REVIEW ON METHODOLOGY OF VOLUNTARY CARBON STANDARDS FOR APPLICATION OF REDD+ PROJECT IN MERU BETIRI NATIONAL PARK, EAST JAVA

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Bogor, 2011

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SUMMARY

During readiness phase, Indonesia has several demonstration activities that have been implemented as learning process before REDD full implementation. One of them is in Meru Betiri National Park (MBNP), located in southern part of East Java as one of the National Parks which has been selected as the project site for ITTO activities. Total area of the Park is ± 58000 ha consisting of various vegetation types from mountainous to coastal areas. MBNP has rich of biological diversity, the communities who are living surrounding the park give both positive and negative effects to the sustainability of the forest. MBNP is eligible for REDD+ project since the area has been experiencing for unplanned deforestation and degradation. This park also has been selected as the site for demonstration activities (DA) of REDD through ITTO project, the project activity aims to 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 the negotiation processes, some voluntary standards are available to be referred such as Voluntary Carbon Standard (VCS), Plan Vivo, American Carbon Registry and CCBA for REDD activities. These standards also has been referred by some demonstration activities in Indonesia to produce carbon credits.

Based on remote sensing data analysis, deforestation rate in MBNP is quite low, although there has been threat of forest degradation due to illegal logging and encroachment. This condition is a challenge to implement REDD+ in MBNP. In order to make the REDD activity in MBNP acknowledge globally, a Project Design Document (PDD) that followed the established standard/methodology should be prepared.

Review the existing REDD methodologies is necessary to be done. From several of those, the methodology published by VCS namely VM0015 Methodology for Avoided Unplanned Deforestation is the most suitable methodology for REDD implementation in MBNP. Lesson learnt from this activity will contribute important element for the REDD negotiation process since the activity is implemented in conservation area, especially related to methodological aspect.

Keywords: Voluntary carbon, REDD+, methodology, meru betiri national park

I. INTRODUCTI ON

Indonesia is the third largest country in terms of total area of tropical rainforest, rich in biodiversity and in carbon. Carbon stored in forests plays an important role in climate change mitigation. Deforestation and forest degradation contribute significantly to global climate change, mean while conservation of carbon and enhancement of carbon stock through planting maintain and increase carbon stock, hence avoiding emission of green house gas mainly CO_2 to the atmosphere. Forestry sector (LULUCF) in Indonesia is an important sector that contributes to the emission of GHG. Up to present Indonesia is still net emitter with forestry sector as the highest contributor to the total emission (MoE, 2009).

United Nations Framework Convention on Climate Change (UNFCCC) has been developing carbon related mechanism for compliance market. For LULUCF sector, after AR-CDM that is considered unsuccessful, current mechanism is being developed to include REDD (Reducing Emission from Deforestation and Degradation) as carbon related mechanism to deal with global warming. 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+.

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 that is internationally recognized with higher tier (Tier 2 or 3) by considering availability of resources. REDD is approached from national level with sub national implementation.

During readiness phase, some demonstration activities have been implemented as learning process before REDD full implementation. For carbon accounting that consider 5 carbon pools, IPCC Guideline provides methodology that has been broadly used by Non Annex I countries. Meanwhile since compliant mechanism is being developed for REDD+ activities under UNFCCC, 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 to have carbon credits.

Meru Betiri National Park (MBNP) located in southern part of East Java is one the National Parks which has been selected as the project site for ITTO activities. The total area of the Park is ± 58000 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 is eligible for REDD+ project because the area has been experiencing unplanned deforestation and degradation. MBNP has been selected as the site for demonstration activities (DA) of REDD through ITTO project. MBNP as ITTO project for 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.

Based on remote sensing data analysis, deforestation rate in MBNP has been quite low. However, there is threat for forest degradation due to illegal logging and encroachment. As this conservation area has relatively high carbon stock, methodology to support REDD+ especially in conservation and avoiding degradation is important to explore. While waiting for the compliant market mechanism to be applied, some voluntary standards are available to follow for carbon trading. Lesson learnt from this conservation area, especially related to methodological aspect for degradation and conservation would provide useful information for negotiation of REDD+ in the UNFCCC.

This review has objective to provide information on some standards for voluntary carbon markets, methodological issue, requirement of data and information as well as necessary steps to fulfill the need for Voluntary Carbon Mechanism, especially for preparation of Project Design Document (PDD) in Conservation Area of MBNP.

II. CLIMATE CHANGE MITIGATION ACTION IN FORESTRY SECTOR

2.1. Clean Development Mechanism (CDM)

The result of COP 3 in Tokyo known as Kyoto Protocol adopted legal binding for reduction of Greenhouse Gasses emission for developed countries (Annex I countries). To achieve the target of emission reduction, flexible mechanism consisted of Joint Implementation (JI), Clean Development Mechanism (CDM) and Emission Trading (ET) has been developed. CDM is the only mechanism of Kyoto Protocol where developed countries could invest in developing countries in various sectors to achieve their emission reduction target by buying Certified Emission Reduction (CER). Developing countries would receive compensation fund that might be used for sustainable development objective.

The CDM identifies over 200 types of projects suitable for generating carbon offsets, which are grouped into broad categories. These project types include renewable energy, methane abatement, energy efficiency, reforestation and fuel switching (UNEP, 2010). Within the Land Use, Land-Use Change and Forestry sector (LULUCF), only A forestation and Reforestation (AR CDM) are eligible during the first commitment period (2008-2012). There is requirement of additionality of carbon sink in project location for LULUCF. For aforestation CDM, the area has been non-forest since 50 years ago and for reforestation CDM, the area should be non forest since 1990.

Internationally, CDM projects must go several through special revision and approval steps. These steps are the results of international negotiations ("modalities and procedures"). The CDM executive board (EB) supervises the compliance of these steps. In the host country, CDM must be approved by the host country and each country has its own national approval procedures. The designated National Authority (DNA) supervises the compliance. A letter of approval must be issued for national approval. Indonesia has issued its procedures for CDM activities through Ministry of Forestry regulation.

Some forestry activities eligible for AR CDM include agroforestry, forest plantation and biomass energy project. Although the interest of AR CDM in Indonesia has been high, so far there has been no AR CDM project in Indonesia due to lack of eligible land, initial investment, readiness of local institution as well as difficult mechanism of CDM. Most people agreed that the AR CDM is not successfully meet the target of UNFCCC in reducing GHG emission. There is an interesting fact on the AR CDM project growth in CDM secretariat. The first registered AR CDM project is from Guang xi, China, and it was in November 2006, and there is no more registered project for three years until the project from Moldova which is registered on 2009. After that the number of registered AR CDM project is increasing significantly, until August 2011 there were 32 projects registered, and there are still many projects under consideration and waiting to be registered. By seeing this fact, it can be assumed that the procedure/methodology of AR CDM is getting easier. This situation is very pleasant and can encourage parties to implement AR CDM projects but some people said that it was too late, because the CDM will be end by 2012.

Aforestation and reforestation (A/R) activities are excluded from REDD activities, although they have been proposed by some Parties as potential REDD+ activities. The reasons for this exclusion are, that the Conference of the Parties has not decided on the inclusion of A/R as a REDD+ eligible activity, and, on the other hand, that following the definitions currently used in the forest carbon context (both in the Clean Development Mechanism (CDM) and in most of the voluntary carbon standards), A/R activities must take place in a project area that has a land use different from forest in the baseline; thus in principle it

would not be possible to carry out such activities under the REDD+ umbrella (however, projects enriching forests through tree planting would fall under the category of 'sustainable forest management' (CIFOR, 2011).

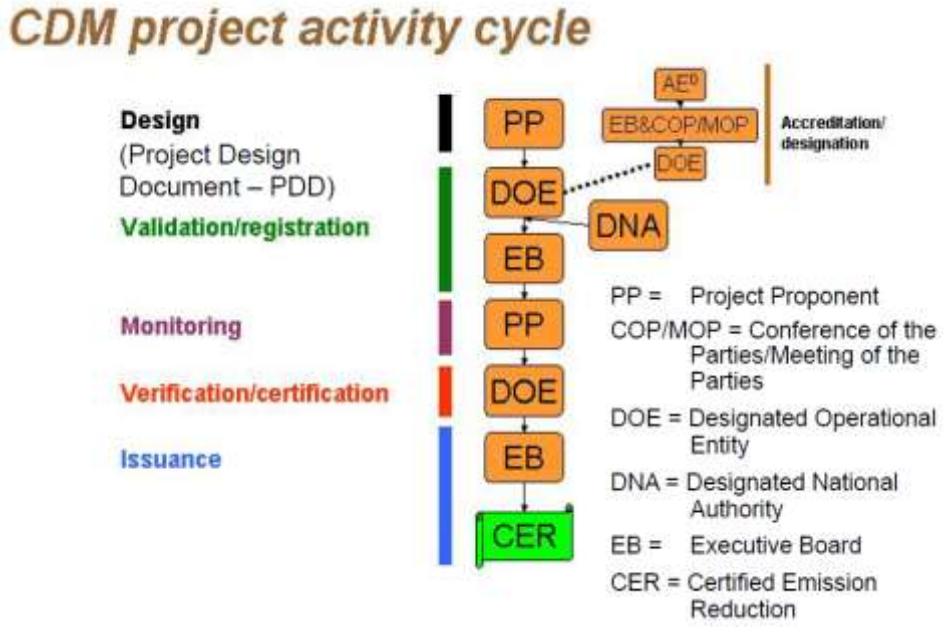

Figure 1. CDM project activity cycle

2.2. REDD+

Because of the unsatisfied progress of climate change mitigation action on forestry sector through AR CDM, the REDD+ has became a hot topic that can respond to emission reduction. The basic idea of REDD+ is reducing or slowing down the rate of deforestation and forest degradation by providing alternative economic activities that can give beneficial for indigenous people and the country as a whole. The parties who did that should be rewarded as an effort to combat the climate change. However, actually the initial development of REDD+ was adopted in Kyoto protocol (see below)

Article 2

1. *Each Party included in Annex I, in achieving its quantified emission limitation and reduction commitments in order to promote sustainable development, shall:*

a. *Implement and/or further elaborate policies and measures in accordance with its national circumstances, such as:*

ii. ***Protection** and **enhancement of sinks** and reservoirs of greenhouse gases, promotion of sustainable forest management practices, afforestation and reforestation;*

iii. *Promotion of sustainable forms of agriculture in light of climate change considerations;*

Article 3

3. *The net changes in greenhouse gas emissions by sources and removals by sinks resulting from direct human-induced land-use change and forestry activities, limited to afforestation, reforestation and **deforestation** since 1990, measured as verifiable changes in carbon stocks in each commitment period, shall be used to meet the commitments under this Article of each Party included in Annex I. The greenhouse gas emissions by sources and removals by sinks associated with those activities shall be reported in a transparent and verifiable manner.*

Even though deforestation was explained as an important issue on climate mitigation, it was ultimately rejected because the ambiguity of emissions estimation, the potency of activities displacement (leakage), the issue of non permanence and lack of information and technology to guide measurement, reporting and verification.

In 2005, at the 11th Conference of the Parties (COP-11), the Coalition of Rainforest Nations initiated a request to consider 'reducing emissions from deforestation in developing countries.' The matter was referred to the Subsidiary Body for Scientific and Technical Advice (SBSTA).

At the 2007 Bali UNFCCC meeting (COP-13), an agreement was reached called the Bali Action Plan. As defined, its aims are directed toward forest conservation, sustainable forest management and the enhancement of carbon stocks known as REDD+. REDD+ calls for activities with serious implications directed towards the local communities, indigenous people and forests which relate to reducing emission from deforestation and forest degradation. Therefore, this will involve enhancing existing forests and increasing forest cover.

In 2009, at COP-15 in Copenhagen, the Copenhagen Accord of 18 December 2009 was reached, noting in section 6 the recognition of the crucial role of REDD and REDD-plus and the need to provide positive incentives for such

actions by enabling the mobilization of financial resources from developed countries.[1] The Accord goes on to note in section 8 that the collective commitment by developed countries for new and additional resources, including forestry and investments through international institutions, will approach USD 30 billion for the period 2010 - 2012.

Reducing Emissions from Deforestation and Forest Degradation (REDD) is a set of steps designed to use market/financial incentives in order to reduce the emissions of greenhouse gases from deforestation and forest degradation. Its original objective is to reduce green house gases but it can deliver "co-benefits" such as biodiversity conservation and poverty alleviation (Varghese, 2009)

REDD is presented as an "offset" scheme of the carbon markets and thus, will produce carbon credits. Carbon offsets are “emissions-saving projects” that in theory “compensate” for the polluters’ emissions. The “carbon credits” generated by these projects can be used by industrialized governments and corporations to meet their targets and/or to be traded within the carbon markets.

During the year 2010-2012, REDD is in the readiness phase. In Indonesia there have been some demonstration activities for REDD+. Meanwhile the mechanism is still under negotiation, REDD is expected to be fully implemented after 2012 (Kyoto Protocol). Project activities included under the REDD+ umbrella, namely:

1. Reducing emissions from deforestation;
2. Reducing emissions from forest degradation;
3. Conservation of forest carbon stocks;
4. Sustainable management of forests; and
5. Enhancement of forest carbon stocks.

III. EXISTING STANDARDS FOR REDD+ PROJECT

3.1. Verified/Voluntary Carbon Standard (VCS)

VCS was established by The Climate Group, International Emissions Trading Association (IETA), and the World Business Council for Sustainable Development in 2005 and several NGOs. Until now VCS is one of the most common standard that has been used for greenhouse gas emission reduction action in the voluntary carbon market. The first official version of the VCS was published in 2007 (called the VCS 2007.1) and the third major revision, the VCS 2011 is still in preparation for launch in early 2011.

VCS concerns on forestry sector which is scoped in sector 14 (Agriculture Forestry and Other Land Use. General provisions in the VCS 2007.1 for the forestry sector are as follows:

Type of VCS Forestry Activity

There are three categories of activity in forestry sectors which may be applied as a VCS project, namely:

- Afforestation, Reforestation and Revegetation (afforestation, Reforestation and Revegetation, ARR), is an activity that increases carbon stocks in biomass (and also soil in certain cases) by enhancing, adding and/or restoring tree cover through planting, seeding and / or natural regeneration of vegetation that human-assisted. To apply for ARR activity, project proponents must prove that in 10 years before the project begins there is no similar project ever undertaken at the project site.

- Improved Forest Management (Improved Forest Management, IFM). Improve the forest management activities in order to reduce GHG emissions or increase carbon sequestration in the long term by: (i) conversion of conventional logging by applying the method of reduced impact logging (RIL), (ii) conversion of over logged forests to protected forests, (iii) extend the life of crop rotation (evenly-aged forests managed forest), and (iv) conversion of low production forest into a more productive forests.

- Reducing Emissions from Deforestation and Forest Degradation, REDD. Activity of reducing GHG emissions by slowing or stopping the conversion of forest to non-forest land and/or reduce degradation of forest land where forest biomass decreased. The land that will be submitted for REDD should be a forest land (according to host country standards or standards to FAO standard) since at least 10 years before the project begins.

Type and Scale of Project

There are two types of projects that may be proposed:

- Individual GHG Project, namely the project (single) which make measurements, operations or other activities that aim to reduce or absorb GHG emissions. Based on the amount of the reduction/absorption of emissions, the project is divided into:
    - micro-projects : less than 5,000 tCO2-e per year;
    - Project : 5,000 - 1,000,000 tCO2-e per year; and
    - mega projects : more than 1,000,000 tCO2-e per year.

- Group of GHG Projects, which is a combination of individual projects or project categories that meet the requirements of VCS. One project group can consist of more than one sub-group. One project group should have one central information system and controls associated with its projects (sub-group) and monitoring.

Credits verified to the standard are called as Voluntary Carbon Units (VCUs) whis is equivalent to 1 Mg CO_2. All VCUs are listed in the VCS Project Database. The VCS Registry System currently consists of the VCS Project Database and 3 international companies that are contracted to act as registries—APX Inc., Caisse des Depots and Markit Environmental Registry; the system could be expanded in the future to include additional registries. The VCS registries issue, hold, transfer and retire VCUs, and interact directly with the VCS Project Database to upload project documentation and obtain unique serial numbers for each VCU.

Initial Period of the Project and Crediting Period

Date of commencement of the project (project start date) for the VCS 2007.1 should not be prior to January 1, 2002, except for AFOLU projects, can be prior to January 1, 2002 by providing evidence.

AFOLU project crediting period is minimum 20 years to maximum 100 years. Starting date of the crediting period is the date of commencement of the first monitoring. The earliest date for the project AFOLU credit period is January 1, 2002.

Additionality

Project proponent should be able to show that the VCS project is additional by using one of the additionality test the following:

1) Project Test: Project proponent (PP) should demonstrated that the project faces barriers (investment, technological or institutional barriers) that causes the project not be implemented unless it is supported by funding from carbon credits, and the project is not a common project in the sector or in areas where projects are implemented.
2) Test of Performance: PP should be demonstrated that the resulting GHG emissions (or carbon stored) per unit of output by the project are under (or over, for sequestration projects) the level that has been agreed as a standard of performance by the VCS Program to ensure that the project not a general practice/day-to-day.

3) Test of Technology: must be demonstrated that the activity of the project and its location is in accordance with the list of types of activity and are in a decent area (applicable) which have been designated as additional by the VCS Program.

Methodology

VCS projects can apply the approved methodology by the VCS standard or apply the methodology that has been approved by another standards that is recognized by the VCS, such as the methodology of the UNFCCC CDM and methodology of the Climate Action Reserve.

Project proponent may also propose a new methodology or revisions to existing methodologies to the VCS Board. All of the proposed methodology will be considered through the double approval process which is determined by the validator that selected by the project proponents and validators from VCS. Both process cost will be covered by the project proponent.

Projects that have been registered through another program that has been recognized by VCS (eg CDM), can claim the emission reductions or sequestration that are not included in the program into VCUs.

There are fourteen existing methodologies under sector 14 (AFOLU), see table below, each methodology has its own characteristic and applicability. Regarding REDD, almost all methodology can be applied.

Table 1. Approved existing VCS Methodology under AFOLU sector

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

VCS Project Cycle

To start VCS project, the first step that needs to be done by project proponents is to select/choose the appropriate methodology (or create a new methodology) for the project activity, and prepare the document of VCS Project Description (VCS PD).

Similar to CDM PDD, VCS PD is a document that includes detailed descriptions of project activities, the baseline scenario, GHG emissions calculation methodology, the monitoring plan, the project's impact on the environment and society, as well as other relevant information. Project proponents can use template format of VCS PD which can be downloaded from the VCS website.

The document of projects that consisting of VCS PD, proof of title (a document that shows ownership of the project), monitoring reports (if any) and other relevant documents should be prepared, and then to be validated and verified by an independent agency that approved by the VCS Program.

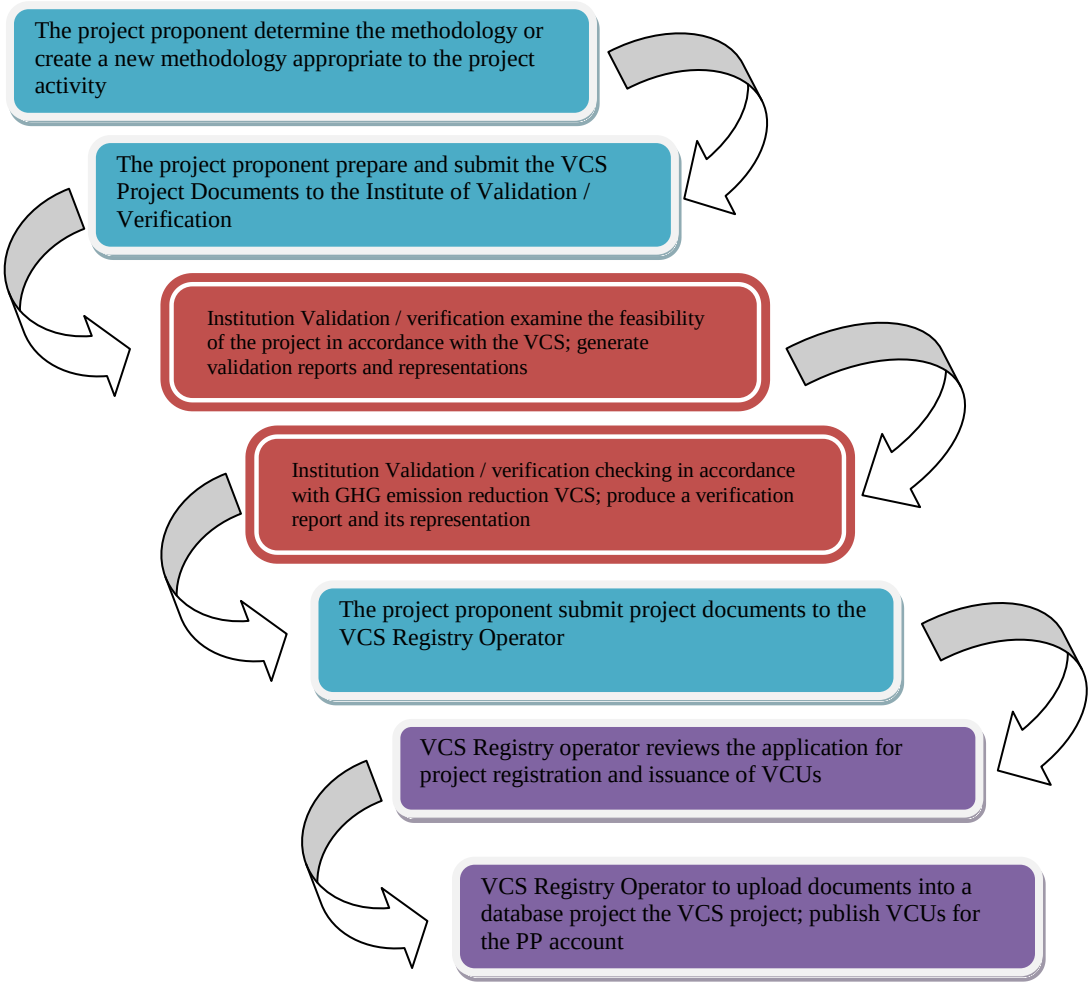

Figure 2. VCS Project Cycle

There are many agencies of validation/verification is allowed to audit the VCS project, including the VCS validation/verification bodies, an institution that is recognized by other programs such as CDM and Climate Action Reserve, the Designated Operational Entities (DOE) and the Certification Bodies (CB), or other institutions that accredited by ISO 14065.

After validation and verification process is completed, the project proponent can register its project to the VCS Registry Operators, and propose the VCU issuance by submitting the project documents such as the VCS PD, validation reports, monitoring reports, verification reports, and other required documents.

VCS Registry Operator will then review the project and make sure if the project is already registered previously. VCS project registration fee will be charged to the project proponents in the amount of 0.04 EUR per VCU.

After VCU serial number is issued, the VCS Registry Operator may issue immediately to the account VCU proposer or owner of the project.

3.2. The Climate, Community & Biodiversity (CCB) Standard

The CCB Standards (http://www.climate-standards.org) different from other standards such as the VCS and Plan Vivo by, *inter alia*. This standard requires that the project will bring significant benefits for society and biodiversity. The CCBS requires the project to be able to generate GHG emission reductions, but can not issue a certificate of emission reductions. Therefore, the CCBS can be combined with other carbon credit standards, such as CDM and VCS, so that the credit generated by the project has more value and will also increase the selling price of carbon credits in carbon markets.

Project Criteria

The standards comprise 14 required criteria and 3 optional 'Gold Level' criteria. Once a project has been designed, a third-party evaluator will use indicators to determine if individual criteria are satisfied. Only projects that use best practices and deliver significant climate, community and biodiversity benefits will earn CCB approval. Gold status is awarded to projects that also satisfy one of the optional criteria by providing exceptional benefits including explicit design for adaptation to climate change, benefits for globally poorer communities or conservation of biodiversity at sites of global conservation significance. Project Checklist for CCB standard consists of:

G1. Original Conditions in the Project Area (Required)
G2. Baseline Projections (Required)
G3. Project Design and Goals (Required)
G4. Management Capacity and Best Practices (Required)
G5. Legal Status and Property Rights (Required)
CL1. Net Positive Climate Impacts (Required)
CL2. Offsite Climate Impacts ('Leakage') (Required)
CL3. Climate Impact Monitoring (Required)
CM1. Net Positive Community Impacts (Required)
CM2. Offsite Stakeholder Impacts (Required)

CM3. Community Impact Monitoring (Required)
B1. Net Positive Biodiversity Impacts (Required)
B2. Offsite Biodiversity Impacts (Required)
B3. Biodiversity Impact Monitoring (Required)
GL1. Climate Change Adaptation Benefits (Optional)
GL2. Exceptional Community Benefits (Optional)
GL3. Exceptional Biodiversity Benefits (Optional)

Type of Project Activity under CCBS

The CCB Standards identify land-based projects that are designed to deliver robust and credible greenhouse gas reductions while also delivering net positive benefits to local communities and biodiversity. The Standards can be applied to any land-based carbon projects including both projects that reduce greenhouse gas emissions through avoided deforestation and forest degradation (REDD) and projects that remove carbon dioxide by sequestering carbon (e.g., reforestation, afforestation, revegetation, forest restoration, agroforestry and sustainable agriculture).

Procedure

Initial step that is necessary to be done by the project proponents is preparing Project Design Document (PDD), the project design document that contains a detailed description of project activity and explanation of how the project can meet the requirements and criteria of CCBS. There is no standard format specified for PDD of CCBS, therefore project proponents can use the format of the PDD according to the standard A / R CDM or VCS PD.

CCBS project approval process consists of two main processes: validation and verification. Process of validation is performed to ensure that the project design is in line with the required standards, while the verification process is to determine that the project has been well implemented, and produce positive benefits for the climate, social and biodiversity in accordance with a design that was made.

Validation and verification phase of CCBS projects are as follows:

Validation:

1. Project proponent (PP) prepares the project documentation (including the Project Design Document) that describes how the project can meet the requirements of CCBS.
2. PP choose auditors for validation
3. Auditors review the project and submit documents to the CCBA; publication and distribution of PDD for public comments.

4. Auditors perform the validation process is accompanied with a site visit.
5. Preparation of Draft CCB Validation Report by auditor
6. PP Revises the PDD to correct inputs identified during the validation.
7. Preparation of the Final Report and Statement of Validation CCB by the auditor.
8. Te final project documents submitted to the CCBA; publication of the revised PDD, Validation Final Report CCB, CCB Validation Statement, and the status of CCB projects in the CCBA website.

Verification:

1. PP submits a plan and monitoring report to the CCBA.
2. PP prepares the project documentation that explains how the project being undertaken in compliance with the requirements of CCBS.
3. PP chooses the auditor for verification.
4. Auditor reviews and submit a report to the CCBA the project implementation; publication of the project implementation report for public comment.
5. Auditors perform the verification process with a site visit.
6. Preparation of Draft Report CCB verification by auditors.
7. PP responds/revise the inputs identified in the Draft Verification Report.
8. Preparation of the Final Report and Verification Statement CCB by the auditor.
9. The final project documents submitted to the CCBA; Publications CCB Final Report Verification, Verification Statement CCB, and the status of the project on the site CCBA.

To keep the CCBS project status, the next verification process has to be done within a maximum period of five years since the last verification.

Auditors

Implementation of validation and verification process should be performed by an independent agency approved by the CCBA, including:

(i) an accredited institutions as "Designated Operational Entity" for the sector "Afforestation / Reforestation" by the CDM Executive Board,
(ii) an accredited institution as the "Certification Body" for auditing sustainable forest management by the Forest Stewardship Council (FSC), and
(iii) the accredited institution by ISO 14065:2007 specifically VCS Program includes forestry and agriculture sectors (AFOLU).

3.3. The Plan Vivo Standard

The System was first conceived and developed in 1994, as part of a UK Department for International Development (DFID)-funded research project in the Chiapas region of Southern Mexico. The development of the project was led by the Edinburgh Centre for Carbon Management (ECCM), in partnership with El Colegio de la Frontera Sur (ECOSUR), the University of Edinburgh and other local organisations. The project itself, Scolel Te ('the tree that grows'), is the longest standing Plan Vivo project.

In 2002, development and governance of Plan Vivo was transferred from ECCM to an independent not-for-profit organisation called BioClimate Research and Development (BR&D), which was dissolved in 2008 when its activities and remit were wholly transferred to the Plan Vivo Foundation, a registered charity.

Plan Vivo standard provides a standard for "managing the emission reductions from rural communities by promoting sustainable livelihoods. The generated credits called verifiable emission reductions (VERs) which is equivalent to 1 ton CO_2. The project participants are small-scale producers and communities in developing countries. They create sustainable land-management plans by combining existing land-uses with additional eligible project activities, namely:

· Afforestation and reforestation
· Agroforestry
· Forest restoration
· Avoided deforestation

Methodology for REDD+ under Plan Vivo Standard

For this moment, there is no methodology for REDD+ developed by Plan Vivo Standard. But, The Plan Vivo Foundation recommends the following external methodologies for guidance in developing REDD+ activities.

- Ecometrica Protocol: Above-ground biomass survey for projects that aim to reduce greenhouse gas emissions from deforestation and forest degradation.
- BioCarbon Fund Methodology for Estimating Reductions of GHG Emissions from Mosaic Deforestation.
- Coming soon: Plan Vivo REDD+ methodology.

A Plan Vivo REDD+ methodology is currently under development, bringing together experience of REDD+ project development so far in Plan Vivo projects. It will be released for stakeholder review in October 2011

3.4. American Carbon Registry (ACR) Forest Carbon Project Standard

ACR is an enterprise of Winrock International, which is a voluntary program leading to offset the strong standards for environmental integrity and transparency. Founded in 1996 by Environmental Resources Trust. ACR was the first private voluntary GHG emissions registry in the United States, and in 2007, both Environmental Resources Trust and American Carbon Registry joined Winrock International. American Carbon Registry provides carbon technical services for GHG accounting, protocol development, offset and corporate GHG inventory registration and over-the-counter (OTC) offset transactions and retirements. ACR establishes tree standards including standard in forestry sector, see table below

Table 2. Standards in ACR

Standard	Version	Status
American Carbon Registry Standard	2.1	Published
Forest Carbon Project Standard	2.1	Published
Livestock Waste Management Standard	1.0	Public comment period closed

The Forest Carbon Project Standard, launched in March 2009, and available for afforestation and reforestation (AR), improved forest management (IFM), and reducing emissions from deforestation and degradation (REDD)projects within the United States or non- Annex I countries.

Methodology

The methodologies are based on International Standards Organization (ISO) 14064. Process for development and approval of methodologies is led by an expert technical team and includes a public comment period and a scientific peer review process by experts in the relevant field.

The Winrock and ACR team leads the development of methodologies in the forestry sectors. Team members have co-authored carbon project protocols for the Clean Development Mechanism (CDM), U.S. Environmental Protection Agency (EPA), U.S. Department of Energy (DOE), the U.S. Department of Agriculture (USDA), the USDA Forest Service, the California Energy Commission (CEC), the World Bank, the International Tropical Timber Organization, United Nations organizations and the Voluntary Carbon Standard

(VCS). Table below shows the existing methodologies related to REDD+ which are developed under ACR forest carbon standard.

Table 3. Methodology related to REDD under ACR Forest Carbon standard

Methodology	Version	Status
Improved Forest Management (IFM) on U.S. Timberlands	1	Published
Afforestation and Reforestation of Degraded Lands	1	Published
REDD - Avoiding Planned Deforestation	1	Published
100-year Improved Forest Managment (IFM) on U.S. Timberlands	1	Published
Improved Forest Management (IFM) on Non-Federal U.S. Forestlands	1	Published
REDD Methodology Modules	1	Public comment period closed

The Project developers are welcome to submit new methodologies and modified methodologies for evaluation and approval via scientific peer review. Upon public comment and scientific peer review, ACR Forest Carbon Project Standard may approve and publish the methodology for future use.

ACR Forest Carbon Project Standard generally accepts methodologies and tools published by the Clean Development Mechanism (CDM) and ACR-reviewed and approved methodologies from other programs to the extent that they comply with ACR's Standards. ACR also gives Project Proponents the flexibility to propose modifications to ACR-approved methodologies and tools.

IV. REDD+ PROJECT CYCLE (desk review and opinion)

In general, project cycle for REDD will be similar to the other forest carbon projects such as in CDM and VCS. The cycle includes: Project Design Document development, Validation, Registration, Implementation and Monitoring, Verification, Certification of Credit and Issuance of certified/verified emission reduction. Figure 2 illustrates the key phases and the order in which the phases are undertaken. There are five key phases in the development of forest carbon projects:

1. Project Idea
2. Project Design
3. Validation and Registration
4. Implementation
5. Verification

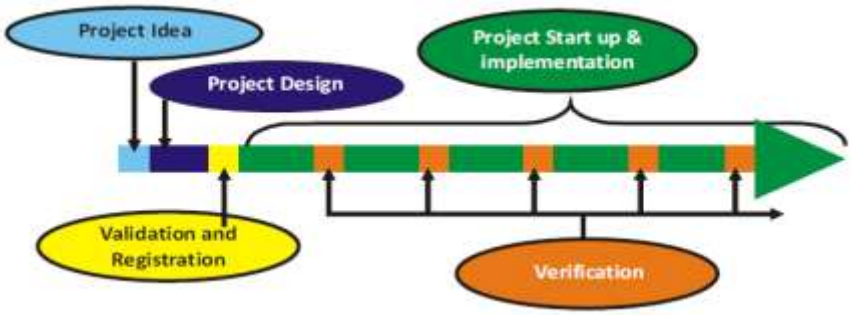

Figure 3. Key project phases of REDD

Phase 1 : Project Idea

The final outcome of the project idea phase is the creation of a project concept note. The project idea phase takes time and it is important to devote sufficient resources to elaborating the project concept. This process could take between 6 months to 2 years to accomplish. Fundraising is important even during this early stage of the project. Costs associated with travel, consultant fees, capacity building, meetings, and logistics can be significant during this stage. Additionally, it is very important to initiate and foster government involvement in the project during this stage. Compiling background information early to develop a credible concept note is critical to generating donor and government support for the project.

Phase 2 : Project Design

The project design phase may be the most intense phase for project developers. The key activities and outcomes involved in the project design phase include:

- Define activities and interventions: What activities are needed to effectively address the drivers of deforestation in the project area and protect the forest?
- Who would need to be involved in executing those strategies?
- What financial incentives are needed to make the strategies work?
- Consult with local communities and stakeholders: What are the expected social and environmental benefits of the project? How will the project respond to stakeholder concerns? How can stakeholders be engaged in the project and what will their roles be?

- Analyze financial costs and legal issues: What are the up-front costs and what are the expected financial flows over the life of the project? What agreements must be signed?

Various experts will be needed during this phase of project development. The project developer will likely need consultants with expertise in: GIS analysis and remote sensing, field biomass measurement, financial planning, community engagement, and legal structures.

The final product of the project design phase is the Project Design Document (PDD). The Project Design Document requires descriptions of:

- a description of the project (e.g. name, location, activities to be implemented);
- the definition of the project boundary (including pools, sources, crediting period and project area);
- a description of the baseline and monitoring methodology used and a justification of why it is applicable to the project;
- the demonstration of the additionality of the project;
- a description of the environmental impacts of the project;
- a summary of stakeholder comments;
- a description of the monitoring plan; and
- calculations leading to the (*ex-ante* and *ex-post*) estimation of the project's emission reductions.

The contents and format of the PDD will depend on the requirements of the standards that the project intends to apply. As an example, there is PDD template for the Voluntary Carbon Standard on web: http://www.v-c-s.org/docs/VCS%20PD.doc as shown in the Appendix 1

Phase 3 : Project Validation and Registration

After the Project Design Document has been completed, a third-party auditor will need to evaluate and validate project design. The auditor will determine whether:

- The project has used an appropriate methodology and applied it correctly
- The appropriate steps have been followed according to standard requirements
- The expected emissions reductions have been correctly calculated.

If the auditor determines that the project has met all the requirements of a particular standard (CDM, VCS, CCB, etc), the auditor will approve the project under that standard. The project will then be registered and certified as in compliance with that standard. The validation process can take 2 months or more to complete and may cost from $7,000 - 40,000.

Phase 4 : Project Implementation

The project implementation phase includes the following activities:

- Sign and implement all landowner and partner agreements: Lease land, negotiate site protection or maintenance contracts, enact government agreements, sign carbon marketing and sales contracts, and establish the benefits sharing structure
- Undertake needed community engagement and education programs
- Implement project activities: forest protection measures, patrolling, monitoring, fire prevention, alternative livelihood and community benefit activities, etc
- Monitor project impacts: monitor deforestation rates in project site, monitor and mitigate leakage, monitor social and ecological impacts

It is important to note that forest carbon projects require more active management throughout the life of the project than traditional forest conservation projects and this must be accounted for in the project plan. One key factor in the success of many projects is that benefits reach the communities early on. Therefore alternative livelihood activities must begin at the same time, or prior to, forest protection activities and capacity building activities should be ongoing during the initial phases of the project.

Phase 5 : Verification

Verification of the project occurs after the project has been implemented and will continue throughout the life of the project. During the verification process, a third-party auditor will determine whether:

- The project has been implemented according to the project design and methodology;
- Monitoring has occurred as planned; and
- The expected social and environmental benefits have been realized and negative impacts have been mitigated.

Once the auditor has validated the project according to the selected standard, the project is awarded emissions reductions credits that it can sell. Forest carbon projects are unique in the level and variety of expertise needed to design and implement the project. For this reason, project design and start-up can be a lengthy, complex, and expensive process. It is important to identify project goals and methodologies early on so that major changes are not needed once the project has already incurred significant costs. A variety of expertise will be needed during all phases of the project, including technical, financial, legal, and management. Though projects can be complex and time-consuming, carbon financing represents a promising new funding tool for forest conservation that could lead to stable and effective long-term projects.

V. METHODOLOGY FOR REDD+

The explanation on methodology for REDD+ is summarized from main sources : (CIFOR, 2011 and VCS, 2007) as follows:

5.1. Use of IPCC Guideline

REDD basically is activity to reduce emission from forestry sector, therefore methodology for estimating emission through GHG inventory on forestry is the basic for REDD activity. IPCC (International Panel on Climate Change) has developed methods that have been broadly applied by countries that ratifying the UNFCCC. The IPCC guidance mostly used by developing countries as the basis for estimating anthropogenic forest-related GHG emissions by sources and removals by sinks, forest carbon stocks and forest area changes in the context of REDD+.

The IPCC methods relevant for REDD+ activities are mainly contained in the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC 2006 GL) and the IPCC Good Practice Guidance for LULUCF (IPCC GPG-LULUCF, 2003). IPCC GL method divides land class into six land categories namely forest land, cropland, grassland, wetland, settlement and other land. Each land use category is further subdivided into land remaining in that category (e.g. 'Forest land remaining forest land') and land converted from one category to another (e.g. 'Forest land converted to cropland').

Carbon stock changes within a stratum are estimated by considering carbon cycle processes between the 5 carbon pools: above ground biomass, below ground biomass, dead wood, litter, soil organic matter. Overall, carbon stock

changes within a stratum are estimated by adding up changes in all pools. Further, carbon stock changes in soil may be disaggregated as to changes in C stocks in mineral soils and emissions from organic soils. Harvested wood products are also included as an additional pool. The IPCC 2006 GL provides 2 methods to estimate annual carbon stock changes in any pool:

The Gain–Loss Method, which includes all processes that bring about changes in a pool. Gains can be attributed to growth (increase of biomass) and to transfer of carbon from another pool (e.g. transfer of carbon from the live biomass carbon pool to the dead organic matter pool due to harvest or natural disturbances). Losses can be attributed to transfers of carbon from one pool to another (e.g. the carbon in the slash during a harvesting operation is a loss from the aboveground biomass pool), or emissions due to decay, harvest or burning. The Gain–Loss Method requires the biomass carbon loss to be subtracted from the biomass carbon gain.

The Stock-Difference Method requires carbon stock inventories for a given land area at 2 points in time. Annual stock change is the difference between the stock at time t2 and time t1, divided by the number of years between the inventories. The Stock-Difference Method requires greater resources and is suitable for Tier 3 and in some cases Tier 2 approaches, but may not be suitable for a Tier 1 approach due to limitations of data.

In applying the above two methods, the most important variable is the change in land area in the relevant category (e.g forest remaining forest areas) or in the conversion category (e.g forest areas that have been converted to agriculture) in the last year. In the REDD+ projects, this calculation is estimated by two types, the ex-ante through modeling and ex-post through monitoring.

IPCC GL 2006 also offers guidance on how to calculate the non-CO2 emissions. Non-CO2 gases that considered for AFOLU sector are methane (CH4) and nitrous oxide (N2O). These emissions come from various sources, including emissions from peat land, livestock and fertilizers, and from burning biomass, dead wood and litter.

Several methodologies related to forestry sector that published by several institutions or forest carbon project standards such as approved methodologies for A/R CDM and methodologies by VCS have referred to the IPPC GL 2006. In any case these standards had been modified or adopted specific approach from IPCC GL 2006 to create one single methodology for specific application

e.g. "*Methodology for Calculating GHG Benefits from Preventing Planned Degradation*".

5.2. Methodology by VCS

VCS allows to use the methodologies related to forestry sector include all VCS methodologies and all A/R CDM methodologies. As mentioned in previous chapter, there are several methodologies published by VCS that related to REDD+ implementation. Those methodologies provide specific applicability that has to match with the project site condition and type of activity that would be implemented.

Table 4. Applicability of methodology under VCS

No	ID	Methodology
1	VM0006	Methodology for Carbon Accounting in Project Activities that Reduce Emissions from Mosaic Deforestation and Degradation, v1.0 ***Applicability:*** 1. Land in the project area, consisting of either one contiguous area or multiple discrete project parcels (see definition of project area), has qualified as forest at least 10 years before the project start date (VCS 2007.1, 2008 p 16). Note that in case the project area consists of multiple discrete project parcels, each of the discrete parcels must meet all the applicability criteria of this methodology. 2. The project area would be deforested in absence of the REDD project activity, as evidenced by the presence of deforestation agents and drivers near the project area (see the following criterion), and a **minimal deforestation rate** in the reference region of **0.5%** during the historical reference period. In addition, the deforestation in the reference region must follow the mosaic typology; the presence of a mosaic typology must be verified using the criteria for mosaic deforestation set forward by the VCS. 3. Areas that have been legally sanctioned for logging where the primary activity would be stopping such logging must be excluded from the project area. 4. Deforestation and forest degradation in the project area occurs due to one or more of the following categories of drivers (see section II.1.3) • Driver 1: Conversion of forest land to crop-land or grazing land for subsistence and small-scale farming. • Driver 2: Conversion of forest land to settlements • Driver 3: Logging of timber for commercial sale • Driver 4: Logging of timber for local and domestic use

		• Driver 5: Fuel-wood collection or charcoal production • Driver 6: Forest fires No other deforestation driver may be present in the project area7. Following the definition for degradation, degradation may only be included in the baseline if the observed decrease in biomass stocks follows the definition of degradation included in this methodology. More specifically, project proponent(s) must demonstrate that the degradation is long-term in nature and human induced. 5. Accurate data on past land use, land cover, and forest cover are available for at least four points in time in the reference region. More specifically: - It must be demonstrated that the reference region has similar characteristics as the project area and that the same drivers of deforestation are present in the reference region and in the project area according to the procedures included in this methodology. - At least one remote sensing image (i.e., data) from 0-1 years before the project start date, at least one image from 2-5 years before the project start date, at least one image from 6-9 before the project start date, and one image from 10-15 years before the project start date must be available. No images older than 15 years may be used for the historical reference period - Broad LULC classes and forest strata (if forest degradation is included) must be recognized with a minimal accuracy of 70%8. The carbon accounting must be completely symmetrical: if degradation is included in the baseline, regeneration must be included as well. Likewise, deforestation is included in the baseline, and, therefore, increase in forest cover must be included in the baseline as well. 6. Subsequent to the removal or disappearance of carbon in the above ground live biomass pool, carbon in the below ground biomass pool is also removed or disappears within the duration of the project. The removal of the belowground biomass can be caused by anthropogenic activities such as digging, extraction of stump, and burning, or by the natural process of decay and decomposition.
2	VM0009	Methodology for Avoided Mosaic Deforestation of Tropical Forests, v1.0 ***Applicability:*** 1. This methodology was developed for avoiding deforestation and assumes that degradation and deforestation occur as a result of land use conversion to agriculture for the cultivation of non-perennial (annual) crops rather than for commercial timber harvest. This methodology may be used if all

		the drivers and agents of deforestation are consistent with those described in section 6 of this methodology. 2. Agriculture in the reference and leakage areas is permanent and cultivation activities do not shift. 3. Forest land in the project area has qualified as forest as defined by FAO 2010 or that of the definition of forest set by the residing designated national authority (DNA) for the project country for a minimum of 10 years prior to the project start date (VCS, 2008). 4. No biomass is harvested for use in long-lived wood products in the project area under the with-project scenario. Therefore, carbon sequestered in long-lived wood products under the project during any monitoring period may be accounted for as zero. 5. If the soil carbon pool is selected and the default mean rate of soil carbon loss is selected, then the project must be located in a tropical or semi-arid tropical region. 6. Foreign agents of deforestation, if any, are unlikely to shift their activities outside the leakage area.] 7. The project area shall not contain organic or peat soils. 8. A reference area can be delineated meeting the requirements described in section 6.3.1 of this methodology including the minimum size requirement. 9. As of the project start date, historic imagery of the reference region exists with sufficient coverage to meet the requirements of section 6.4.2 of this methodology. 10. Project activities are planned or implemented to mitigate deforestation by addressing the agents and drivers of deforestation as described in section 10.1 of this methodology. 11. The project proponents have access to the leakage area to sample forest degradation (see section 10.3.2). 12. If the lag period for the cumulative leakage model is estimated after the project start date but before the end of the first monitoring period (see section 10.3.3), then activity-shifting leakage has not occurred prior to the estimation of the lag period. 13. Project areas shall not include land designated for legally sanctioned logging activities.

3	VM0011	Methodology for Calculating GHG Benefits from Preventing Planned Degradation, v1.0 ***Applicability:*** Project Type; Improved Forest Management - Logged to Protected Forest; with no removals (e.g. harvesting, planned biomass burning) occurring in the Project Area upon implementation of the actual project (with the exception of felling sample trees for validating or deriving project-specific parameters presented in Section 7.2.4). Condition of the Forest; Intact forest or previously logged forest (also known as forest degraded due to logging) Land within the Project Area must have qualified as forest at least 10 years before the project start date. Type of Forest; Tropical forests including evergreen tropical rainforests, moist deciduous forests, tropical dry forests and tropical upland forests (see Appendix A for definition), except peat swamp forests. Forest Product Type; Harvested wood products i.e., saw log, pulp log and commercially harvested fuel wood (See Appendices A and B.9). Driver of Degradation Legally sanctioned logging (timber and commercially harvested fuel wood) undertaken in accordance with the relevant laws, regulations and codes of practice of the country in which the Methodology is being applied. Baseline Activities to be Displaced Legally sanctioned selective logging for specific forest product types presented above. Project Area; Must be designated, sanctioned or approved by the relevant authority in the host country for the selective logging
4	VM0015	Methodology for Avoided Unplanned Deforestation ***Applicability:*** The methodology has no geographic restrictions and is applicable globally under the following conditions: a) Baseline activities may include planned or unplanned logging for timber, fuel-wood collection, charcoal production, agricultural and grazing activities as long as the category is unplanned deforestation according to the most recent VCS AFOLU requirements. b) Project activities may include one or a combination of the eligible categories defined in the description of the scope of the methodology (table 1 and figure 2). c) The project area can include different types of forest, such as, but not limited to, old-growth forest, degraded forest, secondary forests, planted

		forests and agro-forestry systems meeting the definition of "forest". d) At project commencement, the project area shall include only land qualifying as "forest" for a minimum of 10 years prior to the project start date. e) The project area can include forested wetlands (such as bottomland forests, floodplain forests, mangrove forests) as long as they do not grow on peat. Peat shall be defined as organic soils with at least 65% organic matter and a minimum thickness of 50 cm. If the project area includes a forested wetlands growing on peat (e.g. peat swamp forests), this methodology is not applicable.

Frontier and Mosaic

According to the VCS Program Update of May 24th, 2010 "Mosaic configurations are defined as any landscape in which no patch of forest in the project area exceeds 1000 ha and forest patches are surrounded by anthropogenically cleared land. "Frontier configurations are defined as any landscape in which all forest areas in the project area have no current direct physical connection with areas anthropogenically deforested".

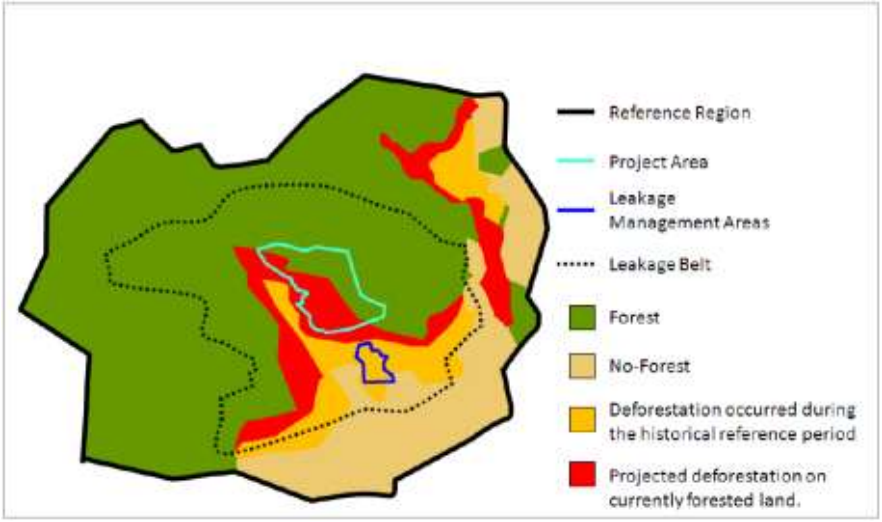

Figure 4. Frontier Configuration

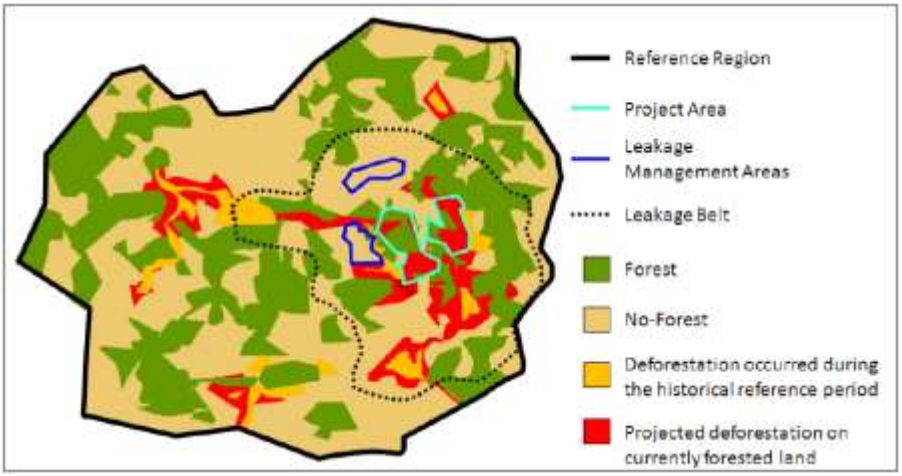

Figure 5. Mosaic Configuration

5.3. Methodology by CCBS

Like mentioned before that the CCBS can not issue a certificate of emission reductions but requires the project to be able to generate GHG emission reductions,. Therefore, the CCBS can be combined with other carbon credit standards, such as CDM and VCS. There is no specific methodology for REDD issued by CCBS, but it is allowed to use the methodology from IPCC GL 2006 or from granted standard such as CDM and VCS.

The CCB guidance can be combined very effectively with carbon accounting standards. However, to earn CCBA approval, projects must satisfy all required criteria in their project documents, including climate benefits, and may optionally also try to satisfy the Gold Level criteria.

1. Community Criteria

- *Net Positive Community Impacts*

The project must generate net positive impacts on the social and economic well-being of communities and ensure that costs and benefits are equitably shared among community members and constituent groups during the project lifetime. Projects must maintain or enhance the High Conservation Values (identified in the standards) in the project zone that are of particular importance to the communities' wellbeing.

- *Offsite Stakeholder Impacts*

The project proponents must evaluate and mitigate any possible social and economic impacts that could result in the decreased social and economic wellbeing of the main stakeholders living outside the project zone resulting from project activities. Project activities should at least 'do no harm' to the wellbeing of offsite stakeholders.

- *Community Impact Monitoring*

The project proponents must have an initial monitoring plan to quantify and document changes in social and economic well-being resulting from the project activities (for communities and other stakeholders). The monitoring plan must indicate which communities and other stakeholders will be monitored, and identify the types of measurements, the sampling method and the frequency of measurement. Since developing a full community monitoring plan can be costly, it is accepted that some of the plan details may not be fully defined at the design stage, when projects are being validated against the standards. This is acceptable as long as there is an explicit commitment to develop and implement a monitoring plan.

2. Biodiversity Criteria

- *Net Positive Biodiversity Impacts*

The project must generate net positive impacts on biodiversity within the project zone and within the project lifetime, measured against the baseline conditions. The project should maintain or enhance any High Conservation Values present in the project zone that are of importance in conserving globally, regionally or nationally significant biodiversity. Invasive species populations must not increase as a result of the project, either through direct use or indirectly as a result of project activities. Projects may not use genetically modified organisms (GMOs) to generate GHG emission reductions or removals. GMOs raise unresolved ethical, scientific and socioeconomic issues. For example, some GMO attributes may result in invasive genes or species.

- *Offsite Biodiversity Impacts*

The project proponents must evaluate and mitigate likely negative impacts on biodiversity outside the project zone resulting from project activities.

- *Biodiversity Impact Monitoring*

The project proponents must have an initial monitoring plan to quantify and document the changes in biodiversity resulting from the project activities (within and outside the project boundaries). The monitoring plan must identify the types of measurements, the sampling method and the frequency of measurement. Since developing a full biodiversity monitoring plan can be costly, it is accepted that some of the plan details may not be fully defined at the design stage, when projects are being validated against the standards. This is acceptable as long as there is an explicit commitment to develop and implement a monitoring plan.

3. Gold Level criteria

- *Climate Change Adaptation Benefits*

The Gold Level Climate Change Adaptation Benefits criterion identifies projects that will provide significant support to assist communities and/or biodiversity in adapting to the impacts of climate change. Anticipated local climate change and climate variability within the project zone could potentially affect communities and biodiversity during the life of the project and beyond. Communities and biodiversity in some areas of the world will be more vulnerable to the negative impacts of these changes due to:

  - vulnerability of key crops or production systems to climatic changes;
  - lack of diversity of livelihood resources and inadequate resources, institutions and capacity to develop new livelihood strategies; and
  - high levels of threat to species survival from habitat fragmentation.

Land-based carbon projects have the potential to help local communities and biodiversity adapt to climate change by: diversifying revenues and livelihood strategies; maintaining valuable ecosystem services such as hydrological regulation, pollination, pest control and soil fertility; and increasing habitat connectivity across a range of habitat and climate types.

- *Exceptional Community Benefits*

The Gold Level Exceptional Community Benefits criterion recognizes project approaches that are explicitly pro-poor in terms of targeting benefits to globally poorer communities and the poorer, more vulnerable households and individuals within them. In so doing, land-based carbon projects can make a significant contribution to reducing the poverty and enhancing the sustainable livelihoods of these groups. Given that poorer people typically have less access to land and other natural assets, this optional criterion requires innovative approaches that enable poorer households to participate effectively in land based carbon

activities. Furthermore, this criterion requires that the project will 'do no harm' to poorer and more vulnerable members of the communities, by establishing that no members of a poorer or more vulnerable social group will experience a net negative impact on their well-being or rights.

- *Exceptional Community Benefits*

The Gold Level Exceptional Community Benefits criterion recognizes project approaches that are explicitly pro-poor in terms of targeting benefits to globally poorer communities and the poorer, more vulnerable households and individuals within them. In so doing, land-based carbon projects can make a significant contribution to reducing the poverty and enhancing the sustainable livelihoods of these groups. Given that poorer people typically have less access to land and other natural assets, this optional criterion requires innovative approaches that enable poorer households to participate effectively in land based carbon activities. Furthermore, this criterion requires that the project will 'do no harm' to poorer and more vulnerable members of the communities, by establishing that no members of a poorer or more vulnerable social group will experience a net negative impact on their well-being or rights.

5.4. Methodology by Plan Vivo

The Plan Vivo Foundation recommends the following external methodologies for guidance in developing REDD+ activities.

Ecometrica Protocol:
Above-ground biomass survey for projects that aim to reduce greenhouse gas emissions from deforestation and forest degradation. This protocol describes the methods to estimate the carbon stocks in biomass at project inception. Since it is not possible to measure every tree in the project area, a sampling approach is necessary. The methodology described ensures that sampling provides a robust estimate of baseline carbon stocks, with minimal reliance on external resources and expertise. Generally this methodology covers to quantify the carbon stocks at the start of the project it is necessary to:
1. define project boundaries and stratify the project area;
2. determine the carbon pools to be measured;
3. carry out the biomass survey; and
4. calculate the carbon stocks per hectare for each stratum

BioCarbon Fund Methodology
For Estimating Reductions of GHG Emissions from Mosaic Deforestation. Conceptual approach of this methodology is based on the AFOLU Guidance Document of the Voluntary Carbon Standard. This methodology is for project

activities that reduce emissions of greenhouse gases (GHG) from mosaic deforestation2 and, where relevant and measurable, enhance carbon stocks of degraded and secondary forests that would be deforested in the absence of the project activity.

The methodology is applicable under the following conditions:

a) At project commencement most of the project area is already accessible to deforestation agents.
b) Baseline activities that may be displaced by the RED project activity include fuelwood collection, charcoal production, agricultural and grazing activities.
c) The project area can include different types of forest, such as old-growth forest, degraded forest, secondary forests, planted forests and agro-forestry systems meeting the definition of "forest".
d) The project activity can include logging activities leading to carbon stock increase in long-lived wood products. However, such activities are excluded or are not significant under the baseline scenario.
e) Changes in the ground water table are excluded in both the baseline and project scenarios.
f) At project commencement, all land within the project area meets the criteria for definition as forest.

The methodology defines three analytical domains from which information on historical deforestation is extracted and projected into the future: a broader reference region, the project area and a leakage belt surrounding or adjacent to the project area. Data from the reference region are used to demonstrate that deforestation will happen in the project area and to estimate the baseline deforestation rate for the project area. Data from the leakage belt are used to set a reference against which to assess any potential future displacement of baseline activities.

The baseline projections of all three domains are revisited after each crediting period and adjusted, as necessary, based on land-use and land-cover changes observed during the past period and monitored changes at the level of agents, drivers and underlying causes of deforestation.

Emissions of non-CO2 gases in the baseline are conservatively omitted, except CH4 and N2O emissions from biomass burning, which can be counted when fire is the main technology used to deforest and when the project proponent considers that ignoring this source of emission would substantially underestimate the *baseline.*

If the RED *project activity* causes a displacement of *baseline* activities into the *leakage belt* and more *deforestation* is detected in this area compared to its

baseline, this will be considered as *leakage*, and the decrease in *carbon stocks* subtracted from the project's net anthropogenic GHG emissions reductions. If *leakage* prevention measures include tree planting, agricultural intensification, fertilization, fodder production and/or other measures to enhance cropland and grazing land areas, then the increase in GHG emissions associated with these activities is estimated and subtracted from the project's net emissions reductions

5.5. Methodology by ACR

ACR has publish methodology related to REDD namely Avoiding Planned Deforestation. This methodology is applicable to all project activities that fall within the AFOLU project category REDD, as defined in the latest version of the ACR Forest Carbon Project Standard, and subcategory Avoiding Planned Deforestation (APD) as defined below. Gains in carbon stock are accounted in areas that are deforested in the baseline

Applicability:

- Land in the project area must qualify as forest as defined in the Forest Carbon Project Standard, for at least 10 years before the project Start Date
- Project Proponents must be able to show control over the project area and ownership of carbon rights for the project area. Land tenure must be clear and uncontested; however, it is not required that the Project Proponent retains land ownership.
- All land areas registered under any other voluntary or regulatory carbon trading scheme must be transparently reported and excluded from the project area. The exclusion of land in the project area from any other carbon trading scheme shall be monitored over time and reported in the monitoring reports.
- Leakage avoidance activities shall not include agricultural lands that are flooded to increase production (e.g. paddy rice), nor intensifying livestock production through use of feed-lots or manure lagoons.
- Conversion of forest lands to a deforested condition must be legally permitted.
- Credible evidence and documentation must show that project lands would have been converted to non-forest use if not for the APD project.
- The total wood volume to be extracted (as timber or for fuel or charcoal) in the baseline must be known.

VI. SELECTING SUITABLE METHODOLOGY FOR MBNP

6.1. Selection of MBNP as DA REDD+

An ITTO funded activity PD 519/08 Rev.1 (F): Tropical Forest Conservation For Reducing Emissions From Deforestation And Forest Degradation And Enhancing Carbon Stocks In Meru Betiri National Park, Indonesia, has been applied in Indonesia since 2010 as a demonstration activity in conservation area to support readiness phase of REDD+.

Meru Betiri National Park (MBNP) located in southern part of East Java is one the National Parks which has been selected as the project site for ITTO activities. The total area of the Park is ± 58000 ha consisting of various vegetation types from mountainous to coastal areas, see figure below. 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.

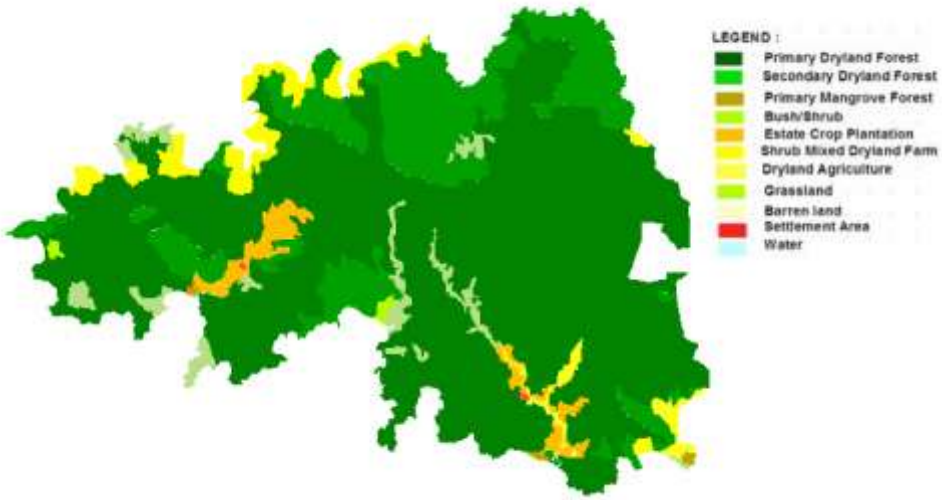

Figure 6. Land use of Meru Betiri National Park in 2010 (FORDA, 2010).

MBNP has been selected as the site for demonstration activities (DA) of REDD through ITTO project. MBNP as ITTO project for 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. MBNP is expected to provide lesson learn on how REDD+ activity is

conducted in a conservation area. As a national park the area is designated for conservation purpose therefore planned deforestation would not be occur. However, MNBP is eligible for REDD+ project because the area has been experiencing unplanned deforestation and degradation.

Based on remote sensing data analysis, deforestation rate in MBNP has been quite low. However, there is threat for forest degradation due to illegal logging and encroachment. As this conservation area has relatively high carbon stock, methodology to support REDD+ especially in conservation and avoiding degradation is important to be explored. While waiting for the compliant market mechanism to be applied, some voluntary standards are available to follow for carbon trading. Lesson learnt from this conservation area, especially related to methodological aspect for degradation and conservation would provide useful information for negotiation

6.2. Methodology Selection

In order to select suitable methodology for REDD implementation in MBNP, assessment on the ***applicability*** of existing methodologies above is necessary.

VCS provides the most for methodology that can be applied, the following decision tree is used to identify the type of VCS-eligible REDD project activity:

Is the forest land expected to be converted to non-forest land in the baseline case?			
YES		**NO**	
Is the land legally authorized and documented to be converted to non-forest?		Is the forest expected to degrade by fuel wood extraction or charcoal production, in the baseline case	
YES	**NO**	**YES**	**NO**
Avoided planned deforestation	Avoided unplanned deforestation	Avoided forest degradation	Proposed project is not a VCS REDD[3] activity

[3]) If degradation is occurring through legal or sanctioned timber production then this is an IFM eligible activity

Based on above decision tree, MBNP is eligible for REDD project under avoided unplanned deforestation or avoided degradation activities.

Methodology VM0006 for Carbon Accounting in Project Activities that Reduce Emissions from Mosaic Deforestation and Degradation, v1.0 is applicable for the project area with a minimal deforestation rate in the reference region of 0.5% during the historical reference period. Based on the study from FORDA in

2010, the rate of deforestation of MBNP is only 0.03-0.08%, much less than 0.5%. therefore this methodology is not suitable.

Methodology VM0009 for Avoided Mosaic Deforestation of Tropical Forests, v1.0. it seems that this methodology is match for MBNP, but unfortunately this methodology is conservative ignored the degradation under the without-project scenario and therefore this methodology only provides baseline scenarios for deforestation. It means it is not suitable for MBNP.

Methodology VM0011 for Calculating GHG Benefits from Preventing Planned Degradation, v1.0. This methodology focuses on degradation activities due to logging activities. The project type should improved forest management - Logged to Protected Forest. Project Area; must be designated, sanctioned or approved by the relevant authority in the host country for the selective logging. Logging is not allowed in MBNP, therefore this methodology in not match.

Methodology VM0015 for Avoided Unplanned Deforestation with its applicability **is suitable** for implementing REDD in MBNP. Baseline activities may include planned or unplanned logging for timber, fuel-wood collection, charcoal production, agricultural and grazing activities as long as the category is unplanned deforestation according to the most recent VCS AFOLU requirements. The project area can include different types of forest, such as, but not limited to, old-growth forest, degraded forest, secondary forests, planted forests and agro-forestry systems meeting the definition of "forest".

CCBS is not providing specific methodology for REDD, but they can complement the other methodology from other standards and make it more valuable. Guideline that provided from CCBS Project Design Standards can be used to complete the methodology from VCS or others.

Plan Vivo is still preparing its own methodology for REDD. For this moment, Plan Vivo refers methodology from BioCarbon Fund which is similar with the methodology from VCS .

ACR has published specific methodology for REDD which is only applicable for planned deforestation activities, by its name it can be assumed that it is not suitable for REDD activities in MBNP, one of its applicability is conversion of forest lands to a deforested condition must be legally permitted, which is not happened in MBNP.

VII. GENERAL INFORMATION OF MBNP FOR PROJECT DESIGN DOCUMENT

7.1. Boundaries Definition

For MBNP, project boundary for the REDD activity will include as follows:

a) Spatial boundaries;
b) Project crediting period;
c) Carbon pools; and
d) Sources of emissions of greenhouse gases (other than carbon stock changes).

a) Spatial boundaries**:**

The spatial boundaries of a project is used to facilitate accurate measuring, monitoring, accounting and verifying of the project's emission reductions/removals. For REDD+ project the boundary is the boundary of MBNP based on the Decision Letter No.277/Kpts-IV/1997 that was issued by Ministry Forestry with total area of 58,000 ha. Detailed geographical location is 113º38'38" - 113º58'30" E and 8º20'48" - 8º33'48"S.

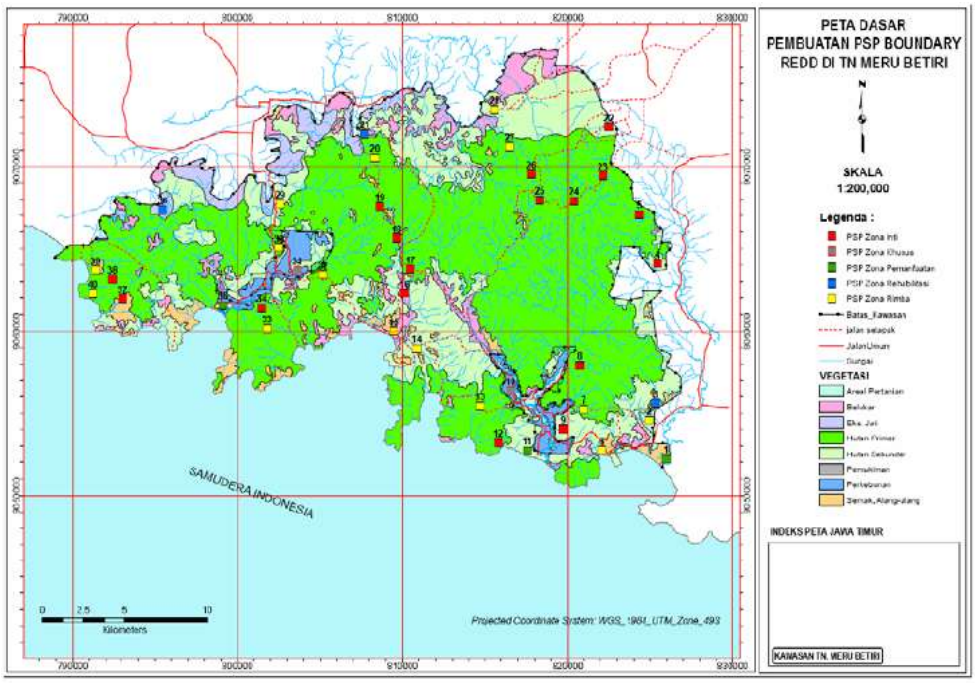

Figure 7. Map of MBNP.

Following the selected methodology, beside project area, PP also should prepare a reference region, leakage belt, and leakage management area as figure below.

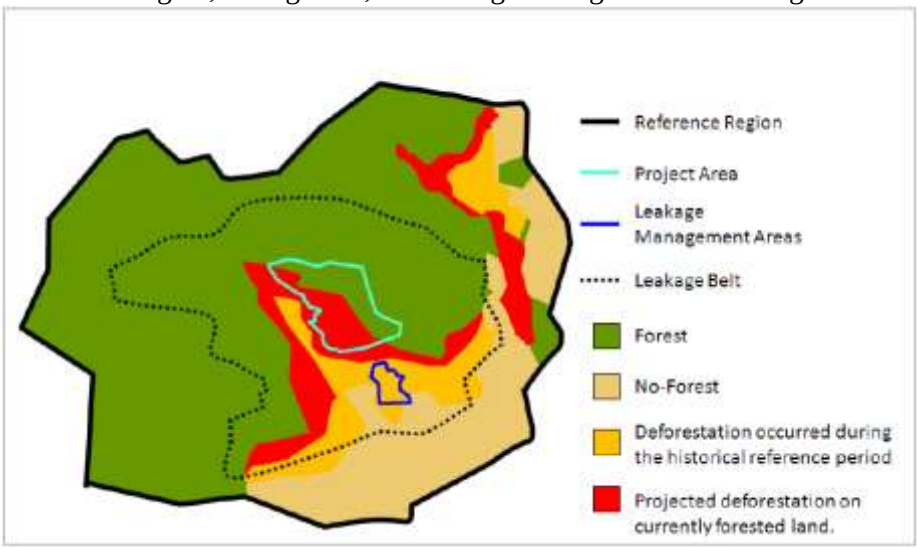

Figure 8. Configuration of project boundaries.

b) **The project crediting period**: This is the period of time for which the net GHG emission reductions or removals will be verified, which under the VCS is equivalent to the project lifetime. The project must have a robust operating plan covering this period. The project crediting period for REDD projects shall be between 20 and 100 years. For MBNP, the crediting period would be > 20 years. However, baselines must be reassessed and validated at least every 10 years, and can take place at the same time as the VCS verification.

c) **The sources and sinks, and associated types of GHGs (i.e. CO2, N2O, CH4), the project will affect**: For MBNP, significant sources include illegal logging, forest encroachment and might be fire. Sources of sinks include forest growth and sink enhancement in rehabilitation area. Other GHG sources may be considered insignificant and do not have to be accounted for if together such omitted decreases in carbon pools and increases in GHG emissions amount to less than 5% of the total CO2-eq benefits generated by the project.

d) **The carbon pools that the project will consider:** For REDD in MBNP, carbon pools to be considered include : abg for trees and non-trees and DOM for wood products.

7.2. Baseline (Estimation Of The Baseline Net GHG Emissions And Removals)

Activity data are required to develop the baseline emissions from carbon stock changes. It includes estimation of the annual rate of deforestation and degradation and in total in the baseline during the crediting period. Data required include: annual rate of deforestation and degradation (logging, encroachment, fire, pest and diseases).

The emission factors are equal to the difference, expressed in tC/ha, between the carbon stocks found in the project area at project start in all relevant pools and those resulting from degradation activities in the baseline. Emission factors for MBNP are gained from data of carbon stock in each forest type in every zone. 40 PSP have been established representing each zone in MBNP.

7.3. Additionality

All REDD+ projects need to demonstrate that they are additional, anthropogenic emissions of GHGs by sources are reduced below those that would have occurred in the absence of the project activity; and that the actual net GHG removals by sinks are increased above the sum of the changes in carbon stocks in the carbon pools within the project boundary that would have occurred in the absence of the project.

Baseline and monitoring methodologies must include methods to analyze the additionality of projects, and project design documents require the application of such methods to the proposed project activities. A number of methodological tools and approaches are available to demonstrate and assess the additionality of projects i.e tool for the Demonstration and Assessment of Additionality in VCS Agriculture, Forestry and Other Land Use (AFOLU) Project Activities, v1.0

7.4. Estimating Project Emissions

Ex-ante emission estimates are carried out based on the expected effectiveness of the proposed measures to reduce emissions from deforestation and/or increase carbon stocks during the crediting period. In the VCS, the *ex-ante* project scenario serves to determine the project's carbon benefits, which are used for the identification of significant emission sources and carbon stock changes in pools using the 'CDM A/R significance tool'. Moreover, methods applied to estimate the project scenario *ex-ante* are also used to obtain *ex-post* estimates.

7.5. Leakage

Leakage is defined as the net increase of anthropogenic emissions of GHGs which occurs outside the project boundary, and which can be measured and is directly attributable to project activities. Leakage emissions must be deducted from the emission reductions generated by the project in order to determine its net carbon benefits.

Leakage occurs when a RED project activity displaces deforestation agents outside the project area instead of providing them with alternative livelihoods. To avoid the displacement of deforestation outside the project boundary, leakage prevention measures should be designed, implemented and monitored. If such measures include tree planting, agricultural intensification, fertilization, fodder production and/or other measures to stabilize cropland and grazing land areas, then the increase in GHG emissions associated with these activities must be estimated and subtracted from the project's net emissions reductions.

Leakage in RED project activities has three main components:

- Displacement of deforestation agents from the project area to the leakage belt, leading to a possible decrease in carbon stocks and increase in GHG emissions in the leakage belt;
- Increase in GHG emissions due to leakage prevention measures implemented in the leakage belt; and
- Increase in CO2 emissions due to the increased consumption of fossil fuels for implementing forest protection, monitoring and surveillance tasks within the leakage belt (otherwise, these would be project emissions).

These potential leakage sources should be assessed, minimized, monitored and accounted for when estimating net emission reductions. Some available references include: the 'Methodology for estimating reductions of GHG emissions from frontier deforestation' developed by Amazonas Sustainable Foundation144, the 'Baseline and monitoring methodology for project activities that reduce emissions from deforestation on degrading land' designed by Terra Global Capital, LLC.145, The module 'LK-ASU Estimation of emissions from activity shifting for avoided unplanned deforestation v1.0'146,

7. 6. Estimating And Monitoring Net Project Greenhouse Gas Benefits

Guidance for estimating carbon stocks and changes in carbon stocks (including recommendations for: taking emissions of non-CO2 gases into account, quality assurance, quality control, and uncertainty analysis) is provided in VCS standard Approved VCS Module VMD0015 Version 1.1, 9 September 2011 REDD Methodological Module: Methods for monitoring of greenhouse gas emissions and removals (M-MON), sectoral Scope 14.

Monitoring of a RED project activity will involve estimating Land-Use and Land-Cover (LU/LC) changes using remote-sensing technologies and estimating carbon stock changes and changes in GHG emissions in the areas subject to LU/LC change using field sampling techniques. Increases in biomass over time would be creditable as long as they do not imply a conversion from non-forest to forest, in which case they would fall under the ARR project category.

7.7. Crediting Period

The crediting period for RED project activities can be specified by project developers, with a minimum of 20 years and maximum of 100 years. However, baselines must be re-assessed and validated at least every 10 years, and can take place at the same time as the VCS verification.

7.8. Challenges for Application of REDD in MBNP

Based on the preliminary results it showed that the net emissions and carbon emissions that occur in Betiri Meru National Park has been very small compared with the existing carbon absorption. If historical data of carbon emissions will be used as the baseline or reference level, the reduction of emission would be very small. Moreover, there is also small additionality in the presence of a REDD mechanism. Therefore, attention should be emphasized on :

- Biodiversity; because without REDD the forests have been maintained properly, the additionality can be obtained from the impact of carbon stocks increasing and carbon emission reductions to the value of biodiversity conservation and hydrological systems.
- Future emission prediction; Making the scenarios of threat level (population growth and economic) against emission level prediction in Meru Betiri National Park in the future. This scenario will be performed on the project boundary of Meru Betiri National Park and consideration of possible expansion of project boundary in the vicinity of Meru Betiri National Park.

In the voluntary carbon markets the term ‘conservation’ has traditionally referred to activities reducing emissions from deforestation and degradation and therefore fit in the definition of REDD. However, in the context of the ongoing UNFCCC negotiations the ‘conservation of carbon stocks’ has a different meaning, since it has not been associated to an imminent emission of GHGs to the atmosphere due to forest degradation or loss, but to the recognition of continuous and successful national-level forest preservation efforts started in the

past (for example, those carried out by India and Costa Rica) and to the generation of international incentives to ensure that such forests will remain protected in the future (e.g. from international and national displacement of emissions due to large-scale REDD implementation).

CLOSURE AND RECOMMENDATION

Based on the methodology review, the methodology VM0015 methodology for avoided unplanned deforestation from VCS is the most suitable for implementing REDD+ in MBNP. This methodology is applicable for activities that included as planned or unplanned logging for timber, fuel-wood collection, charcoal production, agricultural and grazing activities as long as the category is unplanned deforestation according to the most recent VCS AFOLU requirements. These activities are exist in MBNP.

Beside using the methodology VM0015, actually CVS also provides a REDD methodology framework (REDD- MF). This 'REDD Methodology Framework' is guideline to develop specific REDD methodology. It provides the generic functionality of the methodology, which frames pre-defined modules and tools that perform a specific function. It constitutes, together with the modules and tools it calls upon, a complete REDD baseline and monitoring methodology. The modules and tools called upon in this document are applicable to project activities that reduce emissions from planned (APD) and unplanned (AUDD) deforestation, and for activities to reduce emissions from forest degradation. But, since the specific methodology that match with MBNP is already exist (VM0015), then it is recommended to use it.

In order to make the REDD Project is more satisfied, the CCBS can complement the Project Design Document that will be developed. The CCBS requires the project will bring significant benefits for society and biodiversity within and surrounding the project site. The CCBS cannot issue a certificate of emission reductions, but CCBS can bring the credit generated by the project has more value and will also increase the selling price of carbon credits in carbon markets. Therefore it is recommended to register the MBNP REDD project in CCBS.

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Appendix 1. PDD Template for REDD project

VCS Project Description Template

Instructions for completing the project description:

TITLE PAGE: All items in the box at the bottom of the title page must be completed using Arial 10pt, black, regular (non-italic) font. This box must appear on the title page of the final document. Project descriptions may also feature the project title and preparers' name, logo and contact information more prominently on the title page, using the format below (Arial 24pt and Arial 11pt, black, regular font).

PROJECT DESCRIPTION: Instructions for completing the project description can be found under the section headings in this template. All sections must be completed using Arial 10pt, black, regular (non-italic) font. Sections which are not applicable may be left blank but should NOT be deleted from the final document.

All instructions, including this introductory text, should be deleted from the final document.

PROJECT TITLE

Logo (optional)
Document Prepared By (individual or entity)
Contact Information (optional)

Project Title	*Name of project*
Version	*Version number of this document*
Date of Issue	*DD-Month-YYYY this version of the document issued*
Prepared By	*Individual or entity that prepared the document*
Contact	*Physical address, telephone, email, website*

Table of Contents

Insert table of contents

1 PROJECT DETAILS

1.1 Summary Description of the Project

Provide a summary description of the project.

1.2 Sectoral Scope and Project Type

Indicate the sectoral scope(s) applicable to the project, the AFOLU project category and activity type (if applicable), and whether the project is a grouped project.

1.3 Project Proponent

Provide contact information and roles/responsibilities for the project proponent(s).

1.4 Other Entities Involved in the Project

Provide contact information and roles/responsibilities for any other entities involved in the development of the project.

1.5 Project Start Date

Indicate the project start date, specifying the day, month and year.

1.6 Project Crediting Period

Indicate the project crediting period, specifying the day, month and year for the start and end dates and the total number of years.

1.7 Project Scale and Estimated GHG Emission Reductions or Removals

Indicate the scale of the project (project or mega project) and the estimated annual GHG emission reductions or removals for the project crediting period.

Project	
Mega-project	

Years	Estimated GHG emission reductions or removals (tCO2e)
Year A (eg, 2011)	
Year B	
Year C	
Year...	
Total estimated ERs	
Total number of crediting years	
Average annual ERs	

1.8 Description of the Project Activity

Describe the project activity or activities (including the technologies or measures employed) and how it/they will achieve net GHG emission reductions or removals. Indicate the lifetime of the project activity(s).

1.9 Project Location

Indicate the project location and geographic boundaries (if applicable).

1.10 Conditions Prior to Project Initiation

Describe the conditions existing prior to project initiation and demonstrate that the project has not been implemented to generate GHG emissions for the purpose of their subsequent reduction, removal or destruction.

1.11 Compliance with Laws, Statutes and Other Regulatory Frameworks

Identify and demonstrate compliance of the project with all and any relevant local, regional and national laws, statutes and regulatory frameworks.

1.12 Ownership and Other Programs

1.12.1 Proof of Title

Provide evidence of proof of title.

1.12.2 Emissions Trading Programs and Other Binding Limits

Where applicable, demonstrate that net GHG emission reductions or removals generated by the project will not be used for compliance with an emissions trading program or to meet binding limits on GHG emissions.

1.12.3 Participation under Other GHG Programs

Indicate whether the project has been registered, or is seeking registration under any other GHG programs. Where the project has been registered under any other GHG program, provide the registration number and details.

1.12.4 Other Forms of Environmental Credit

Demonstrate that the project neither has nor intends to generate any other form of GHG-related environmental credit for GHG emission reductions or removals claimed under the VCS Program, or that any such credit has been or will be cancelled from the relevant program.

1.12.5 Projects Rejected by Other GHG Programs

Indicate whether the project has been rejected by any other GHG programs. Where the project has been rejected, provide the relevant information.

1.13 Additional Information Relevant to the Project

Eligibility Criteria

For grouped projects, identify eligibility criteria for inclusion of new instances of each project activity.

Leakage Management

Where applicable, describe the leakage management plan and implementation of leakage and risk mitigation measures.

Commercially Sensitive Information

Indicate whether any commercially sensitive information has been excluded from the public version of the project description and briefly describe the items to which such information pertains.

Further Information

Include any additional relevant legislative, technical, economic, sectoral, social, environmental, geographic, site-specific and/or temporal information that may have a bearing on the eligibility of the project, the net GHG emission reductions or removals, or the quantification of the project's net GHG emission reductions or removals.

2 APPLICATION OF METHODOLOGY

2.1 Title and Reference of Methodology

Provide the title, reference and version number of the methodology or methodologies applied to the project.

2.2 Applicability of Methodology

Demonstrate and justify that the project activity(s) meet the applicability conditions of the methodology(s) applied to the project.

2.3 Project Boundary

Define the project boundary and identify the relevant GHG sources, sinks and reservoirs for the project and baseline scenarios (including leakage if applicable).

Source		Gas	Included?	Justification/Explanation
Baseline	Source 1	CO_2		
		CH_4		

Source		Gas	Included?	Justification/Explanation
		N_2O		
		Other		
	Source 2	CO_2		
		CH_4		
		N_2O		
		Other		
Project	Source 1	CO_2		
		CH_4		
		N_2O		
		Other		
	Source 2	CO_2		
		CH_4		
		N_2O		
		Other		

2.4 Baseline Scenario

Identify and justify the baseline scenario.

2.5 Additionality

Demonstrate and assess the additionality of the project, undertaken in accordance with the applied methodology.

2.6 Methodology Deviations

Describe and justify any methodology deviations.

3 QUANTIFICATION OF GHG EMISSION REDUCTIONS AND REMOVALS

3.1 Baseline Emissions

Describe the procedure for quantification of the baseline emissions and/or removals. Include all relevant equations.

3.2 Project Emissions

Describe the procedure for quantification of the project emissions and/or removals. Include all relevant equations.

3.3 Leakage

Describe the procedure for quantification of the leakage emissions. Include all relevant equations.

3.4 Summary of GHG Emission Reductions and Removals

Describe the procedure for quantification of net GHG emission reductions and removals. Include all relevant equations For AFOLU projects, include net change in carbon stocks.

Provide the ex-ante calculation (estimate) of baseline emissions/removals, project emissions/removals, leakage emissions and net emission reductions and removals, using the table below:

Years	Estimated baseline emissions or removals (tCO2e)	Estimated project emissions or removals (tCO2e)	Estimated leakage emissions (tCO2e)	Estimated net GHG emission reductions or removals (tCO2e)
Year A				
Year B				
Year C				
Year...				
Total				

4 MONITORING

4.1 Data and Parameters Available at Validation

Describe data and parameters available at validation using the following table (copy table for each data unit/parameter).

Data Unit / Parameter:	
Data unit:	
Description:	
Source of data:	
Value applied:	
Justification of choice of data or description of measurement methods and procedures applied:	
Any comment:	

4.2 Data and Parameters Monitored

Describe data and parameters monitored subsequent to validation using the following table (copy table for each data unit/parameter).

Data Unit / Parameter:	
Data unit:	
Description:	
Source of data:	
Description of measurement methods and procedures to be applied:	*Identify how the data/parameter is measured*
Frequency of monitoring/recording:	*Identify measurement and recording frequency*
Value applied:	*Provide estimated value for the purpose of calculating ex-ante GHG emission reductions or removals*
Monitoring equipment:	*Identify equipment used to monitor the data/parameter including type, accuracy class, serial number of equipment*
QA/QC procedures to be applied:	*Identify calibration information such as frequency, date of last calibration and validity*

Calculation method:	*If applicable*
Any comment:	

4.3 Description of the Monitoring Plan

- *Describe the monitoring plan.*
- *Identify organizational structure, responsibilities and competencies.*
- *Describe methods for generating, recording, storing, aggregating, collating and reporting data on monitored parameters.*
- *Describe procedures for handling internal auditing and non-conformities.*

Line diagrams may be used to display the GHG collection and management system.

5 ENVIRONMENTAL IMPACT

Summarize any environmental impact assessments carried out with respect to the project, where applicable.

6 STAKEHOLDER COMMENTS

Summarize relevant outcomes from stakeholder consultations and mechanisms for on-going communication.