 MBNP.

### 4.1. Project Outcome Related to Community

Social Economy of Community

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 10.** 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 |
| | Kab.Banyuwangi | | | |
| 6 | 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 11.** Income of community in villages around the MBNP area

| Income | Income (Rp) in Village of | | | | | | |
|---|---|---|---|---|---|---|---|
| | Wonoasri | Curahnongko | Andongrejo | 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.

Community Planting

Important objective of the project was to gain carbon benefits as much as possible. Therefore, activities were aimed to reduce unplanned deforestation/degradation although from historical data has shown slow rate of deforestation. Other important activities included 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+. Although there were no direct activities in this ITTO program to conduct tree planting, supports of facilitation and seedlings have been provided from the REDD+ project. There was a support of seedlings from *CSR of Seven and I Holdings Company* managed by local NGO. Moreover, other initiatives including, from MBNP office and support by many stakeholders have supported planting activities.

Planting activity has been involving the whole local communities including women and students. Planting of trees involving students and improving partnership through cooperation with RECOFTC were also conducted as an adaptation study of climate change in Curahnongko village.

## Cultivation of Oyster Mushroom to improve Community's Income

An activity has been implemented to improve community income though 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, trough improvement of skills of the community, improvement the effectiveness of capital assistance that has been previously provided and ultimatelly 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 was expected that pressure and disturbance of the community to Meru Betiri National Park will decrase. This was 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-NGO 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 have been carried out through collaboration of community, NGO and officer of MBNP. Coverage of mapping included types of agroforestry in rehabilitation zone of MBNP managed by farmer groups of Curahnongko village. The results of mapping automatically described the distribution of agroforestry type and its owner. 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.

Legal assurance for community to have access of lands that have been rehabilitated through agroforestry is very improtant. 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. The MoU was signed between farmer groups in Curahnongko village that joined in a group called JAKETRESI (Network of rehabilitation farmers) with MBNP.

Local NGO (LATIN/KAIL) has also 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.

Training

Several training activities have been implemented during the program, to improve skill, knowledge and income. The training would contribute to forest sustainability and climate change related mitigation program. The topics of training consisted of :

- Carbon accounting in collaboration with Brawijaya University, with 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 that was conducted in cooperation between Forestry Research and Development Agency (FORDA), Meru Betiri National Park and the Faculty of Agriculture, Brawijaya University. 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. 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 other material was field practice of the role of agroforestry in hydrology to prevent erosion and flood.

- 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.

Awareness Raising

Awareness raising program has been addressed mainly to increase community's awareness for the sustainability of conservation area and the importance of maintaining ecosystem function, especially to reduce illegal logging and land encroachment. 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. To increase awareness of local community

including students, several media have been applied including through wayang puppet show and involvement of women group through religion's gathering "Pengajian Akbar" or great pray that inserted forest sustainability and climate change issue.

## 4.2. Project Outcome Related to MRV of Carbon Accounting

<u>Information on Carbon Stock trough the Establishment of PSP</u>

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.

Results of measurement were as follows:

**Table 11.**   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 tress with age of < 10 years, and planted in low density. Therefore this area is potential to be developed 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.)

Remote Sensing Analysis

FORDA and Jember University 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. 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).

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 indicated that Forest land tended to dominate the landcover in MBNP, followed by Crop land, Grassland, Other land and Settlement.

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 $CO_2$ from 1997-2010 was made to estimate emission/sequestration of $CO_2$ from 2010 until 2020.

The BAU scenario assumed constant parameters until 2020. It assumed annual sequestration of 2,196,04 tCO2eq/year with cummulative sequestration in 2020 will be 264.420,40 tCO2eq/year. A scenario has been performed to consider efforts in rehabilitation activities. In was assumed that rate of $CO_2$ sequestration gained from rehabilitation was 24.859,63 tCO2eq/year.

**Table 12.** Forecasting analysis on rate of $CO_2$ 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 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+.

<u>Measures to Enhance the Sustainable Emissions Reductions and Enhancement of Carbon Stocks in Meru Betiri National Park</u>

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 13.** 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

Selection of Methodology from VCS 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.

Finally, DA REDD+ in MBNP 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. This standard has made possible for REDD project to be implemented with project cycle of 20-100 years.

<u>Potential of Plan Vivo Scheme for DA REDD+ in MBNP</u>

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). 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, has been 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. Acces 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 asnd 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.

Monitoring System of Carbon Stock

For Carbon Stock Monitoring System, analysis was performed based on field experiences in establishing permanen 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 raining, socializtion, and traning for carbon measurement.

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 completed with field measurement team.

For data management, 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.

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.

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.

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.

**4.3.  General Project Outcome**
Approval/Registration from Minister of Forestry for DA REDD+ in MBNP.

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

Some potential markets/incentive mechanism for REDD+ /

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. Which is now under development to include also ) and may be with Korea
- National mechanism such as establishment of REDD+ Agency, National Carbon Market, (Pasar Karbon Nusantara), Fiscal/incentive mechanism, and CSR of private companies,
- Supported NAMAs: REDD+ as a part of NAMA.

The issuance of Indonesia National Standard (SNI) No.7848 / 2013 on Implementation of DA REDD and DG PHKA Regulation No. On.

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. DG PHKA Regulation No. On. Has been issued also with contribution of the implementation of DA REDD+ in MBNP.

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. During project implementation, some publications and networking have been produced and developed. As learning process, the following publications have been available:

Aliadi, A. 2010. Stakeholder Consultation to Determine The Most Viable Scheme of Community and Other Stakeholders to be Applied at MBNP. Center for Climate Change and Policy Research and Development Forestry Research and Development Agency Ministry of Forestry, Indonesia In Cooperation with International Tropical Timber Organization (ITTO).

Aliadi, A. 2011. Developing Partnership for Conservation at Meru Betiri National Park. Center for Climate Change and Policy Research and Development Forestry Research and Development Agency Ministry of Forestry, Indonesia In Cooperation with International Tropical Timber Organization (ITTO).

Aliadi, A. 2011. Pengembangan alternatif pendapatan untuk meningkatkan taraf hidup masyarakat lokal disekitar TNMB (In Bahasa). Center for Climate Change and Policy Research and Development Forestry Research and Development Agency Ministry of Forestry, Indonesia In Cooperation with International Tropical Timber Organization (ITTO).

Aliadi, A; Nurhadi; Wibowo, A. 2013. Community Involvement to Support Enhancement of Carbon Stock in Rehabilitation Zone of Meru Betiri National Park. Center for Climate Change and Policy Research and Development Forestry Research and Development Agency Ministry of Forestry, Indonesia In Cooperation with International Tropical Timber Organization (ITTO).

Arifanti, VB; Bainnaura, A; Ginoga, KL. 2010. Landcover change analysis using remote sensing and GIS: Initial Phase Of Measuring Carbon Sequestration For REDD+ In Meru Betiri National Park, Indonesia. Center for Climate Change and Policy Research and Development Forestry Research and Development Agency Ministry of Forestry, Indonesia In Cooperation with International Tropical Timber Organization (ITTO).

Arifanti, VB; Marthinus, D. 2013. Establishment of Project Boundaries of REDD+ And Landcover RE-Classification in Meru Betiri National Park. Center for Climate Change and Policy Research and Development Forestry Research and Development Agency Ministry of Forestry, Indonesia In Cooperation with International Tropical Timber Organization (ITTO).

Bismark, M. 2011. Standard Operational Procedure for Biodiversity Survey in Conservation Area. Center for Climate Change and Policy Research and Development Forestry Research and Development Agency Ministry of Forestry, Indonesia In Cooperation with International Tropical Timber Organization (ITTO).

Boer, R ; Ginoga, KL ; Masripatin, N.2010. Review Existing Methodology of Resourcebased Inventory for Measuring Reporting and Verifying (MRV) Carbon Accounting for Reducing Emissions from Deforestation and Forest Degradation and Enhancing Carbon Stock in Meru Betiri National Park (MBNP), Indonesia. Center for Climate Change and Policy Research and Development Forestry Research and Development Agency Ministry of Forestry, Indonesia In Cooperation with International Tropical Timber Organization (ITTO).

Carbon and Environmental (CER) Indonesia, and Center for Climate Change and Policy. Research and Development. 2015. 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. Center for Climate Change and Policy Research and Development Forestry Research and Development Agency Ministry of Forestry, Indonesia In Cooperation with International Tropical Timber Organization (ITTO).

Dharmawan, IWS; Arifanti, VB; Wibowo, A; Atmojo, ND. 2010. Analysis of Land Use, Land Cover Change and the Association Carbon Stock Change to Establish Project Baseline. Center for Climate Change and Policy Research and Development Forestry Research and Development Agency Ministry of Forestry, Indonesia In Cooperation with International Tropical Timber Organization (ITTO).

Dharmawan, IWS; Atmojo ND; Wibowo, A; Partiani, T. 2013. Set up institutional system for monitoring forest carbon stocks in TNMB. Center for Climate Change and Policy Research and Development Forestry Research and Development Agency Ministry of Forestry, Indonesia In Cooperation with International Tropical Timber Organization (ITTO).

Dharmawan, IWS; Ginoga, KL. 2010. Standard Operating Procedures (SOPs) for Field Measurement. Center for Climate Change and Policy Research and Development Forestry Research and Development Agency Ministry of Forestry, Indonesia In Cooperation with International Tropical Timber Organization (ITTO).

Fitri Nurfatriani, Kirsfianti L. Ginoga, Ari Wibowo, dan Deden Djaenuddin. 2015. Assessment of Potential Financing and Benefit Sharing Mechanism) For REDD+ (in Bahasa). Center for Climate Change and Policy Research and Development Forestry Research and Development Agency Ministry of Forestry, Indonesia In Cooperation with International Tropical Timber Organization (ITTO).

Hairiah, K; Widianto; Kurniawan, S; Sari, RR; Priyadarsini, R; Sarkam. 2010. Laporan Pelatihan Pelibatan Masyarakat dalam Pengukuran, Pelaporan, dan Verifikasi Perubahan Cadangan Karbon di Taman Nasional Meru Betiri (TNMB), Jember 29-31 Oktober 2010, Banyuwangi 1-3 November 2010. Center for Climate Change and Policy Research and Development

Forestry Research and Development Agency Ministry of Forestry, Indonesia In Cooperation with International Tropical Timber Organization (ITTO).

Irawan, JF; Purnomosiddy. 2010. The Completion of The GIS (Geographic Information System) Analysis Activity In Meru Betiri National Park, East Java. Center for Climate Change and Policy Research and Development Forestry Research and Development Agency Ministry of Forestry, Indonesia In Cooperation with International Tropical Timber Organization (ITTO).

Lugina, M; Ginoga, KL; Wibowo, A; Bainnaura, A; Partiani, T. 2011. Prosedur Operasi Standar (SOP) untuk Pengukuran Stok Karbon di Kawasan Konservasi (In Bahasa). Center for Climate Change and Policy Research and Development Forestry Research and Development Agency Ministry of Forestry, Indonesia In Cooperation with International Tropical Timber Organization (ITTO).

Lugina, M; Zuhud, EAM; Ginoga, L. 2010.Review Existing Schemes And Lessons Learned From The Surrounding Areas. Center for Climate Change and Policy Research and Development Forestry Research and Development Agency Ministry of Forestry, Indonesia In Cooperation with International Tropical Timber Organization (ITTO).

Martinus, D; Wibowo, A; Boer, R; Ma, HO. 2011. Review on Methodology of voluntary carbon standards for application of REDD+ Project in Meru Betiri National Park, East Java. Center for Climate Change and Policy Research and Development Forestry Research and Development Agency Ministry of Forestry, Indonesia In Cooperation with International Tropical Timber Organization (ITTO).

MBNP. 2012. Meningkatkan Kelembagaan dan Pemberdayaan Masyarakat untuk Mengatasi Masalah Penebangan Liar di TNMB (In Bahasa). Center for Climate Change and Policy Research and Development Forestry Research and Development Agency Ministry of Forestry, Indonesia In Cooperation with International Tropical Timber Organization (ITTO).

MBNP. 2013. Pelatihan Pembuatan Bibit Jamur Tiram bagi Masyarakat Desa Penyangga Taman Nasional Meru Betiri (In Bahasa). Center for Climate Change and Policy Research and Development Forestry Research and Development Agency Ministry of Forestry, Indonesia In Cooperation with International Tropical Timber Organization (ITTO).

MoE. 2010. Indonesia Second National Communications to UNFCCC. Ministry of Environment. Jakarta. 2010

PES Consortium. 2015. Plan Vivo Project Idea Note (PIN) Local Community Participation For Carbon Stock Enhancement In Meru Betiri National Park. Center for Climate Change and Policy Research and Development Forestry Research and Development Agency Ministry of Forestry, Indonesia In Cooperation with International Tropical Timber Organization (ITTO).

Pramudita, S . Et al. 2011. Potensi Karbon di Taman Nasional Meru Betiri (In Bahasa). Center for Climate Change and Policy Research and Development Forestry Research and Development Agency Ministry of Forestry, Indonesia In Cooperation with International Tropical Timber Organization (ITTO).

Rochmayanto, Y; Atmodjo, ND; Wibowo, A; Partiani, T. 2013. Identify Measures to Enhance the Sustainable Emissions Reduction and Enhancement of Carbon Stocks in TNMB. Center for Climate Change and Policy Research and Development Forestry Research and Development Agency Ministry of Forestry, Indonesia In Cooperation with International Tropical Timber Organization (ITTO).

Wibowo, A. 2012. Hutan, Perubahan Iklim dan REDD+ (In Bahasa) . Center for Climate Change and Policy Research and Development Forestry Research and Development Agency Ministry of Forestry, Indonesia In Cooperation with International Tropical Timber Organization (ITTO).

Wibowo, A; Maryani, R; Partiani, R. 2012. Technical Information Implementation of Demonstration Activity [DA] of REDD+ in Conservation Area. Center for Climate Change and Policy Research and Development Forestry Research and Development Agency Ministry of Forestry, Indonesia In Cooperation with International Tropical Timber Organization (ITTO).

Wibowo, A; Partiani. T; Rachmawati, M. 2013. Demontstrationa (DA) REDD+ di Taman Nasioanal Meru Betiri (In Bahasa). Center for Climate Change and Policy Research and Development Forestry Research and Development Agency Ministry of Forestry, Indonesia In Cooperation with International Tropical Timber Organization (ITTO).

Wibowo, A; Widodo, WRM; Atmojo, ND. 2010. Determination Of Project Boundary To Facilitate Measuring and Monitoring of Carbon Stocks. Center for Climate Change and Policy Research and Development Forestry Research and Development Agency Ministry of Forestry, Indonesia In Cooperation with International Tropical Timber Organization (ITTO)

Zuhud, EAM. 2010. Developing Conservation Based Industry from Rehabilitation Zone in Meru Betiri National Park. Center for Climate Change and Policy Research and Development Forestry Research and Development Agency Ministry of Forestry, Indonesia In Cooperation with International Tropical Timber Organization (ITTO).

Research/studies by Variety of Institutions

Some studies have been made by many institutions to learn about the implementation of DA REDD in MBNP. Sudies 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, AfoCo and other institutions.

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.

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.

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.

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). 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.

In term of biodiversity, 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. There are potential medicinal plants in  MBNP area. 77 species of medicinal plants have been used by the local community as medicine herbs.

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. 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.

## 4.4. Participation of Stakeholder

This project is a typical of Public-Private Partnership where many stakeholders habe been involved in various activities to support the implementation of DA REDD+.  The following Table shows, stakeholders and their role in project activities.

**Table 14.** Stakeholders and their role in the activities of DA REDD+ in MBNP under ITTO PD 519/08 rev 1 (F).

| No. | Institution | Status | Role |
|---|---|---|---|
| 1. | **Forestry research and Developmant Agency (FORDA)** Ministry of Forestry  Gedung Manggala Wanabhakti, Blok I, Lantai 11, Jalan Jend Gatot Subroto, Jakarta, Tel: 62-21-573-0398, Fax: 62-21-572-0189 Email:  secforda@forda-mof.org, Website:www.forda.go.id | Executing Agency | As the Executing Agency under the ministry of Forestry. The Director General of FORDA also as the Head of theProject Steering Committee of the project. |
| | **Center for Climate Change and Policy Research and Development** Jl. Gunung Batu No. 5, Bogor, West Java, Indonesia Phone: +62-251-8633944, Fax: +62-251-8634924 Website: www.puspijak.org | Implementing Agency | As the Implementing Agency under the FORDA toConductand coordinate the implementation of  DA REDD activities |
| 2. | **International Tropical Timber Organization International Organization (ITTO)** Centre,  5 Th Floor-Pacifico-Yokohama, minato-Mirai Nishi-Ku, Yokohama, 220-0012 Japan | Donor | ITTO is an International Organization that thas commitment to contribute to the sustainability of tropical forest as well as to support land based mitigation action on climate change trough REDD+ as the donor for the activities |
| 3. | **Seven and i Holdings Company.** 8-8, Nibancho, Chiyoda-ku, Tokyo 102-8452, Japan | Donor | As the biggest retail company in Japan through the ITTO has contributed to finance the activities as its commitment to sustainability of global environment especially though sustainability of tropical forest and its role in climate change . |
| 4. | **Balai Taman Nasional Meru Betiri** Jalan Siriwijaya 53, Jember, Jawa Timur, Tel. : 62-0331-335-535, Fax: 62-0331-335-535 Email: meru@telkom.net, Website: www.merubetiri.or.id | *Proponent Collaborating Agencies* | As a Project Proponent and Collaborating Agency. As the location of DAREDD   project activities. As he most important ntitution for the overall implementation of REDD. |

| 5. | **Lembaga Alam Tropika Indonesia –LATINand (The Indonesian Tropical Institute)** Jl. Sutera No. 1 Bogor 16115, Jawa Barat, Tel. : :62-251-8425552, , Fax: 62-251-8626593, Email: latin@latin.or.id, Website: www.latin.or.id | *Collaborating Agency* | As a partner /collaborating agency a NGO that conduct activities related to community involvement in REDD+ |
|---|---|---|---|
| | LSM Latin, Kail, Perguruan Tinggi (IPB, Universitas Brawijaya, Universitas Jember) | *Collaborating Agencies/prtnners* | KAIL is a local NGO that support LATIN NGO to conduct activities related to community involvement in REDD+. IPB UNEJ and Univ Brawijaya partner universities that conduct some project activities |
| | Local goverment and communty | *Local Stake holders* | As local stakeholders that determine the success of activities as the object and subject of the activities |

## 4.5. Project Sustainability

REDD+ activities actually in line with the objective of forest sustainability. In management plan of MBNP, some activities have been identified to support the implementation of REDD+, hence combating climate change. The following Table shows some activities that are still required to support the implementation of REDD+, with sources of budget after project support from ITTO ended in April 2015.

**Table 15.** Activities required to support the implementation of REDD+ and forest sustainability after project completion.

| No | Activity | Institution | Source of budget |
|---|---|---|---|
| 1 | Continue extension and awareness raising | MBNP. NGO | MBNP budget, Donor |
| 2 | Improve community income | MBNP, NGO, Private | |
| 3 | Enhance community institution | MBNP, NGO | |
| 4 | Technical training for carbon measurement, monitoring and cultivation of plantation | Universities | |
| 5 | Forest protection (patrol, prevention and control) | MBNP, Comunity | |
| 6 | Planting | | |

| No | Activity | Institution | Source of budget |
|---|---|---|---|
| | Community monitoring of carbon stock | MBNP, Community | MBNP budget, Donor |
| | Maintaining institutional system for monitoring forest carbon stocks | Proponent | |
| | Conduct validation to assess the applied | Independent | |

| | | |
|---|---|---|
| methodologies by a selected standard system. | validator | |
| Conduct Activities to enhance the sustainable emissions reductions and enhancement of carbon stocks in the MBNP | Proponent | |
| Monitoring of emission | Proponent | |

## 5. ASSESSMENT AND ANALYSIS

Project Rationale, Issues and Strategy

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 selection of MBNP as the site for DA REDD+ activities considered three important issues to be sddressed: (1) the role of forest and conservation areas that have important contribution and benefits to many aspects of live including biodiversity and global warming (2) the issue of global warming, with significant contribution of emission from land use change and forestry and the progress development of REDD+ and (3) related to community who have significant role in forest sustainability, in relation also with their prosperity and their activities that can be therats to forest sustainability.

Moreover, REDD+ in global level is still under development process, therefore experience from DA that represent conservation area would be usefull as a learning before REDD+ full implementation. The activities in this DA REDD+ therefore have been implemented with strategy that focussed on gaining lesson learned and not merely physical activities to reduce emission or to enhance carbon stock

Involvement of Stakeholders, Project Inputs and dissemination

Multi stakeholders have been involved in the activities including governments (local and central), private, universities, NGO, and communities. In relation with project dissemination, some studies have been made by various institutions to learn about the implementation of DA REDD in MBNP, and implementation of REDD+ in Indonesia. Sudies 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, AfoCo and other institutions.

Financial support from *Seven and i Holdings Company* through ITTO has made possible for the implementation of this program. The activities have been programmed for 4 years and have been extended to another year due to adjustment of budget and activities. According to Indonesia Nationl Standard (SNI) 8834 on Implementation of DA REDD+, time interval for learning DA couyld be 5 yaers maximum. However, if the learning DA is increased into results based DA, the time frame can be 20-100 years. Project support for 5 years meant that basically the activities can be considered as learning DA. However, in exit strategy, some activities related to community and carbon accounting will be continued after project completion. There has been commitment from project proponent to continue some activities as most activities are inline with the objective to achieve forest sustainability.

Project Effectiveness and Challenges

REDD (Reducing Emission from Deforestation and Degradation) is a carbon related mechanism which is under development. MBNP has been selected as one of DA representing conservation area (national park). The total area of the Park is ± 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.

While the REDD mechanism under compliance market is still under negotiation, some voluntary standards are available such as Voluntary 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. MBNP as conservation area has relatively high carbon stock, and low deforestation rate. Lesson learned from this conservation area, especially related to methodological aspect for degradation and conservation would provide useful information for negotiation of REDD+ in the UNFCCC.

Basically, the implementation of REDD+ in MBNP has been quite effective to support overcoming the issue of forest conservation, REDD+ as mitigation action and role of community. However, there are challenges for REDD activity in MBNP, because based on remote sensing data analysis, deforestation rate in MBNP has been quite low and no net emission, although there has been threat from forest degradation due to illegal logging and encroachment.

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 biodivertsity and social safeguards are considered as co-benefits only.

So far, the role of conservation in REDD+ mechanism relatively unclear. Therefore, a challenge for conservation area with good forest condition, high carbon stock and biodiversity to get also incentivers from REDD+ mechanism. Some possible alternatives of incentives include from national sources through national fiscal mechanism, CSR from private companies and even bilateral cooperations to support SFM.

Community is important stakeholder of REDD+ in MBNP. They make the park vurnerable 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 long term community participation in national park management and to improve their prosperity towards mitigation

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.

## 6. LESSON LEARNED

As a DA REDD+ representing conservation area in management unit level, implementation of DA REDD+ program in MBNP has provided lesson learned related to whole implementation of DA REDD+ in Indonesia, related to implementation of DA REDD+ in MBNP, related to carbon accounting and to community.

For the whole implementation of DA REDD+ in Indonesia, some lesson learned include:
- DA REDD+ have been established representing various geographycal/forest conditions of Indonesia, with scope of FMU, District, Province
- There has been no clear guidance for the future of DA, such as on Registry, Monitoring, Reporting, Verification, contribution to national emission reduction, Incentive/Results Based Payment
- The DA's have been running by themselves, some have completed, some have been trying to follow voluntary carbon standards such as VCS, CCBS and Plan Vivo
- Some DA could end up as learning DA, however, according to SNI of DA REDD+, some potential DA might continue to be the result based DA
- With the establishment of current Ministry of Environment and Forestry, with the structure of Directorat General of Climate Change Control, there is a need for more role and guidance from government related to DA, including register system, providing media for communication, financial 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 has been 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
- Considering important role of community in conservation and DA REDD+ activities, particular zone is needed to accomodate community activities by establishment of agroforestry system. This agroforestry system is the only way to increase C-stock in conservation areas.

Lesson learned of DA REDD+ Activities related to Carbon
- Conservation forest in MBNP is relatively in good condition, high in carbon stock and has important biodiversity value
- The activities have been providing information on carbon stock of national park as conservation area, MRV system for monitoring carbon stock and low rate of deforestation.
- From analysis, emission reduction in MBNP can be done by avoiding deforestation and degradation, and enhancement of C-stock, especially in rehabilitation zone
- Some PSP's have been establihsed, represnting various zones of MBNP. PSP's are required to monitor the dynamic of carbon stock in forest areas (increase/decrease)
- Current mechanism of REDD+ gives advantage for areas with high deforestation rate, meanwhile conservation area has small deforestation rate and high conservation value (biodiversity). Therefore, additionallity of REDD+ in term of carbon from avoiding deforestation is small.
- This condition has urged a need of reward / incentive mechanism for areas with good conservation effort. So far, no mechanism yet applied for compliance scheme of REDD+, however some voluntary standards are available such as VCS, CCBS and Plan Vivo that have been applied by some DA. 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

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, therefeore mechanism of REDD+ should consider community as main stakeholder, and the program should provide short and long term benefits to the community.
- 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.

- Community involvement as important inputs for development of MRV system for the national level or other REDD program.

# 7. CONCLUSIONS AND RECOMMENDATIONS

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.

**RESPONSIBLE FOR THE REPORT**

**Name:  Ari Wibowo**
**Position held: Project Coordinator**
**Date: 1 July 2015**

**Project No. PD 519/08 Rev.1 (F)**       **For Periods from January 1, 2010 to April 30, 2015**

**Project Title: Tropical Forest Conservation for Reducing Emissions from Deforestation and Forest Degradation and Enhancing Carbon Stocks in Meru Betiri National Park, Indonesia**

| | | | Component | Reference | Date | Amount | |
|---|---|---|---|---|---|---|---|
| | | | | | | US$ | IDR |
| A | | | **Funds received from ITTO:** | | | | |
| | | 1 | 1st installment | G0100192388601 | 19/01/2010 | $ 120.000,00 | Rp 1.107.000.000,00 |
| | | 2 | 2nd installment | G0101873600501 | 06/07/2010 | $ 120.000,00 | Rp 1.090.560.000,00 |
| | | 3 | 3rd installment | G0111081560901 | 18/04/2011 | $ 100.000,00 | Rp 867.000.000,00 |
| | | 4 | 4th installment | S0620531029801 | 02/03/2012 | $ 100.000,00 | Rp 910.800.000,00 |
| | | 5 | 5th installment | G0130223305401 | 22/01/2013 | $ 70.000,00 | Rp 674.800.000,00 |
| | | 6 | 6th installment | G131971630901 | 22/07/2013 | $ 70.000,00 | Rp 702.520.000,00 |
| | | 7 | 7th installment | Debit in TTSusp | 04/02/2014 | $ 70.000,00 | Rp 857.360.000,00 |
| | | 8 | 8th installment | Debit in TTSusp | 19-Nop-14 | $ 59.250,00 | Rp 718.347.000,00 |
| | | | Other Revenue | | | $ (591,01) | Rp (5.960.564,90) |
| | | | Gain or (losses) on exchange rates: | | | $ - | Rp 46.369.274,55 |
| | | | **Total Funds received:** | | | $ 708.658,99 | Rp 6.968.795.709,65 |
| B | | | **Expenditures by executing agency:** | | | | |
| | 10 | | **Project Personnel** | | | | |
| | | 11 | National Expert | | | $ 45.000,00 | Rp 420.465.143,10 |
| | | 12 | International Consultation | | | $ 20.000,00 | Rp 189.010.000,00 |
| | | 13 | Project Coordinator | | | $ 136.000,00 | Rp 1.371.669.821,40 |
| | | 14 | Secretary | | | $ 27.200,00 | Rp 274.507.353,44 |
| | | 15 | Technicians | | | $ 5.400,00 | Rp 50.779.024,49 |
| | | 16 | Extension Officer | | | $ 15.800,13 | Rp 155.140.038,60 |
| | | 17 | Other Labors | | | $ 9.300,00 | Rp 87.913.633,39 |
| | | 19 | **Component Total** | | | $ 258.700,13 | $ 2.549.485.014,42 |
| | 20 | | **Sub-Contract** | | | | |
| | | 21 | carry out stake holders | | | $ 15.000,00 | Rp 136.567.500,00 |
| | | 22 | Establish partenrship for conservation of MBNP | | | $ 15.000,00 | Rp 134.474.613,80 |
| | | 23 | Conduct aw arenes raising programe | | | $ 26.999,58 | Rp 284.617.691,49 |
| | | 24 | Enhance community level intitution to reduce | | | $ 15.000,00 | Rp 140.257.687,00 |
| | | 25 | develop SOP for filed measurement | | | $ 15.000,00 | Rp 134.108.800,00 |
| | | 26 | Organize and conduct training workshops on resources base inventory for related | | | $ 16.500,00 | Rp 140.976.801,00 |
| | | 27 | Organize and conduct training workshop on carbon accounting for related stakeholders | | | $ 16.500,00 | Rp 147.107.960,00 |
| | | 28 | Conduct validation to assess the applied methodologies by a selected standard | | | $ 5.500,00 | Rp 64.410.000,00 |
| | | - | Monitoring carbon stock and improving database | | | $ 8.000,00 | Rp 91.600.000,00 |
| | | - | Monitoring the overall results of DA REDD+ activities in MBNP and identification of non | | | $ 11.000,00 | Rp 87.440.000,00 |
| | | | Analysis of potential REDD+ markets in global / national level, and benefit sharing mechanism | | | $ 7.500,00 | Rp 89.450.000,00 |
| | | | Workshop for dissemination overall lesson learned of DA REDD+ implementation | | | $ 8.000,00 | Rp 103.040.000,00 |
| | | | Preparation of PIN for Plan Vivo Standard | | | $ 9.000,00 | Rp 162.544.000,00 |
| | | 29 | **Component Total** | | | $ 168.999,58 | Rp 1.716.595.053,29 |
| | 30 | | **Duty Travel** | | | | |
| | | 31 | International travel | | | $ 7.700,00 | Rp 73.959.146,00 |
| | | 32 | Return Ticket | | | $ 19.867,67 | Rp 196.104.765,50 |
| | | 33 | Local Transport | | | $ 17.571,69 | Rp 171.110.370,04 |
| | | 34 | Daily Subsistence Allow ance | | | $ 49.911,02 | Rp 470.529.064,48 |
| | | 39 | **Component Total** | | | $ 95.050,38 | $ 911.703.346,02 |
| | 40 | | **Capital Items** | | | | |
| | | 41 | Computers | | | $ 5.452,66 | Rp 49.292.050,00 |
| | | 42 | Office Space | | | $ - | Rp - |
| | | 43 | Vehicles | | | $ 19.574,82 | Rp 177.250.000,00 |
| | | 49 | **Component Total** | | | $ 25.027,48 | $ 226.542.050,00 |
| | 50 | | **Consumable Items** | | | | |
| | | 51 | Fuel and Utilities | | | $ 25.607,49 | Rp 243.485.477,03 |
| | | 52 | Office Supllies | | | $ 4.389,43 | Rp 43.549.965,03 |
| | | 53 | Printing and Photocopy | | | $ 3.660,17 | Rp 34.050.978,23 |
| | | 54 | Other Consumable Items | | | $ 32.865,56 | Rp 297.113.368,74 |
| | | 59 | **Component Total** | | | $ 66.522,65 | $ 618.199.789,03 |
| | 60 | | **Miscellaneous** | | | | |
| | | 61 | Auditing | | | $ 8.684,22 | Rp 92.579.525,46 |
| | | 62 | Meeting Package | | | $ 10.100,03 | Rp 127.502.458,80 |
| | | 63 | Publications of technical reports and promotial | | | $ 26.917,42 | Rp 264.566.250,00 |
| | | 64 | Outreach for mess medias | | | $ 14.325,92 | Rp 129.134.966,22 |
| | | 65 | Other Miscellaneous | | | $ 34.250,23 | Rp 331.450.630,94 |
| | | 69 | **Component Total** | | | $ 94.277,82 | $ 945.233.831,42 |
| | 70 | | **Executing Agency Management Cost** | | | | |
| | | 79 | **Component Total** | | | $ - | |
| | 80 | | **ITTO Monitoring, Evaluation and Administration** | | | | |
| | | 81 | Monitoring and Review Cost | | | $ - | Rp - |
| | | 82 | Mid-term Projcet Evaluation | | | $ - | Rp - |
| | | 83 | Programme Support Cost | | | $ - | Rp - |
| | | 89 | **Component Total** | | | $ - | |
| | | | **Total Expenditures To-date: April 30, 2015** | | | $ 708.578,04 | $ 6.967.759.084,19 |
| | | | **Remaining balance of funds (A-B)** | | | $ 85.54 | $ 1,140,029.37 |

**Project No. PD 519/08 Rev.1 (F)**                                                                 **Period ending on: 30 April 2014**

**Project Title: Tropical Forest Conservation for Reducing Emissions from Deforestation and Forest Degradation and Enhancing Carbon Stocks in Meru Betiri National Park, Indonesia**

| | | Component | Original Amount | Modified Amount (A) | Accrued (B) | Expended (C) | Total (D) {B + C} | Available Funds (E) {A - D} |
|---|---|---|---|---|---|---|---|---|
| 1 | | **Funds managed by Executing Agency** | | | | | | |
| | 10 | **Project Personel** | | | | | | |
| | | 11 National Expert | $ 49,500.00 | $ 45,000.00 | | $ 45,000.00 | $ 45,000.00 | $ - |
| | | 12 International Consultation | $ 40,000.00 | $ 20,000.00 | | $ 20,000.00 | $ 20,000.00 | $ - |
| | | 13 Project Coordinator | $ 96,000.00 | $ 136,000.00 | | $ 136,000.00 | $ 136,000.00 | $ - |
| | | 14 Project Secretary | $ 19,200.00 | $ 27,200.00 | | $ 27,200.00 | $ 27,200.00 | $ - |
| | | 15 Technicians | $ 5,600.00 | $ 5,400.00 | | $ 5,400.00 | $ 5,400.00 | $ - |
| | | 16 Extension Officer | $ 21,600.00 | $ 15,800.13 | | $ 15,800.13 | $ 15,800.13 | $ - |
| | | 17 Other Labor | $ 9,300.00 | $ 9,300.00 | | $ 9,300.00 | $ 9,300.00 | $ - |
| | | | | | | | | |
| | | **19 Component Total** | **$ 241,200.00** | **$ 258,700.13** | | **$ 258,700.13** | **$ 258,700.13** | **$ -** |
| | 20 | **Sub-Contract** | | | | | | |
| | | 21 carry out stake holders | $ 15,000.00 | $ 15,000.00 | | $ 15,000.00 | $ 15,000.00 | $ - |
| | | 22 Establish partenrship for conservation of MBNP | $ 15,000.00 | $ 15,000.00 | | $ 15,000.00 | $ 15,000.00 | $ - |
| | | 23 Conduct awarenes raising programe | $ 15,000.00 | $ 26,999.58 | | $ 26,999.58 | $ 26,999.58 | $ - |
| | | 24 Enhance community level intitution to reduce | $ 15,000.00 | $ 15,000.00 | | $ 15,000.00 | $ 15,000.00 | $ - |
| | | 25 develop SOP for filed measurement | $ 15,000.00 | $ 15,000.00 | | $ 15,000.00 | $ 15,000.00 | $ - |
| | | 26 Organize and conduct training workshops on | $ 16,500.00 | $ 16,500.00 | | $ 16,500.00 | $ 16,500.00 | $ - |
| | | 27 Organize and conduct training workshop on | $ 16,500.00 | $ 16,500.00 | | $ 16,500.00 | $ 16,500.00 | $ - |
| | | 28 Conduct validation to assess the applied | $ 60,000.00 | $ 5,500.00 | | $ 5,500.00 | $ 5,500.00 | $ - |
| | - | Monitoring carbon stock and improving | | $ 8,000.00 | | $ 8,000.00 | $ 8,000.00 | $ - |
| | - | Monitoring the overall results of DA REDD+ | | $ 11,000.00 | | $ 11,000.00 | $ 11,000.00 | $ - |
| | | Analysis of potential REDD+ markets in global / | | $ 7,500.00 | | $ 7,500.00 | $ 7,500.00 | $ - |
| | | Workshop for dissemination overall lesson | | $ 8,000.00 | | $ 8,000.00 | $ 8,000.00 | $ - |
| | | Preparation of PIN for Plan Vivo Standard | | $ 9,000.00 | | $ 9,000.00 | $ 9,000.00 | $ - |
| | | **29 Component Total** | **$ 168,000.00** | **$ 168,999.58** | | **$ 168,999.58** | **$ 168,999.58** | **$ -** |
| | 30 | **Duty Travel** | | | | | | |
| | | 31 International Travel | $ 20,000.00 | $ 7,700.00 | | $ 7,700.00 | $ 7,700.00 | $ - |
| | | 32 Return Ticket | $ 21,850.00 | $ 19,867.67 | | $ 19,867.67 | $ 19,867.67 | $ - |
| | | 33 Local Transport | $ 19,200.00 | $ 17,571.69 | | $ 17,571.69 | $ 17,571.69 | $ - |
| | | 34 Daily Subsistence Allowance | $ 49,500.00 | $ 49,911.02 | | $ 49,911.02 | $ 49,911.02 | $ - |
| | | **39 Component Total** | **$ 110,550.00** | **$ 95,050.38** | | **$ 95,050.38** | **$ 95,050.38** | **$ -** |
| | 40 | **Capital Items** | | | | | | |
| | | 41 Computers | $ 6,000.00 | $ 5,452.66 | | $ 5,452.66 | $ 5,452.66 | $ - |
| | | 42 Office Space | $ - | $ - | | $ - | $ - | $ - |
| | | 43 Vehicles | $ 20,000.00 | $ 19,574.82 | | $ 19,574.82 | $ 19,574.82 | $ - |
| | | **49 Component Total** | **$ 26,000.00** | **$ 25,027.48** | | **$ 25,027.48** | **$ 25,027.48** | **$ -** |
| | 50 | **Consumable Items** | | | | | | |
| | | 51 Fuel and Utilities | $ 28,500.00 | $ 25,607.49 | | $ 25,607.49 | $ 25,607.49 | $ - |
| | | 52 Office Supplies | $ 5,500.00 | $ 4,389.43 | | $ 4,389.43 | $ 4,389.43 | $ - |
| | | 53 Printing and Photocopy | $ 9,000.00 | $ 3,660.17 | | $ 3,660.17 | $ 3,660.17 | $ - |
| | | 54 Other Consumable Items | $ 33,500.00 | $ 32,865.56 | | $ 32,865.56 | $ 32,865.56 | $ - |
| | | **59 Component Total** | **$ 76,500.00** | **$ 66,522.65** | | **$ 66,522.65** | **$ 66,522.65** | **$ -** |
| | 60 | **Miscellaneous** | | | | | | |
| | | 61 Auditing | $ 6,000.00 | $ 8,684.22 | | $ 8,684.22 | $ 8,684.22 | $ - |
| | | 62 Meeting Package | $ 3,000.00 | $ 10,100.03 | | $ 10,100.03 | $ 10,100.03 | $ - |
| | | 63 Publications of technical reports and promotion | $ 30,000.00 | $ 26,917.42 | | $ 26,917.42 | $ 26,917.42 | $ - |
| | | 64 Outreach for mess medias | $ 15,000.00 | $ 14,325.92 | | $ 14,325.92 | $ 14,325.92 | $ - |
| | | 65 Other Miscellaneous | $ 33,000.00 | $ 34,250.23 | | $ 34,250.23 | $ 34,250.23 | $ - |
| | | **69 Component Total** | **$ 87,000.00** | **$ 94,277.82** | | **$ 94,277.82** | **$ 94,277.82** | **$ -** |
| | 70 | **Executing Agency Management Cost** | $ - | | | | | |
| | | **79 Component Total** | $ - | | | | $ - | $ - |
| | | **Sub Total** | **$ 709,250.00** | **$ 708,578.04** | **$ -** | **$ 708,578.04** | **$ 708,578.04** | **$ -** |
| | 80 | **ITTO Monitoring, Evaluation and Administration** | | | | | | |
| | | 81 Monitoring and Review Cost | $ 30,000.00 | $ 30,000.00 | | $ 30,000.00 | $ 30,000.00 | |
| | | 82 Mid-term Projcet Evaluation | $ 15,000.00 | $ 15,000.00 | | $ 15,000.00 | $ 15,000.00 | |
| | | 83 Programme Support Cost | $ 60,340.00 | $ 60,340.00 | | $ 60,340.00 | $ 60,340.00 | |
| | | **89 Component Total** | **$ 105,340.00** | **$ 105,340.00** | | **$ 105,340.00** | **$ 105,340.00** | |
| | 100 | **GRAND TOTAL** | **$ 814,590.00** | **$ 813,918.04** | | | **$ 813,918.04** | **$ 671.96** |

a)    This total has dcreased with other bank administration expennse amounting to US$ 671.96 from US$ 814,590

|  |  |  |
|---|---|---|
| | $ | (671.99) |
| bank administration | $ | (586.45) |
| remaining fund | $ | (85.54) |

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

**Some Photos**



Photo 1. Involvement of students in nursery and planting activities



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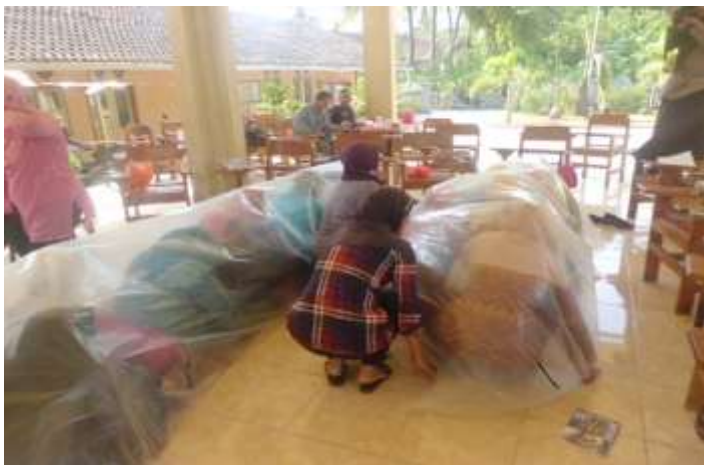


Photo 3. Training workshop and awareness raising on climate change and REDD+ to local community

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 6. Rehabilitation zone planted with agroforestry and medicinal plants

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